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May 15, 2020

Mark D. Marini, Secretary
Department of Public Utilities
One South Station, 5th Floor
Boston, MA 02110

Re: NSTAR Electric Company d/b/a Eversource Energy 2019 Grid Modernization Cost Recovery – D.P.U. 20-54

Dear Secretary Marini:

Over the past several years, the Department of Public Utilities (the “Department”) has engaged in a wide-ranging and comprehensive investigation into the modernization of the Massachusetts electric grid. After several proceedings and stakeholder input, the Department directed NSTAR Electric Company d/b/a Eversource Energy (“Eversource” or the “Company”), to develop and invest in an innovative and comprehensive Grid Modernization Plan (“GMP”) designed to advance achievement in four grid modernization objectives. On May 10, 2018, the Department issued an order approving in part and modifying in part the Company’s GMP. NSTAR Electric Company d/b/a Eversource Energy d/b/a Eversource Energy, D.P.U. 15-122 (2018) (“D.P.U. 15-122”). In its Order, the Department determined that it was appropriate for Eversource to recover the costs of its GMP through a grid modernization cost recovery mechanism (“Grid Modernization Factor” or “GMF”). Consistent with this, the Department directed the Company to file an annual GMF rate adjustment and reconciliation filing on or before May 15th of each year for rates effective July 1st. Reconsideration Order, D.P.U. 15-122-A, at 10 (February 7, 2019).

Consistent with the Reconsideration Order, Eversource hereby files its 2020 GMF rate adjustment and reconciliation filing comprised of: (1) actual, eligible preauthorized expenditures from the prior GMP investment year, in this instance 2019; and (2) a reconciliation component in the second year and beyond. D.P.U. 15-122, at 225.

Specifically, the Company’s filing encompasses the following elements:

- (1) The Joint Direct Testimony and Exhibits of Giuseppe A. Perniciaro, Program Manager for the Massachusetts GMP and Kevin M. Boughan, Manager, Research & Business Development responsible for managing the Company’s electric vehicle (“EV”) development strategies, in support of the Company’s implementation of the GMP in 2019; and

- (2) The Joint Direct Testimony and Exhibits of Robert W. Frank, Director, Revenue Requirements, Massachusetts for Eversource Energy Service Company, and John G. Griffin, Director of Corporate Performance Management for the Eversource Energy, in support of the revenue requirement and supporting documentation associated with plant-in-service for investment year 2019, for rates effective July 1, 2020.

Also enclosed is a Motion for Protective Treatment for Exhibits ES-JGG-5 (CONFIDENTIAL), ES-JGG-6a (CONFIDENTIAL) and ES-JGG-6b (CONFIDENTIAL) and a Statement of Critical Energy Infrastructure Information ("CEII") for Exhibit ES-JGG-5 (CONFIDENTIAL-CEII).

Thank you for your attention to this matter. Please contact me with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Danielle C. Winter", with a stylized flourish at the end.

Danielle C. Winter, Esq.

Enclosures

cc: Tina Chin, Esq., Hearing Officer
Daniel Licata, Esq., Hearing Officer
Greggory Wade, Esq., Hearing Officer
Nathan Forster, Assistant Attorney General

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

	)	
NSTAR Electric Company d/b/a Eversource)	)	
Energy 2019 Grid Modernization Plan)	)	D.P.U. 20-54
Cost Recovery Filing)	)	
	)	

**MOTION OF NSTAR ELECTRIC COMPANY d/b/a EVERSOURCE ENERGY
FOR PROTECTIVE TREATMENT OF CONFIDENTIAL INFORMATION**

I. INTRODUCTION

Now comes NSTAR Electric Company d/b/a Eversource Energy (“Eversource” or the “Company”) to hereby request that the Department of Public Utilities (the “Department”) grant protection from public disclosure of certain confidential and proprietary information submitted in this proceeding in accordance with G.L. c. 25, § 5D.

II. BACKGROUND

On May 15, 2020, the Company submitted its 2019 Grid Modernization Plan Cost Recovery Filing (the “Filing”) for rates effective July 1, 2020. In support of the Filing for cost recovery, the Company provided external contractor invoices supporting the Operations & Maintenance (“O&M”) expense charged to the Grid Modernization Plan (“GMP”), that are eligible for recovery through the Grid Modernization Factor (“GMF”). Accordingly, Eversource hereby requests that the Department, pursuant to G.L. c. 25, §5D and 220 C.M.R. § 1.04(5)(e), grant protection from public disclosure certain confidential, competitively sensitive, and proprietary information submitted in connection with the above-captioned proceeding. The Company requests that the Department protect from public disclosure the pricing and invoice information in Exhibits ES-JGG-6a (CONFIDENTIAL) and ES-JGG-6b (CONFIDENTIAL), which contain the summaries

and supporting invoices for the GMF relating to costs involving external contractor and vendor costs, and Exhibit ES-JGG-5 (CONFIDENTIAL), which contains bid proposals from outside vendors (the “Confidential Exhibits”).

III. LEGAL STANDARD

Confidential information may be protected from public disclosure in accordance with G.L. c. 25, § 5D, which states in part that:

The [D]epartment may protect from public disclosure, trade secrets, confidential, competitively sensitive or other proprietary information provided in the course of proceedings conducted pursuant to this chapter. There shall be a presumption that the information for which such protection is sought is public information and the burden shall be on the proponent of such protection to prove the need for such protection. Where the need has been found to exist, the [D]epartment shall protect only so much of the information as is necessary to meet such need.

In interpreting the statute, the Department has held that:

. . . [T]he burden on the company is to establish the need for protection of the information cited by the company. In determining the existence and extent of such need, the Department must consider the presumption in favor of disclosure and the specific reasons why disclosure of the disputed information benefits the public interest.

The Berkshire Gas Company et al., D.P.U. 93-187/188/189/190, at 16 (1994) as cited in Hearing Officers Ruling On the Motion of Boston Gas Company for Confidentiality, D.P.U. 96-50, at 4 (1996).

In practice, the Department has often exercised its authority to protect sensitive market information. For example, the Department has determined specifically that competitively sensitive information, such as price terms, are subject to protective status:

The Department will continue to accord protective status when the proponent carries its burden of proof by indicating the manner in which the price term is competitively sensitive. Proponents generally will face a more difficult task of overcoming the statutory presumption against the disclosure of other terms, such as the identity of the customer.

Standard of Review for Electric Contracts, D.P.U. 96-39, at 2, Letter Order (August 30, 1996). See also Colonial Gas Company, D.P.U. 96-18, at 4 (1996) (the Department determined that price terms were protected in gas supply contracts and allowed Colonial Gas Company's request to protect pricing information including all "reservation fees or charges, demand charges, commodity charges and other pricing information").

Moreover, the Department has recognized that competitively sensitive terms in a competitive market should be protected and that such protection is desirable as a matter of public policy:

The Department recognizes that the replacement gas purchases . . . are being made in a substantially competitive market with a wide field of potential suppliers. This competitive market should allow LDC's to obtain lower gas prices for the benefit of their ratepayers. Clearly the Department should ensure that its review process does not undermine the LDC's efforts to negotiate low cost flexible supply contracts for their systems. The Department also recognizes that a policy of affording contract confidentiality may add value to contracts and provide benefits to ultimate consumers of gas, the LDC's ratepayers, and therefore may be desirable for policy reasons.

The Berkshire Gas Company et al., D.P.U 93-187/188/189/190, at 20 (1994).

IV. BASIS FOR CONFIDENTIALITY

A. Negotiated Pricing

The Company seeks protection from public disclosure of negotiated pricing and financial terms contained in the Confidential Exhibits ES-JGG-6a and ES-JGG-6b. The terms contained in the Confidential Exhibits ES-JGG-6a and ES-JGG-6b are negotiated and proprietary to the Company and its counterparties. There are several factors that argue in support of a finding by the Department that these negotiated terms and pricing information should be granted protective treatment. These factors go to both the business interests of the Company, as well as to the counterparties, and to the Company's customers

who bear the cost of negotiated contracts.

The price and negotiated rate terms included in the Confidential Exhibits ES-JGG-6a and ES-JGG-6b were the result of significant negotiation between the Company and the contract counterparties. If the Department were to require the disclosure of these competitively sensitive pricing and rate terms in this docket, the Company (and other utilities in the Commonwealth) would likely experience substantial difficulty in the future in negotiating successfully with potential contract partners; particularly in terms of getting potential vendors and negotiating partners to agree to a favorable contract price as compared to other customers of the contract partner. A decision requiring the Company to disclose pricing and negotiated rate terms in this proceeding would put potential vendors and negotiating partners on notice that their pricing information and other negotiated terms may be disclosed to the public in the Department's approval process, including persons who are seeking to procure similar services from the vendor. As a result, the disclosure of this information would have a chilling effect on the Company's ability to: (1) attract contract partners who may fear that the Department will ultimately release proprietary pricing data to their other customers; and (2) secure attractive pricing from contract partners for the benefit of the Company's customers.

The Department has protected sensitive pricing and other negotiated terms from public disclosure historically because the public release of negotiated terms discloses the very types of information that the Department has previously and consistently held to be confidential. See Boston Gas Company and Colonial Gas company each d/b/a National Grid, D.P.U. 15-129, Oct. 30, 2015 Stamp Approval; Boston Gas Company and Colonial Gas Company each d/b/a National Grid, D.P.U. 15-130, Oct. 29, 2015 Stamp Approval

(specifically approving Motions for Confidential Treatment seeking protection for negotiated pricing and contract terms); see e.g., Colonial Gas Company d/b/a National Grid, D.P.U. 17-GC-06, Letter Order at 3-4 (2017) (granting protective treatment for the pricing and related financial terms in a special contract filing). The Department has recognized that release of negotiated pricing information would seriously undermine the Company's negotiating position in a competitive market, and thus, jeopardize the ability of the Company to ensure that customers are being served by the lowest cost supply option. See, e.g., Western Massachusetts Electric Company, D.T.E. 99-101, at 3 (2002), citing Boston Edison Company, D.T.E. 99-16 (1999); Western Massachusetts Electric Company, D.T.E. 99-56 (1999). See also Canal Electric Company/Cambridge Electric Light Company/Commonwealth Electric Company, D.T.E. 02-34 (Tr. A at 19 (June 12, 2002)) and Cambridge Electric Light Company, D.T.E. 01-94 (May 9, 2002 Approval by the Department of Amended Motion of Cambridge Electric Light Company for a Protective Order).

The Department's general practice for protecting price information in contracts is to grant such protection subject to a "sunset" provision, after which the proponent of protective treatment may seek an extension upon a showing of good cause. See e.g., National Grid, D.P.U. 11-09 (2012). The Company requests that the Department apply this precedent to the Confidential Exhibits ES-JGG-6a and ES-JGG-6b. Pursuant to Department precedent, the Company seeks protection for the competitively sensitive information for a period of three years from the date that a final Order is issued in this case, subject to further protection upon a showing that continued confidential treatment is warranted and appropriate. National Grid, D.P.U. 09-32 (April 16, 2010 Hearing Officer

Memorandum at 6). To the best of the Company's knowledge, the terms and price information in the Confidential Exhibits ES-JGG-6a and ES-JGG-6b is not otherwise available in the public domain.

B. Responses to the Company's Requests for Proposals

The Company is seeking confidential treatment for the confidential pricing information based on competitive bid responses produced in the Confidential Exhibit ES-JGG-5. The pricing information contained in the Confidential Exhibit ES-JGG-5 should be protected by the Department because it contains competitively sensitive pricing information provided in response to a request for proposals process. Specifically, the Confidential Exhibit ES-JGG-5 contains references to the terms, rates and fees that the Company's consultants and vendors have offered the Company for their professional services in a competitive market. The Department should protect such terms and rate information from public disclosure because such information is competitively sensitive. The Department has previously found that the billing rates of consultants and vendors are confidential. See New England Gas Company, D.P.U. 08-35 (approving October 22, 2008 and December 10, 2008 motions for protective treatment of confidential bid information and billing rates); Boston Gas Co., D.T.E. 03-40, at 3 (approving all motions for protective treatment of confidential information filed in this proceeding by Boston Gas, including the motion filed on August 11, 2003 related to consultants' billing rates).

Disclosure of the pricing information contained in the Confidential Exhibit ES-JGG-5 to the public will place the Company's consultants and service providers in a competitive disadvantage vis-à-vis their respective competitors because such competitors would have information by which to base any future bids for providing services to the

Company. Moreover, disclosure of such information may place the Company's consultants and service providers at a competitive disadvantage with respect to their existing and potential clients with respect to negotiating fees for services. This result would disadvantage the Company to the extent that the Company's consultants and service providers determine in the future not to bid on the Company's requests for services because of the potential competitive disadvantages that may arise should they do so. Ultimately, customers would be negatively impacted if the Company's ability to secure necessary expertise at reasonable prices was somehow compromised. Such protection is consistent with the treatment afforded by the Department regarding the same type of information provided in other rate cases. Bay State Gas Company, D.P.U. 15-50 (2015) (Hearing Officer's December 9, 2015 Stamp Approval); Bay State Gas Company, D.P.U. 13-75 (2013) (Hearing Officer's June 6, 2013 Stamp Approval) and Bay State Gas Company, D.P.U. 12-25 (2012) (Hearing Officer's August 2, 2012 Stamp Approval).

The Department has recognized that release of bid information, in particular, would seriously undermine the Company's negotiating position in the market, and thus, jeopardize the ability of the Company to ensure that customers are being served by the lowest cost option. See, e.g., Western Massachusetts Electric Company, D.T.E. 99-101, at 3 (2002), citing Boston Edison Company, D.T.E. 99-16 (1999); Western Massachusetts Electric Company, D.T.E. 99-56 (1999); see also Canal Electric Company/Cambridge Electric Light Company/Commonwealth Electric Company, D.T.E. 02-34 (Tr. A at 19 (June 12, 2002)) and Cambridge Electric Light Company, D.T.E. 01-94 (May 9, 2002 Approval by the Department of Amended Motion of Cambridge Electric Light Company for a Protective Order); NSTAR Gas Company d/b/a Eversource Energy, D.P.U. 17-15,

Stamp-Approved Motion for Confidential Treatment (June 22, 2018) (protecting RFP responses, financial terms and contract information).

Accordingly, the Department should grant the motion and maintain the competitively sensitive price information contained in the Confidential Exhibit ES-JGG-5 as confidential in order to protect the Company, its consultants, and other third parties' commercially sensitive and proprietary information. The Company is requesting that the Confidential Exhibit ES-JGG-5 be maintained as confidential for a period of three years, subject to further protection upon a showing that continued confidential treatment is warranted and appropriate.

V. CONCLUSION

The Company respectfully requests that the competitively sensitive pricing information contained in the Confidential Exhibits, be kept confidential, not be placed in the public docket and be disclosed only to the Department and those parties that execute a non-disclosure agreement.

Pursuant to Department precedent, the Company seeks protection of the competitively sensitive pricing information contained in the Confidential Exhibits for a period of three years from the date that a final Order is issued with the Company provided the option to seek an extension of the protective period prior to the end of the initial three years.

WHEREFORE, the Company respectfully requests that the Department grant its Motion for Protective Treatment as stated herein.

Respectfully submitted,

**NSTAR ELECTRIC COMPANY
D/B/A EVERSOURCE ENERGY**

By its attorney



Danielle C. Winter, Esq.
Keegan Werlin LLP
99 High Street, 29th Floor
Boston, MA 02110
(617) 951-1400

Dated: May 15, 2020

**COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES**

NSTAR Electric Company d/b/a Eversource) Energy 2019 Grid Modernization Plan) Cost Recovery Filing) 	D.P.U. 20-54

**STATEMENT OF NSTAR ELECTRIC COMPANY D/B/A EVERSOURCE
ENERGY IN SUPPORT OF ITS REQUEST FOR A DESIGNATION OF
CONFIDENTIAL ENERGY INFRASTRUCTURE INFORMATION**

I. INTRODUCTION

NSTAR Electric Company d/b/a Eversource Energy ("the "Company" or "Eversource") hereby requests the Department of Public Utilities (the "Department") grant protection from public disclosure of certain confidential information submitted in this proceeding in accordance with G.L. c. 4, §7 cl. 26 (n). Specifically, Eversource requests that the Department protect critical energy infrastructure information ("CEII") produced as part of Exhibit ES-JGG-5 (CONFIDENTIAL-CEII) (the "CEII Exhibit"), the public disclosure of which would reveal certain CEII-related materials that are protected by statute. The Company has provided the CEII Exhibit to the Hearing Officer in this proceeding electronically in a Sharefile folder marked "CONTAINS CEII – DO NOT RELEASE", which will only be available for a timeframe of two weeks.

II. STANDARD OF REVIEW

G.L. c. 4, § 7, cl. 26 sets out the statutory definition for “Public Records” as enumerated documents, maps, photographs, etc. that are made or received by any officer or employee of any state agency, department, board, commission, etc. G.L. c. 4, § 7, cl. 26(n) exempts CEII from the public records law and thus public disclosure requirements as follows:

(n) records, including, but not limited to, blueprints, plans, policies, procedures and schematic drawings, which relate to internal layout and structural elements, security measures, emergency preparedness, threat or vulnerability assessments, or any other records relating to the security or safety of persons or buildings, structures, facilities, utilities, transportation or other infrastructure located within the commonwealth, the disclosure of which, in the reasonable judgment of the record custodian, subject to review by the supervisor of public records under subsection (b) of section 10 of chapter 66, is likely to jeopardize public safety.

III. STATEMENT OF SUPPORT

The Department has plain and unambiguous statutory authority to keep the requested information in the CEII Exhibit confidential pursuant to G.L. c. 4, § 7, clause 26(n). The Legislature, which enacted Clause 26(n) in 2002 in response to the events of September 11, 2001, clearly expressed a desire to protect public safety by exempting materials related to a utility’s critical infrastructure from the general presumption that certain information is a public record. The Department has noted that its authority to keep materials exempt under G.L. c. 4, § 7, clause 26(n) is “separate and apart” from (and, by implication, broader than) its more narrowly construed authority under G.L. c. 25, § 5D. D.T.E. and Siting Board Rulemaking, D.T.E. 98-84, at 23 (2003) (declining to rule with particularity in the context of a rulemaking regarding the protection of critical energy infrastructure).

Eversource recognizes that the Department must balance two competing interests of the public in making its determination whether to keep particular information such as the CEII contained in the CEII Exhibit confidential pursuant to G.L. c. 4, § 7, clause 26(n). The Department

must weigh the public's interest in transparency and information and the public's interest in safety, security and the safe and reliable provision of gas service. However, by inserting clause 26(n) as a specific exemption to the general presumption of disclosure, the Legislature has statutorily communicated its belief that the interest in safety, security and the safe and reliable provision of gas service should outweigh the public's interest in transparency and information where disclosure jeopardizes public safety. The Department has performed this balancing in the past and protected information pursuant to G.L. c. 4, § 7, clause 26(n). Verizon New England, Inc. d/b/a Verizon Massachusetts, D.T.E. 02-8, at 11-12 (2005) (granting Verizon's motion to restrict public disclosure of results of internal security reviews).

Based on the language of G.L. c. 4, § 7, cl. 26(n), the Company classifies the following information in the CEII Exhibit as CEII and hereby seeks to protect it from public dissemination:

- Exhibit ES-JGG-5 (CONFIDENTIAL) contains information that relates details about operating and engineering processes and procedures for the Company's electrical transmission and substation infrastructure. This information could be useful to a person or persons planning tampering, sabotage, vandalism or other targeted attacks on Eversource's critical energy infrastructure. Thus, public disclosure of the information in Exhibit ES-JGG-5 (CONFIDENTIAL) would represent an undue risk to public safety and should be protected as confidential.

To the best of the Company's knowledge, the CEII in the CEII Exhibit is not customarily available in the public domain. The Company requests that the Department maintain the confidential CEII status associated with the information in the CEII Exhibit indefinitely. There is no basis for assuming that the threat to public safety that may result from disclosure of the CEII will abate in a fixed, predetermined period of time.

IV. CONCLUSION

For the reasons stated above, Eversource respectfully requests that the CEII Exhibit be maintained as confidential.

Respectfully submitted by,

**NSTAR Electric Company d/b/a
Eversource Energy**

By its attorney,



Danielle C. Winter, Esq.
Keegan Werlin LLP
99 High Street, Suite 2900
Boston, Massachusetts 02110
(617) 951-1400

Dated: May 15, 2020

**COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES**

NSTAR Electric Company d/b/a Eversource Energy 2019 Grid Modernization Plan Cost Recovery Filing	)))))	D.P.U. 20-54

APPEARANCE OF COUNSEL

In the above-referenced proceeding, I hereby appear for and on behalf of
NSTAR Electric Company d/b/a Eversource Energy.



Danielle C. Winter, Esq.
Keegan Werlin LLP
99 High Street, Suite 2900
Boston, Massachusetts 02110
(617) 951-1400

Dated: May 15, 2020

**COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES**

NSTAR Electric Company d/b/a Eversource Energy 2019 Grid Modernization Plan Cost Recovery Filing	)))))	D.P.U. 20-54

APPEARANCE OF COUNSEL

In the above-referenced proceeding, I hereby appear for and on behalf of
NSTAR Electric Company d/b/a Eversource Energy.



Kerri A. Mahoney, Esq.
Keegan Werlin LLP
99 High Street, Suite 2900
Boston, Massachusetts 02110
(617) 951-1400

Dated: May 15, 2020

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource
Energy 2019 Grid Modernization Plan Cost
Recovery Filing

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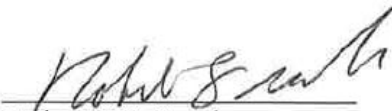
D.P.U. 20-54

AFFIDAVIT OF ROBERT W. FRANK

Robert W. Frank does hereby depose and say as follows:

I, Robert W. Frank, certify that the attached direct testimony and related exhibits on behalf of NSTAR Electric Company d/b/a Eversource Energy, which bear my name, were prepared by me or under my supervision and are true and accurate to the best of my knowledge and belief.

Signed under the pains and penalties of perjury as of this 15th day of May 2020.



Robert W. Frank

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource
Energy 2019 Grid Modernization Plan Cost
Recovery Filing

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D.P.U. 20-54

AFFIDAVIT OF JOHN G. GRIFFIN

John G. Griffin does hereby depose and say as follows:

I, John G. Griffin, certify that the attached direct testimony and related exhibits on behalf of NSTAR Electric Company d/b/a Eversource Energy, which bear my name, were prepared by me or under my supervision and are true and accurate to the best of my knowledge and belief.

Signed under the pains and penalties of perjury as of this 15th day of May 2020.



John G. Griffin

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource
Energy 2019 Grid Modernization Plan Cost
Recovery Filing

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D.P.U. 20-54

AFFIDAVIT OF GIUSEPPE A. PERNICIARO

Giuseppe A. Perniciaro does hereby depose and say as follows:

I, Giuseppe A. Perniciaro, certify that the attached direct testimony and related exhibits on behalf of NSTAR Electric Company d/b/a Eversource Energy, which bear my name, were prepared by me or under my supervision and are true and accurate to the best of my knowledge and belief.

Signed under the pains and penalties of perjury as of this 15th day of May 2020.



Giuseppe A. Perniciaro

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource
Energy 2019 Grid Modernization Plan Cost
Recovery Filing

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D.P.U. 20-54

AFFIDAVIT OF KEVIN M. BOUGHAN

Kevin M. Boughan does hereby depose and say as follows:

I, Kevin M. Boughan, certify that the attached direct testimony and related exhibits on behalf of NSTAR Electric Company d/b/a Eversource Energy, which bear my name, were prepared by me or under my supervision and are true and accurate to the best of my knowledge and belief.

Signed under the pains and penalties of perjury as of this 15th day of May 2020.



Kevin M. Boughan

**COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES**

D.P.U. 20-54

JOINT DIRECT TESTIMONY OF

**ROBERT W. FRANK
JOHN G. GRIFFIN**

EXHIBIT ES-RWF/JGG

**IN SUPPORT OF
NSTAR ELECTRIC COMPANY D/B/A EVERSOURCE ENERGY**

**2020 GRID MODERNIZATION
COST RECOVERY FILING**

May 15, 2020

1 **I. INTRODUCTION**

2 **Q. Mr. Frank, please state your name and business address.**

3 A. My name is Robert W. Frank. My business address is 247 Station Drive, Westwood,
4 Massachusetts 02090.

5 **Q. By whom are you employed and in what position?**

6 A. I am the Director, Revenue Requirements, Massachusetts for Eversource Energy
7 Service Company (“EES”). In this capacity, I am responsible for the coordination
8 and implementation of revenue requirement calculations in regulatory cost
9 recovery filings for NSTAR Electric Company d/b/a Eversource Energy (“NSTAR
10 Electric,” “Eversource,” or “the Company”)¹ and NSTAR Gas Company d/b/a
11 Eversource Energy (“NSTAR Gas”). In this proceeding, I am testifying on behalf
12 of NSTAR Electric.

13 **Q. What is your educational background?**

14 A. I graduated from the University of Massachusetts in 1980 with a Bachelor of
15 Science degree in Accounting. I graduated in 1988 from Providence College with
16 a Master’s in Business Administration.

17 **Q. Please describe your employment history.**

18 A. I was hired by the Company as a Principal Financial Analyst in April 1998 and was
19 responsible for the development of the Company’s Annual Financial Operating
20 Plan. I have held a variety of positions at Eversource, including Manager of

1 Investment Planning, and have 22 years' experience in the industry. I was
2 promoted to Director of Revenue Requirements in November 2019.

3 **Q. Have you previously testified before any regulatory bodies?**

4 A. No, I have not.

5 **Q. Mr. Griffin, please state your name and business address.**

6 A. My name is John G. Griffin and my business address is 247 Station Drive, Westwood,
7 MA 02090.

8 **Q. By whom are you employed and in what position?**

9 A. I am the Director of Corporate Performance Management for EES. As Director of
10 Corporate Performance Management, my responsibilities include the oversight of
11 the performance management process for the corporation. This includes the
12 development of the performance plan and the periodic reporting throughout the
13 year. I am also responsible for the development and administration of the
14 Company's financial and performance reporting systems.

15 **Q. What is your educational background?**

16 A. I graduated from Plymouth State College (now Plymouth State University) in 2001
17 with a Bachelor of Science degree in Accounting. I earned a Master of Science in

¹ On December 31, 2017, Western Massachusetts Electric Company ("WMECO") was merged with and into NSTAR Electric Company, with NSTAR Electric Company as the surviving entity pursuant to the Department of Public Utilities' (the "Department") approval in D.P.U. 17-05 under G.L. c. 164, § 96. NSTAR Electric Company and Western Massachusetts Electric Company d/b/a Eversource Energy, D.P.U. 17-05, at 36-44 (2017). Beginning January 1, 2018, the legal name of Eversource Energy's electric distribution company in Massachusetts is NSTAR Electric Company d/b/a Eversource Energy.

1 Accountancy from Stonehill College in 2005. I am also a Certified Public
2 Accountant in the Commonwealth of Massachusetts.

3 **Q. Please describe your employment history.**

4 A. I have been employed by the Company and its predecessors for the past 17 years
5 and have held roles of increasing responsibility in Budgeting & Forecasting,
6 Investment Planning and currently in Corporate Performance Management. In
7 2018, I assumed my current role.

8 **Q. Have you previously testified before any regulatory bodies?**

9 A. I have testified in the NSTAR Electric and NSTAR Gas Annual Service Quality
10 proceedings, as well as D.P.U. 19-23, the Company's 2019 Grid Modernization
11 Cost Recovery filing.

12 **Q. What is the purpose of your joint testimony in this docket?**

13 A. In this filing, the Company presents its second grid modernization cost recovery
14 filing in accordance with the approval of the Company's 2018-2020 Grid
15 Modernization Plan ("GMP") by the Department of Public Utilities (the
16 "Department"). NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15-
17 122 (2018)("D.P.U. 15-122"). In D.P.U. 15-122, the Department required the
18 Company, as well as the other electric distribution companies, to file annual Grid
19 Modernization Factor ("GMF") rate adjustment and reconciliation filings
20 comprised of: (1) actual, eligible preauthorized expenditures from the prior GMP

1 investment year; and (2) a reconciliation component in the second year and beyond.

2 D.P.U. 15-122, at 225.

3 In the Company's first GMF filing, D.P.U. 19-23, the Department also required
4 certain changes to the calculation of the revenue requirement and GMF, as well as
5 certain related changes to the GMF tariff. Those directives were initially
6 incorporated into the Company's revised filing in D.P.U. 19-23, which was
7 approved by the Department on August 28, 2019, and are also reflected in the
8 calculation of the 2019 grid modernization revenue requirement and 2020 GMF.

9 The purpose of this testimony is to present the revenue requirement and supporting
10 documentation associated with plant-in-service for investment year 2019, for rates
11 effective July 1, 2020, in accordance with the Department's directives in D.P.U.
12 15-122 and D.P.U. 19-23.

13 **Q. Please describe the evolution of the GMF tariff that has been reviewed and**
14 **approved by the Department.**

15
16 A. On May 15, 2019, the Company filed with the Department a request for approval
17 to recover approximately \$1.5 million in grid modernization costs for calendar year
18 2018 through its proposed GMFs for effect July 1, 2019. As described above, the
19 Department docketed Eversource's request as D.P.U. 19-23. On June 28, 2019, the
20 Department issued its Order in D.P.U. 19-23 (the "GMF Order") and disallowed
21 the model GMF tariff and the proposed GMF tariffs filed by the Company in D.P.U.

1 15-122, as well as the other Electric Distribution Companies (“EDCs”) in D.P.U.
2 15-120 (Massachusetts Electric Company and Nantucket Electric Company, d/b/a
3 National Grid) and 15-121 (Fitchburg Gas and Electric Light Company d/b/a
4 Unitil). NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15-122-B/19-
5 23, at 34 (2019). In its Order, the Department directed the Company to make a
6 compliance filing with revised tariffs and a recalculated revenue requirement. Id.
7 at 33.

8 Subsequently, on July 11, 2019, the Company, along with the other EDCs, filed a
9 Joint Motion for Reconsideration² requesting the Department review its
10 determinations on three elements of the revenue requirement recoverable for annual
11 grid-modernization investments in its GMF Order. These three components are:
12 (1) the recovery of the current year revenue requirement on eligible grid-
13 modernization investments made in the Investment Year and prior; (2) the recovery
14 of property tax applicable to grid-modernization investments made in each year;
15 and (3) the peremptory exclusion of all “overhead and burdens” associated with
16 operating and maintenance (“O&M”) expenses deemed eligible for recovery as
17 incremental costs. The EDCs also requested the Department incorporate provisions
18 on the criteria for demonstrating incremental O&M expenses eligible for recovery

² As of the date of this filing, the Department has not issued an Order on the EDCs’ July 11, 2019 Joint Motion for Reconsideration.

1 and the treatment of grid-modernization investments as part of rate base in a base-
2 rate proceeding, which were omitted from the Department's GMF Order.

3 On July 17, 2019, the Company participated in a conference call with the
4 Department, resulting in a revised revenue requirement calculation. In accordance
5 with the conversation and in compliance with the GMF Order, the Company filed
6 a revised GMF tariff, M.D.P.U. No. 73A, and updated GMFs, for effect September
7 1, 2019. On August 1, 2019, pursuant to D.P.U. 15-120/D.P.U. 15-121/D.P.U. 15-
8 122, at 225-226, the Department directed the Company to supplement its filing with
9 certain required documentation of its proposed incremental O&M labor expenses.

10 NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 19-23, Hearing
11 Officer Memorandum (August 1, 2019). The Company complied with this request
12 and supplemented its filing on August 12, 2019 with the required documentation.

13 On August 28, 2019, the Department issued an Order approving the Company's
14 revised tariff, M.D.P.U. No. 73A, and approved the proposed GMFs for effect
15 September 1, 2019. NSTAR Electric Company d/b/a Eversource Energy, D.P.U.
16 19-23-A, at 6-7 (2019).

17 **Q. Please describe the exhibits accompanying this joint testimony.**

18 A. The exhibits accompanying this testimony are as follows:

Exhibit	Description
Exhibit ES-RWF/JGG	Joint Direct Testimony of Robert W. Frank and John G. Griffin
Exhibit ES-JGG-1	Capital Authorization Policy
Exhibit ES-JGG-2	Summary of Costs by Investment Type
Exhibit ES-JGG-3	Summary of Retirements
Exhibit ES-JGG-4	Project Master Summary
Exhibit ES-JGG-5	Project Documentation
Exhibit ES-JGG-6a and Exhibit ES-JGG-6b	O&M Invoices
Exhibit ES-RWF-1	Revenue Requirement Calculation
Exhibit ES-RWF-2	O&M Overhead Test
Exhibit ES-RWF-3	Bill Impacts

1 **Q. Has the Company prepared other testimony to support this filing?**

2 A. Yes. Company witnesses Giuseppe A. Perniciaro and Kevin M. Boughan are
3 presenting testimony regarding the Company’s overall implementation of the
4 approved GMP. Their testimony summarizes the Company’s progress in
5 implementing the GMP in 2019 following the Department’s approval of the 2018-
6 2020 GMP on May 10, 2018. Additional detailed implementation information is
7 contained in the Company’s 2019 Grid Modernization Annual Report (“2019
8 Report”) consistent with the Department’s directives. NSTAR Electric Company
9 d/b/a Eversource Energy, D.P.U. 15-122-C; D.P.U. 15-122, at 112; D.P.U. 15-122
10 Memorandum at 2 (March 29, 2019). The 2019 Report is being provided as Exhibit
11 ES-GAP/KMB-1.

1 **Q. How is this filing organized?**

2 A. Section I of this joint testimony presents the introduction. Section II discusses the
3 accounting and cost tracking for the GMP in accordance with D.P.U. 15-122.
4 Section III discusses the Company's capital authorization policy and
5 documentation associated with plant-in-service for 2019. Section IV discusses the
6 revenue requirement and rate to be effective July 1, 2020. Section V presents the
7 typical bill impacts. Section VI presents the conclusion.

8 **II. ACCOUNTING AND COST TRACKING**

9 **Q. Please describe the accounting process created for the GMP.**

10 A. Upon receipt of the D.P.U. 15-122 order authorizing implementation of the GMP,
11 the Company implemented an accounting process to specifically track grid
12 modernization costs. Prior to actual investment in grid modernization technologies,
13 a number of foundational processes were developed and deployed in order to ensure
14 that the GMP plan investments were undertaken in a deliberate, efficient and cost-
15 effective manner. This framework, developed prior to commencing the 2018 GMP
16 investments, has been utilized in 2019 and will continue to be followed for the
17 remainder of the 2019-2020 GMP, as well as future GMPs. The Company will
18 continue to monitor the process to identify and implement necessary changes to
19 continue to improve GMP investment deployment.

1 As an initial step, the Engineering teams reviewed the Project Approval Forms
2 (“PAFs”) for each investment category in accordance with the Company’s Capital
3 Authorization Policy (“Authorization Policy”), which is provided as Exhibit ES-
4 JGG-1 and discussed in greater detail below, in order to ensure that all 2019 GMP
5 investments had the requisite spending authorization. The PAFs describe the
6 project need, justification, scope, budget and alternatives considered. The PAFs
7 were approved through the Company’s Delegation of Authority consistent with the
8 process used to authorize all capital expenditures.

9 The Company also followed specific and dedicated cost control processes to track
10 and monitor all costs to ensure that all GMP costs were segregated from all other
11 capital project costs and were incremental to existing or business as usual
12 investments. The Company used cost control centers for both Eastern
13 Massachusetts (E98) and Western Massachusetts (5GW). Although the GMP was
14 designed and is being implemented across the Company’s service territory, the
15 Company is still required, consistent with the Department’s directives, to maintain
16 separate financial records for NSTAR Electric and the former WMECO. D.P.U.
17 17-05, at 44-45.

18 Next, the Company utilized the lines of businesses set up in 2018 for each
19 investment type to track grid modernization projects and work orders separately
20 from base capital work and ensure segregation of incremental costs from base

1 capital work. Lines of business ensure incremental spending is accounted for
2 distinctly and separately from base capital spending.

3 The Company is using the following lines of business:

- 4 • Electric Vehicle (“EV”) – 12165
- 5 • Energy Storage – 12160
- 6 • Advanced Sensing Technology – 12190
- 7 • Automated Feeder Reconfiguration – 12170
- 8 • Urban Underground System Automation – 12175
- 9 • Communications – 12180
- 10 • Distribution System Network Operator – 12185
- 11 • Grid Mod Admin and Regulatory - 12195.

12
13 All grid modernization work orders, which are set up in STORMS and Passport,
14 the Company’s work management systems, and PowerPlan, the Company’s
15 financial repository system, link to a specific grid modernization project, which are
16 themselves linked to a specific line of business. The project approval process
17 remains consistent with that of normal base capital work, which involves adhering
18 to the Authorization Policy including review of the project and associated cost
19 incurrence at project governance meetings.

20 The GMP cost tracking process tracks total spending for the entire GMP portfolio.
21 The process enables accurate, repeatable reporting and requires minimal manual
22 effort to ensure data consistency and that the GMP spending was incremental.
23 Customized reporting was created in Eversource’s budgeting and financial

1 application that is specific to GMP projects and lines of business. These reports
2 contain monthly actuals, budget, variance, and projection information.

3 **Q. How does the Company determine that costs associated with a GMP**
4 **investment are recoverable through the GMF?**

5
6 A. As discussed in the joint testimony of Company witnesses Perniciaro and Boughan,
7 the Company utilizes two classifications when categorizing the status of a GMP
8 investment: Construction Complete and Commissioned. The Company classifies a
9 GMP unit as Construction Complete when a device is placed in-service, meaning
10 that it is used and useful.

11 GMP investments that are classified as in-service and used and useful are eligible
12 for cost recovery through the GMF. Following the device being placed in service
13 in the field, the Company continues to accumulate charges to the project work order
14 associated with the grid modernization investment until invoices are reviewed and
15 paid and field personnel finalize the project documents. The completion of the
16 work order occurs shortly after the work order is placed in service when all work
17 order charges have been incurred. Consistent with the Company's August 14, 2018
18 Compliance Filing in D.P.U. 15-122, eligible GMP investments are the cumulative
19 capitalized costs of eligible GMP projects recorded as in-service, including net
20 salvage, and are used and useful, at the end of the GMP Investment Year, which in
21 this case is 2019. See also D.P.U. 19-23-A at 5-6; M.D.P.U. No. 73A, § 2.5.

1 Consistent with Department's Order on the Company's 2018 GMF filing, the
2 Company only included costs that have aggregate total expenditures for
3 preauthorized Eligible GMP Projects less than the three-year expenditure cap
4 determined by the Department and have been recorded as in-service by December
5 31 of 2019. D.P.U. 19-23, at 8.

6 As described in the Company's 2019 GMP Annual Report, certain devices were
7 placed in service in the field at the end of 2019 but were not classified as plant-in-
8 service in 2019 and therefore are not included in the 2020 GMF. The Company
9 will include these costs in the 2021 GMF to be filed on May 15, 2020.

10 **Q. How is the Company accounting for and tracking labor charges related to grid**
11 **modernization?**

12
13 A. Similar to the processes used to track and assess GMP spending, the Company also
14 follows a process for properly tracking all grid modernization labor charges. As an
15 initial step in laying the foundational groundwork for implementing the GMP in
16 2019, the Company's Planning and Scheduling team conducted an analysis to
17 estimate the number of labor hours required to engineer, construct and commission
18 the 2019 GMP work plan. This analysis supported the development of a labor
19 resource strategy designed to maximize the efficiency of GMP execution by
20 leveraging incremental internal resources where possible, particularly for highly
21 technical tasks related to field engineering and communication. This strategy also

1 supported a competitive procurement process to obtain external engineering and
2 construction resources to complete the 2019 GMP work plan. This strategy is
3 consistent with the Company's overall labor resource strategy that allows for hiring
4 external resources to execute work plans such as the GMP portfolio. As a result of
5 this process, in 2018 the Company established three positions, a Financial Analyst,
6 a Program Analyst, and a Program Manager, dedicated solely to GMP program and
7 financial management and developing and executing the integration plan for the
8 GMP portfolio.

9 Operationally, the GMP is being implemented by a combination of internal and
10 contracted operational personnel, such as line workers, electricians, technicians, IT
11 developers, and commissioning agents. Various departments are responsible for
12 the execution of the GMP, such as Procurement, Planning, Operations, Information
13 Technology, and various administrative functions. This provides inter-
14 departmental visibility into the various GMP programs and enables more effective
15 and efficient planning of work and resources.

16 Given the cross-cutting department responsibilities associated with the
17 implementation of the GMP, rigorous labor reporting and tracking processes are
18 utilized. All Eversource internal labor was instructed to direct charge their time
19 when appropriate to GMP work orders. In the event that an internal employee's
20 time cannot be direct charged, their time is charged to Engineering & Supervision

1 (“E&S”) and spread across all grid modernization work orders consistent with
2 Eversource accounting practice for all capital work. For existing employees
3 supporting the grid modernization program who were hired prior to May 10, 2018,
4 all labor expense and productive and non-productive time will remain as an expense
5 in the employee’s home cost center. For employees hired after May 10, 2018, a
6 specific work order was created to track all new external hires who are dedicated
7 to the Company’s grid modernization initiatives, i.e., these new hires do not
8 perform any work on other Eversource programs or initiatives and assign only those
9 hours associated with the execution of the program to the Grid Modernization work
10 order. All outside services, or external contractors, procured to assist in the design,
11 implementation, and construction the GMP capital units of property charge the
12 relevant grid modernization capital work orders, which roll up to the relevant grid
13 modernization lines of business, and are eligible for recovery through the GMF.

14 **Q. What steps has the Company taken to ensure that the data being used to track**
15 **GMP spending is accurate?**

16
17 A. The Company follows various informal and formal tracking mechanisms to report
18 on portfolio performance and ensure the accuracy of the data. In addition to the
19 established accounting process described above, the Company carefully scrutinizes
20 and assesses the reported data. The Company employs a mechanism to track GMP
21 portfolio operational performance and analyze GMP work order activity. The
22 reporting combines both financial and operational information on the GMP

1 portfolio. Operational work order details are formally tracked using this reporting.
2 Work order detail, including but not limited to, work order description, service
3 center, costs and work order status are pulled into the reports from various
4 Eversource systems. The Grid Modernization Program Analyst refreshes the data
5 weekly.

6 Additionally, Eversource's work management systems (Passport and STORMS)
7 are queried weekly to pull GMP work orders that have been created. The
8 population of work orders is cross checked against the Company's accounting
9 system and financial reporting tool, PowerPlan. Data is organized by project and
10 by the GMP-specific lines of business discussed above. Any identified
11 inconsistencies are addressed and corrected in a timely manner. For example, if it
12 is determined that a work order was inadvertently written to the wrong GMP project
13 and/or line of business, the analyst would work with engineering to cancel and
14 rewrite the work order to the correct GMP project and line of business.

15 In addition to regular meetings to discuss GMP performance and data tracking,
16 informal processes also exist to ensure robust tracking and monitoring of all aspects
17 of the GMP projects. Integrated Planning & Scheduling, Engineering,
18 Procurement, Corporate Performance Management, and other functional groups
19 across Eversource are in constant communication regarding all aspects of Company
20 business, including the implementation of the GMP. Representatives from these

1 various departments work cross-functionally and collaboratively to meet GMP
2 portfolio performance expectations. Stakeholders within these various departments
3 also maintain their own tracking mechanisms, which are cross checked periodically
4 to the formal GMP source document maintained by the Grid Modernization
5 Program Analyst.

6 Over the course of the 2018-2020 (and future) GMPs, the Company will continually
7 assess its tracking and reporting processes and, as appropriate, modify those
8 processes and adopt best practices.

9 **III. CAPITAL AUTHORIZATION POLICY & DOCUMENTATION OF THE**
10 **COMPANY'S 2019 GRID MODERNIZATION INVESTMENTS**

11 **Q. Please describe the Company's Capital Authorization Policy and procedures**
12 **that apply to the grid modernization projects placed in service in 2019.**

13 A. Exhibit ES-JGG-1 is a copy of the Company's Authorization Policy. Consistent
14 with the Company's Authorization Policy and procedures, all grid modernization
15 projects that have been placed in service in 2019 have received the requisite
16 spending authorization. For GMP projects where the total costs are below
17 \$100,000, the authorization has been granted via the annual program blanket
18 approval that occurs as part of the capital plan book review by the Company's
19 Board of Directors. However, given the nature and cost of the GMP investments,
20 this type of authorization will rarely occur. For GMP projects where the total cost
21 exceeds \$100,000, a specific project identification number is assigned and a PAF

1 is written and approved through the PowerPlan system (the Company's accounting
2 system) following the delegation of authority described in the Authorization Policy.
3 The PAFs contain relevant details regarding the GMP project, including but not
4 limited to a project need statement, project objectives, and a project costs summary.
5 If a GMP project is expected to exceed the original authorized dollar amount, then
6 a supplemental PAF is required when the direct costs of the project exceed or are
7 expected to exceed the original authorized amount by the following levels:

- 8 ▪ \$25,000 for projects less than \$250,000;
- 9 ▪ \$50,000 for projects greater than \$250,000 and less than \$500,000; and
- 10 ▪ 10 percent for projects greater than or equal to \$500,000.

11 Supplemental PAFs contain supplemental costs summary information, as well as a
12 cost breakdown, and a justification for additional resources.

13 **Q. Please describe Exhibit ES-JGG-2.**

14 A. Exhibit ES-JGG-2 provides the investment summary by month for the
15 preauthorized GMP projects that were placed in service and classified as
16 Construction Complete in investment year 2019. Page 1 of the exhibit includes a
17 summary view of capital additions and cost of removal categorized by plant account
18 and line of business. Page 1 also provides a breakdown of 2018 carry over projects.
19 In 2019, the Company invested \$57,962,062 in total grid modernization additions,

1 with cost of removal totaling \$749,244 as shown on lines 59 and 106 respectively.³
2 These amounts include the carry-over costs from 2018. Pages 2 through 14 present
3 detailed cost information for additions by contractor, indirect/overheads, labor,
4 materials, and other. Pages 15 through 24 present detailed cost information for cost
5 of removal by contractor, indirect/overheads, labor, material, and other.

6 **Q. Please describe Exhibit ES-JGG-3.**

7 A. Exhibit ES-JGG-3 provides the retirements summary by month for the
8 preauthorized GMP projects that were placed in service and classified as
9 Construction Complete in investment year 2019. Page 1 of the exhibit includes a
10 summary view of retirements categorized by plant account and line of business. In
11 2019, the Company had \$(1,058,457) in total grid modernization retirements as
12 shown on line 16. Pages 2 through 4 present detailed cost information for
13 retirements by contractor, indirect/overheads, labor, materials, and other.

14 **Q. Please describe Exhibit ES-JGG-4.**

15 A. Exhibit ES-JGG-4 contains the Project Master Summary, which provides a
16 summarized list of all 2019 GMP investments placed in service and classified as
17 Construction Complete. The Project Master Summary provides the following

³ The Company originally recorded \$57,962,062 for grid modernization projects placed in service for Investment Year 2019, with cost of removal totaling \$749,244. Due to the Company's rigorous review and controls associated with the GMP, the Company determined that there were capital costs charged to transmission accounts that were related to the GMP. This resulted in an adjustment of \$253,621 to be added to the plant in service amounts for 2019. The Company reflected this adjustment in the revenue requirement and as calculated on Exhibit ES-RWF-1, Schedule 6.

1 information: the project number; the project description; line of business; line of
2 business description; the direct, indirect, and total costs of the job; the estimated
3 direct, indirect, and total cost estimate of the job as reported on the PAFs; and the
4 total cost broken down by additions, cost of removal and construction work in
5 progress (“CWIP”). The summarized list also includes the documentation page
6 number in which the documentation is provided for each project in Exhibit ES-
7 JGG-5, described in more detail below.

8 **Q. Please describe Exhibit ES-JGG-5.**

9 A. Exhibit ES-JGG-5 contains the 2019 GMP project documentation for the projects
10 listed in Exhibit ES-JGG-4 and summarized in Exhibit ES-JGG-2. The project
11 documentation includes variance analyses if required under the Authorization
12 Policy. For each GMP project placed into service and classified as Construction
13 Complete in 2019, Exhibit ES-JGG-5 includes the grid modernization cover sheet,
14 a closing report showing a table of the actual charges booked to the job, and, if
15 necessary, the PAF with the PowerPlan system generated authorization screen. In
16 the event that a GMP project exceeded the authorized spending threshold provided
17 in the Authorization Policy, a supplemental PAF with appropriate approvals has
18 been provided. The supplemental PAF also contains the project variance
19 explanations. As described above, the Company authorized initial PAFs in order
20 to begin work immediately.

1 **Q. Please describe the unique format associated with the project documentation**
2 **provided in Exhibit ES-JGG-5.**

3 A. Due to the presence of multi-year projects in this annual filing, the process for
4 assembling project documentation for Exhibit ES-JGG-5 was changed to provide
5 transparency to plant-in-service progress, as well as capital expenditures for each
6 project included in Exhibit ES-JGG-5. For this filing, changes were made to the
7 cover sheet and the closing report for each project included in Exhibit ES-JGG-5 to
8 explicitly identify the components of total capital spend including additions, cost
9 of removal, and CWIP. This new layout is organized to facilitate ease of review
10 between documentation and exhibits in this filing. For example, the additions and
11 cost of removal associated with 2019 presented for each project are included for
12 recovery in this proceeding, therefore the amounts presented for additions and cost
13 of removal for 2019 on each cover sheet in Exhibit ES-JGG-5 can easily be traced
14 through to Exhibit ES-JGG-4 at the project level, and then through to Exhibit ES-
15 JGG-2 at a summarized plant account level. Lastly, Exhibit ES-JGG-2 can easily
16 be traced through to the investment costs included in the revenue requirement,
17 Exhibit ES-RWF-1, Schedule 6, which is explained in more detail below.

1 **Q. Please describe Exhibits ES-JGG-6a and 6b.**

2 A. Exhibits ES-JGG-6a and 6b⁴ provide the external contractor invoices supporting
3 the O&M expense charged to the GMP that are eligible for recovery through the
4 GMF. Itemized cost detail supporting the invoices is provided as Exhibit ES-RWF-
5 1, Schedule 12, explained in more detail below.

6 **IV. REVENUE REQUIREMENT**

7 **Q. What is the Company's proposed 2020 grid modernization revenue**
8 **requirement?**

9
10 A. Schedule 1 of Exhibit ES-RWF-1 summarizes the Company's current year grid
11 modernization cumulative revenue requirement through December 31, 2019 of
12 \$10,433,935. This total is comprised of: (1) the 2019 annual revenue requirement
13 for vintage year 2018 investments totaling \$548,913; (2) the 2019 monthly revenue
14 requirement for vintage year 2019 investments totaling \$2,206,248; (3) O&M
15 expenses incurred in the 2019 investment year totaling \$7,626,852; and (4) a prior
16 year reconciliation amount of \$51,922, as shown on Schedule 1.

17 **Q. Please describe how rate base was calculated.**

18
19 A. Exhibit ES-RWF-1, Schedule 2, lines 111 to 115 and Schedule 5, lines 166 to 170
20 show the calculation of rate base for the vintage year 2018 and vintage year 2019
21 eligible grid modernization investments, respectively. Schedule 2, line 111 and

⁴ Due to the volume of invoices presented for recovery in this filing, the Company has broken out Exhibit ES-JGG-6 into two parts, 6a and 6b, and is providing confidential versions only of these exhibits.

1 Schedule 5, line 166 show the cumulative incremental net additions, which is the
2 sum of net plant additions and cost of removal. The values for net plant additions
3 and cost of removal are based upon the actual vintage year grid modernization
4 investments. Accumulated depreciation and deferred income taxes are subtracted
5 from cumulative incremental net additions to arrive at the month-end/year-end rate
6 base for Year to Date (“YTD”) 2019. Rate base for vintage year 2018 investment
7 is then averaged on Schedule 2, line 118, column (n) before applying the pre-tax
8 rate of return to arrive at the return and taxes component of the grid modernization
9 revenue requirement. Rate base for vintage year 2019 investment is based on a
10 monthly average on Schedule 5, line 173 before applying the pre-tax rate of return
11 to arrive at the return and taxes component of the grid modernization revenue
12 requirement.

13 **Q. Please explain the basis for net plant additions and cost of removal.**

14
15 A. The values for net plant additions and cost of removal are based upon the actual
16 vintage year 2018 and 2019 grid modernization investments. As detailed in Exhibit
17 ES-RWF-1, Schedules 3 and 6, the Company’s starting point is the actual per book
18 investment, as shown on Schedule 3, lines 2 through 7, and Schedule 6, lines 2
19 through 12, as well as related cost of removal as shown on Schedule 3, lines 27
20 through 32 and Schedule 6, lines 42 through 52. These values are as reported on
21 Exhibit ES-JGG-2, Page 1. As previously described above, the Company originally
22 recorded \$57,962,062 for grid modernization projects placed in service for

1 Investment Year 2019, with cost of removal totaling \$749,244. In the Company's
2 prior year GMF filing, the Company determined that there were capital costs
3 charged to the GMP work orders that were not 2018 vintage grid modernization
4 investment related. This resulted in an adjustment of \$189,777 and \$30,693 to be
5 removed from the plant in service amounts for 2018. The Company's per book
6 balances in 2019 reflect the actual credits that were made to the GMP work orders,
7 therefore the Company has added back the manual adjustments from 2018 into its
8 2019 balances. In addition, there was an adjustment of \$253,621 for 2019 grid
9 modernization related plant additions that were incorrectly charged to a
10 transmission plant account. The Company reflected these adjustments to the 2019
11 vintage investment in Exhibit ES-RWF-1, Schedule 6, lines 15 through 25 and lines
12 55 through 65, for plant additions and cost of removal, respectively. As a result,
13 the revised 2019 monthly plant additions total \$58,405,460 with revised cost of
14 removal totaling \$779,937, as shown on Lines 28 through 38 and 68 through 78 for
15 additions and cost of removal, respectively. This revised total then carries through
16 to the revenue requirement calculation presented in Exhibit ES-RWF-1, Schedule
17 5.

18 **Q. How did you derive the pre-tax rate of return?**

19
20 A. Exhibit ES-RWF-1, Schedule 10 derives the pre-tax rate of return used and is based
21 upon the cost of capital approved in the Company's most recent base distribution

1 rate case, D.P.U. 17-05. The calculation is based on the approved debt/equity ratio
2 of 45.67 percent for debt, 0.74 percent for preferred stock, and 53.59 percent for
3 equity. The calculation is also based on a weighted cost of long-term debt rate of
4 4.21 percent, cost of preferred stock of 4.56 percent, and cost of equity of 10
5 percent. The resulting pre-tax rate of return for vintage year 2019 is 9.34 percent.

6 **Q. What did you use for book depreciation rates?**

7
8 A. The book depreciation rates for investment years 2018 and 2019 are listed by plant
9 account in Exhibit ES-RWF-1, Schedule 2, lines 71 to 75 and Schedule 5, lines 111
10 to 120. These depreciation rates represent the per book depreciation rates that were
11 approved in, D.P.U. 17-05.

12 **Q. Have you calculated the Accumulated Deferred Income Taxes (“ADIT”) and**
13 **Accumulated Reserve for Depreciation (“ARD”) consistent with the**
14 **Department’s Order in D.P.U. 15-122-B, D.P.U. 19-23?**

15 Yes, the Company has determined the ADIT and ARD on a monthly basis for the
16 year the Eligible GMP investments are placed into service. For subsequent years
17 both ADIT and ARD are calculated based upon the average of the beginning and
18 ending calendar year balances.

19 **Q. Have you considered retirements in your calculation of book depreciation?**

20
21 A. Yes. Retirements related to the GMP are monthly/annual actuals as shown in
22 Exhibit ES-RWF-1, Schedule 2, lines 54 to 58 and Schedule 5, lines 84 to 93.

1 **Q. Please describe the inclusion of property tax expense in the revenue**
2 **requirement.**

3
4 A. In accordance with D.P.U. 15-122, property tax expense for the first year's revenue
5 requirement shall be set to zero. The second year's revenue requirement will be
6 calculated by first applying the effective property tax rate approved in the
7 Company's most recent base rate case to the eligible net plant as of the end of the
8 applicable investment year and then taking one-half of that amount. D.P.U. 15-
9 122, at 228. The third year, the Company is eligible to recover the full property tax
10 amount. Id. Therefore, Exhibit ES-RWF-1, Schedule 11, shows the second year
11 property tax expense of \$53,125 for vintage year 2018 which is shown in the
12 calculation of the 2019 revenue requirement on Schedule 2, line 124. Exhibit ES-
13 RWF-1, Schedule 11 shows the first year property tax expense of \$0 for vintage
14 year 2019 which is shown in the calculation of the 2019 revenue requirement on
15 Schedule 5, line 179.

16 **Q. Have you included O&M expense in the calculation of the revenue**
17 **requirement?**

18
19 A. Yes. O&M expenses, totaling \$7,626,852, are itemized on Schedule 12. Eligible
20 O&M expenses are defined as the actual monthly grid modernization plan-related
21 O&M expenses incurred throughout the prior twelve-month investment year related
22 to GMP implementation and proven to be incremental, preauthorized, and
23 reasonable. O&M expenses that are supported with appropriate documentation are
24 eligible for recovery through the GMF. D.P.U 15-122, at 228-229. The O&M

1 expenses itemized on Schedule 12 are for incremental payroll-related expense and
2 incremental external contractor expense totaling \$402,346 and \$7,224,506,
3 respectively, as shown on Schedule 12, Page 1, Lines 1 and 3.

4 **Q. Please describe the incremental labor expense included for recovery in this**
5 **filing.**

6
7 A. As discussed above, as the Company established its GMP implementation
8 processes, three positions were created and filled dedicated solely to the GMP
9 program management and financial management. In D.P.U. 15-122, the
10 Department limited eligible O&M labor expense to new positions created after the
11 May 10, 2018 issuance of the order, unless the Company can demonstrate that the
12 associated costs are attributed solely to grid modernization activities and are not
13 otherwise recovered through rates. D.P.U. 15-122, at 222.

14 In D.P.U. 15-122, the Department directed the Company, as well as the other
15 electric distribution companies to: (1) propose a rigorous protocol to demonstrate
16 that grid modernization expenses are incremental to the costs already recovered
17 through base distribution rates; and (2) limit eligible O&M labor expense to new
18 positions created after May 10, 2018. Id. The Company filed its proposed GMF
19 tariffs on August 14, 2018 and proposed to use a full-time equivalents (“FTEs”)
20 test to establish whether internally-transferred employees are incremental to the
21 representative level of O&M expenses otherwise recovered in base distribution
22 rates. The Department held a technical conference to discuss the FTEs test that was

1 submitted jointly by the electric distribution companies on December 20, 2018 and
2 requested initial and reply comments on the proposed FTEs test by January 14,
3 2019 and January 25, 2019, respectively. This issue is currently pending before the
4 Department.

5 Regardless of the Department's decision on the incremental labor test described
6 above, the incremental labor included for recovery in this filing complies with the
7 Department's directive in D.P.U. 15-122, in which the positions were created after
8 the May 10, 2018 order, would not otherwise have been created *but for* the GMP,
9 and are therefore not included in base distribution rates. Exhibit ES-JWF-3 in
10 D.P.U. 19-23 provides the job descriptions associated with Financial Analyst,
11 Program Analyst, and Program Manager, which were the three positions created
12 after the issuance of the order in D.P.U 15-122 and are solely dedicated to grid
13 modernization. The three positions were hired on the following dates:

- 14 • Financial Analyst, Grid Modernization: August 27, 2018
- 15 • Program Analyst, Grid Modernization: September 24, 2018
- 16 • Program Manager, Grid Modernization: October 9, 2018.

17 **Q. Please describe the incremental external contractor expense included for**
18 **recovery in this filing.**

19
20 A. As detailed in Exhibit ES-RWF-1, Schedule 12, Pages 2 through 12, the Company
21 incurred \$7,224,506 in external contractor expense in the 2019 Investment Year.

1 Most of the expenses are related to the Company's Geographical Information
2 Systems ("GIS") verification project. The incremental external contractor expense
3 included for recovery in this filing was incurred by the Company as a result of
4 implementing the GMP and is solely attributable to preauthorized grid
5 modernization investments, including incremental GMP development and
6 evaluation costs, the cost of which is not being recovered in base distribution rates
7 or through another cost recovery mechanism.

8 **Q. Did the Company allocate overhead costs to GMP projects included in this**
9 **filing?**

10
11 A. Yes. The Company applies overheads to all capital projects including GMP projects
12 consistent with the terms of its proposed GMF tariff provisions.

13
14 **Q. Did the Company perform an analysis of its overhead (indirect) costs to ensure**
15 **that they are properly accounted for in the Company's 2019 GMP Investment**
16 **Year?**

17
18 A. Yes. The Company has reviewed its total direct costs and overhead cost burdens
19 assigned to all vintage 2018 and 2019 GMP and non-GMP capital projects placed
20 in service. In addition, the percentage of capitalized overhead and burdens assigned
21 to GMP projects has been set equal to the ratio of GMP to non-GMP direct costs in
22 2019. This analysis is provided in Exhibit ES-RWF-1, Schedules 8 and 9 and
23 reflects how the capitalized indirect costs assigned to GMP projects were
24 normalized by setting them equal to the ratio of GMP to non-GMP direct costs.
25 The normalized annual indirect charges calculated in Exhibit ES-RWF-1,

1 Schedules 8 and 9 are carried forward to Exhibit ES-RWF-1 Schedule 2 lines 17 to
2 21, and Schedule 5 lines 27 to 36 and converted to normalized monthly indirect
3 charges. Please note that the Company has revised its 2018 overhead and burdens
4 test that was filed in D.P.U. 19-23, as shown in Schedule 8. In the prior year's filing,
5 the Company inadvertently included capital spending dollars, as well as capital
6 dollars associated with the Company Solar Program. For an accurate representation
7 of distribution, non-grid modernization capital for the basis of the test, the
8 Company has corrected the distribution portion to include capital additions for the
9 distribution company only, excluding Solar Program investments.

10 **Q. Did the Company confirm that it will not be double-recovering O&M**
11 **overhead-related expenses through base rates approved in D.P.U. 17-05 and**
12 **the 2019 GMP Investment Year?**

13 A. Yes. Similar to the capital test, Exhibit ES-RWF-2 confirmed that the Company
14 did not double-recover overhead and cost burdens charged to O&M and Payroll
15 Tax expense in 2019 as compared to the O&M overhead and burdens base line
16 amount established in D.P.U. 17-05. In the event the actual O&M expenses for any
17 year as compared to the base line amount are less, the under base line difference
18 amount would be subtracted from the normalized Capital amounts in Exhibit ES-
19 RWF-1 Schedule 9, column (g). This adjustment, if it were to occur, is to ensure
20 the Company's O&M overhead and cost burdens being recovered through base
21 rates are not also included in the annual GMF.

1 **Q. Please describe the information in Exhibit ES-RWF-2.**

2 A. Exhibit ES-RWF-2 provides a summary of the comparison of the O&M overhead–
3 related costs in base rates established in D.P.U. 17-05, and inflated in D.P.U. 18-
4 101, as shown in column (b) and the actual costs charged to O&M and payroll taxes
5 in 2019 in column (a). Column (c) reflects the difference between the actual 2019
6 O&M and payroll taxes and the D.P.U. 17-05 O&M baseline amount. As noted in
7 column (c), the 2019 expenses were \$5M higher than the base line amount allowed
8 in the D.P.U. 17-05 base rate calculation. Therefore, no adjustment is required and
9 \$0 is reflected in Exhibit ES-RWF-1, Schedule 9 column (g), O&M Adjustment to
10 Overheads.

11 **Q. How did the Company allocate the revenue requirement to each rate class?**

12
13 A. The Company’s 2020 grid modernization revenue requirement is multiplied by the
14 distribution revenue allocator, approved in the Company’s most recent base
15 distribution rate case, D.P.U. 17-05, for each rate class to derive the revenue
16 requirement by rate class. This class-specific revenue requirement is divided by
17 forecast kilowatt hours (“kWh”) sales for each rate class to arrive at the proposed
18 GMFs as shown in Exhibit ES-RWF-1, Schedule 13.

1 **V. TYPICAL BILL IMPACTS**

2 **Q. Have you prepared illustrative typical bill impact analyses?**

3 A. Yes, typical bill impact analyses have been prepared for the proposed GMF rates,
4 which are detailed in Exhibit ES-RWF-3.

5 **Q. What are the illustrative bill impacts associated with the proposed GMF rates?**

6 A. Under the Company's proposed GMF rates, a typical residential customer would
7 see an increase of 0.2 percent of the total bill on an annual basis. Bill impacts for
8 other customer classes are shown in Exhibit ES-RWF-3.

9 **VI. CONCLUSION**

10 **Q. Does this conclude your testimony?**

11
12 A. Yes, it does.

2020 Grid Modernization Cost Recovery

TABLE OF CONTENTS

<u>Description</u>	<u>Exhibit & Schedule Reference</u>
Calculation of Total Revenue Requirement	Exhibit ES-RWF-1, Sch. 1
Calculation of (Over)/Under Recovery	Exhibit ES-RWF-1, Sch. 1A
Calculation of Vintage 2018 Grid Modernization Revenue Requirement	Exhibit ES-RWF-1, Sch. 2
Calculation of Vintage 2018 Grid Modernization Investment	Exhibit ES-RWF-1, Sch. 3
Calculation of Vintage 2018 Grid Modernization Tax Depreciation	Exhibit ES-RWF-1, Sch. 4
Calculation of Vintage 2019 Grid Modernization Revenue Requirement	Exhibit ES-RWF-1, Sch. 5
Calculation of Vintage 2019 Grid Modernization Investment	Exhibit ES-RWF-1, Sch. 6
Calculation of Vintage 2019 Grid Modernization Tax Depreciation	Exhibit ES-RWF-1, Sch. 7
Calculation of Overheads and Burdens Adjustment - 2018 (Revised)	Exhibit ES-RWF-1, Sch. 8
Calculation of Overheads and Burdens Adjustment - 2019	Exhibit ES-RWF-1, Sch. 9
Calculation of Pre-Tax Rate of Return	Exhibit ES-RWF-1, Sch. 10
Calculation of Vintage Grid Modernization Investment related Property Tax	Exhibit ES-RWF-1, Sch. 11
Calculation of 2019 Grid Modernization O&M Expense	Exhibit ES-RWF-1, Sch. 12
Calculation of Grid Modernization Factor (GMF) by Rate Class Sectors	Exhibit ES-RWF-1, Sch. 13

**2020 Grid Modernization Cost Recovery
Revenue Requirement Summary thru December 31, 2019
Grid Modernization Factor (GMF) Calculation Effective July 1, 2020**

<u>Line #</u>		<u>Reference</u>	<u>Revenue Requirement</u> <u>(a)</u>
1	Current Year Revenue Requirement on Vintage 2018 Grid Modernization Investment	Schedule 2, Page 1, Line 125 Col. (n)	\$ 548,913
2	Current Year Revenue Requirement on Vintage 2019 Grid Modernization Investment	Schedule 5, Page 1, Line 180 Col. (m)	2,206,248
3	Current Year Operations & Maintenance Expense for 2019	Schedule 12, Page 1, Line 5	7,626,852
4	Total Current Year Cumulative Grid Modernization Revenue Requirement	Sum of Lines 1 thru 3	\$ 10,382,013
5			
6	Prior Recovery Period Reconciliation Balance (Over)/Under	Schedule 1A, Page 1, Line 18	51,922
7			
8	Total Amount for Recovery Effective July 1, 2020	Line 4 + Line 6	<u>\$ 10,433,935</u>

2020 Grid Modernization Cost Recovery
Prior Recovery Period Reconciliation for Investments through December 31, 2018

<u>Line No.</u>	<u>Date</u>	<u>Act./ Est.</u>	<u>Beginning Balance</u> (a)	<u>GMF Rate</u> (b)	<u>Forecasted Sales kWh</u> (c)	<u>Projected Recoveries</u> (d) = - (b) * (c)	<u>Actual Revenue Recovery</u> (e)	<u>Ending Balance</u> (f) = (a) + (d) + (e)	<u>Average Balance</u> (g) = ((a)+(f)) / 2	<u>Interest Rate</u> (h)	<u>No. of Days</u> (i)	<u>Monthly Interest</u> (j) = (f)*(h)*(i) / 365	<u>Ending Balance w/ Interest</u> (k) = (f) + (j)
1	January 2019	Actual	\$ 874,586					\$ 874,586	\$ 874,586	0.00%	31	\$ -	\$ 874,586
2	February	Actual	\$ 874,586					\$ 874,586	\$ 874,586	0.00%	28	\$ -	\$ 874,586
3	March	Actual	\$ 874,586					\$ 874,586	\$ 874,586	0.00%	31	\$ -	\$ 874,586
4	April	Actual	\$ 874,586					\$ 874,586	\$ 874,586	0.00%	30	\$ -	\$ 874,586
5	May	Actual	\$ 874,586					\$ 874,586	\$ 874,586	0.00%	31	\$ -	\$ 874,586
6	June	Actual	\$ 874,586					\$ 874,586	\$ 874,586	0.00%	30	\$ -	\$ 874,586
7	July	Actual	\$ 874,586					\$ 874,586	\$ 874,586	0.00%	31	\$ -	\$ 874,586
8	August	Actual	\$ 874,586					\$ 874,586	\$ 874,586	0.00%	31	\$ -	\$ 874,586
9	September	Actual	\$ 874,586				\$ (42,999)	\$ 831,588	\$ 853,087	2.53%	30	\$ 1,774	\$ 833,362
10	October	Actual	\$ 833,362				\$ (83,715)	\$ 749,646	\$ 791,504	2.53%	31	\$ 1,701	\$ 751,347
11	November	Actual	\$ 751,347				\$ (84,357)	\$ 666,990	\$ 709,169	2.53%	30	\$ 1,475	\$ 668,465
12	December	Actual	\$ 668,465				\$ (94,739)	\$ 573,726	\$ 621,095	2.53%	31	\$ 1,335	\$ 575,060
13	January 2020	Actual	\$ 575,060				\$ (100,324)	\$ 474,736	\$ 524,898	1.97%	31	\$ 878	\$ 475,614
14	February	Actual	\$ 475,614				\$ (94,430)	\$ 381,185	\$ 428,399	1.97%	29	\$ 671	\$ 381,855
15	March	Actual	\$ 381,855				\$ (85,080)	\$ 296,775	\$ 339,315	1.97%	31	\$ 568	\$ 297,343
16	April	Estimate	\$ 297,343	\$ 0.00005	1,645,739,278	\$ (77,141)		\$ 220,202	\$ 258,772	1.97%	30	\$ 419	\$ 220,621
17	May	Estimate	\$ 220,621	\$ 0.00005	1,706,060,504	\$ (79,968)		\$ 140,653	\$ 180,637	1.97%	31	\$ 302	\$ 140,955
18	June 2020	Estimate	\$ 140,955	\$ 0.00005	1,902,789,690	\$ (89,189)		\$ 51,766	\$ 96,360	1.97%	30	\$ 156	\$ 51,922

Column Notes:

(a) Line 1 = As filed in D.P.U. 19-23, Exhibit ES-ANB-1 (Revised), Schedule 1, Page 1, Line 5; Lines 2 through 18 = Prior Month's Ending Balance

(b) As approved in D.P.U. 19-23, Exhibit ES-ANB-1 (Revised), Schedule 8, Page 1, Line 23

(c) and (e) Company Records

(h) and (j) Interest calculated on the average monthly balance using the customer deposit rate, as outlined in 220 CMR 26.09. As filed in D.P.U. 15-122, DPU-GMF-1-3, interest is accrued at the start of the year when the investments are recovered through the GMF. Investments placed in service in 2018 started being recovered September 1, 2019.

2018 Grid Modernization Investment
Calculation of Revenue Requirement thru December 31, 2019

		Reference Plant Account																Cumulative Revenue Requirement		Annual Revenue Requirement Reference	
		Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	YTD 12/31/18	YTD 12/31/19						
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)					
Depreciable Plant Additions																					
1	Monthly Plant Additions: Line of Business																				
2	12170, 12175, 12190	Sch. 3, Line 18	364	\$	-	\$	-	\$	-	\$	-	\$	-	\$	39,452	\$	140,194	\$	61,917	\$	241,563
3	12170, 12175, 12190	Sch. 3, Line 19	365	-	-	-	-	-	-	-	-	5,219	342,409	609,838	766,948					1,774,414	
4	12185, 12175	Sch. 3, Line 20	366	-	-	-	-	-	-	-	-	-	-	24,818	120,196					234,088	
5	12175	Sch. 3, Line 21	367	-	-	-	-	-	-	-	-	-	-	24,818	46,027					191,241	
6	12185	Sch. 3, Line 22	369	-	-	-	-	-	-	-	-	-	-	19,624	-					1,252,729	
7	Total Monthly Depreciable Plant Additions	(Sum of Lines 2 thru 6)		\$	-	\$	-	\$	-	\$	-	\$	5,219	\$	451,122	\$	1,040,824	\$	2,197,480	\$	3,694,645
Monthly Plant Additions Allocations: Line of Business																					
9	12170, 12175, 12190	(Line 2 divided by Line 25, Column (f))	364	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.37%	58.04%					25.67%	
10	12170, 12175, 12190	(Line 3 divided by Line 26, Column (f))	365	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.29%	19.30%	37.19%	43.22%					43.22%	
11	12185, 12175	(Line 4 divided by Line 27, Column (f))	366	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.57%	51.30%					38.13%	
12	12175	(Line 5 divided by Line 28, Column (f))	367	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.98%	62.90%					24.07%	
13	12185	(Line 6 divided by Line 29, Column (f))	369	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.57%	0.00%					98.43%	
Overheads Burdens Adjustment: Line of Business																					
15	12170, 12175, 12190	(Line 10 * Sch. B Line 1, Cols. (f) - (j) - (k))	364	\$	-	\$	-	\$	-	\$	-	\$	-	\$	(7,481)	\$	(26,586)	\$	(11,742)	\$	(45,809)
16	12170, 12175, 12190	(Line 11 * Sch. B Line 2, Cols. (f) - (j) - (k))	365	-	-	-	-	-	-	-	-	-	-	(296)	(19,429)		(37,429)		(43,555)		(100,653)
17	12185, 12175	(Line 12 * Sch. B Line 3, Cols. (f) - (j) - (k))	366	-	-	-	-	-	-	-	-	-	-	-	(2,428)		(11,781)		(8,750)		(22,965)
18	12175	(Line 13 * Sch. B Line 4, Cols. (f) - (j) - (k))	367	-	-	-	-	-	-	-	-	-	-	-	(5,766)		(27,972)		(10,683)		(44,432)
19	12185	(Line 14 * Sch. B Line 5, Cols. (f) - (j) - (k))	369	-	-	-	-	-	-	-	-	-	-	-	6,830		55,465		563,654		563,654
20	Total Overheads Burdens Adjustment	(Sum of Lines 17 thru 21)		\$	-	\$	-	\$	-	\$	-	\$	-	\$	(296)	\$	(26,269)	\$	(103,768)	\$	-488,128
Cumulative Before Adjustment Depreciable Additions: Line of Business																					
22	12170, 12175, 12190	(Prior Mo. Line 25 + Current Mo. Line 2)	364	\$	-	\$	-	\$	-	\$	-	\$	-	\$	39,452	\$	179,646	\$	241,563	\$	241,563
23	12170, 12175, 12190	(Prior Mo. Line 26 + Current Mo. Line 3)	365	-	-	-	-	-	-	-	-	5,219	347,628	1,007,466	1,774,414					234,088	
24	12185, 12175	(Prior Mo. Line 27 + Current Mo. Line 4)	366	-	-	-	-	-	-	-	-	-	-	24,818	145,215					191,241	
25	12175	(Prior Mo. Line 28 + Current Mo. Line 5)	367	-	-	-	-	-	-	-	-	-	-	24,818	145,215					1,252,729	
26	12185	(Prior Mo. Line 29 + Current Mo. Line 6)	369	-	-	-	-	-	-	-	-	-	-	19,624	19,624					3,694,645	
27	Cumulative Before Adjustment Depreciable Additions	(Sum of Lines 25 thru 29)		\$	-	\$	-	\$	-	\$	-	\$	5,219	\$	456,341	\$	1,497,165	\$	3,694,645	\$	3,694,645
Cumulative After Adjustment Depreciable Additions: Line of Business																					
29	12170, 12175, 12190	(Prior Mo. Line 33 + Current Mo. Line 2 and 17)	364	\$	-	\$	-	\$	-	\$	-	\$	-	\$	31,970	\$	145,578	\$	195,754	\$	195,754
30	12170, 12175, 12190	(Prior Mo. Line 34 + Current Mo. Line 3 and 18)	365	-	-	-	-	-	-	-	-	4,923	327,909	994,318	1,673,760					1,673,760	
31	12185, 12175	(Prior Mo. Line 35 + Current Mo. Line 4 and 19)	366	-	-	-	-	-	-	-	-	886	346	5,874	5,205					211,213	
32	12175	(Prior Mo. Line 36 + Current Mo. Line 5 and 20)	367	-	-	-	-	-	-	-	-	-	19,652	111,477	146,610					1,466,610	
33	12185	(Prior Mo. Line 37 + Current Mo. Line 6 and 21)	369	-	-	-	-	-	-	-	-	-	-	28,454	28,454					1,816,383	
34	Cumulative After Adjustment Depreciable Additions	(Sum of Lines 33 thru 37)		\$	-	\$	-	\$	-	\$	-	\$	4,923	\$	429,776	\$	1,366,832	\$	4,044,440	\$	4,044,440
Cost of Removal: Line of Business																					
40	12170, 12175, 12190	Sch. 3, Line 43	364	\$	-	\$	-	\$	-	\$	-	\$	889	\$	544	\$	6,464	\$	5,184	\$	19,254
41	12170, 12175, 12190	Sch. 3, Line 44	365	-	-	-	-	-	-	-	-	-	4,566	19,233	19,628					13,156	
42	12185, 12175	Sch. 3, Line 45	366	-	-	-	-	-	-	-	-	886	346	5,874	5,205					4,946	
43	12175	Sch. 3, Line 46	367	-	-	-	-	-	-	-	-	886	346	5,874	5,205					4,946	
44	12185	Sch. 3, Line 47	369	-	-	-	-	-	-	-	-	-	-	-	2					2	
45	Total Monthly Cost of Removal	(Sum of Lines 43 thru 47)		\$	-	\$	-	\$	-	\$	-	\$	3,756	\$	5,881	\$	37,445	\$	36,338	\$	28,234
46	Cumulative Cost of Removal	(Prior Mo. Line 48 + Current Mo. Line 46)		\$	-	\$	-	\$	-	\$	-	\$	3,756	\$	9,557	\$	47,002	\$	83,331	\$	111,565
47	Total Grid Modernization Plant Investment	(Line 38 + Line 46)		\$	-	\$	-	\$	-	\$	-	\$	3,756	\$	14,481	\$	476,777	\$	1,458,163	\$	4,156,085
Depreciable Retirements																					
50	Plant Retirements: Line of Business																				
51	12170, 12175, 12190	Company Rewards	364											\$	(143)	\$	(3,290)	\$		\$	(3,433)
52	12170, 12175, 12190	Company Rewards	365											(1,066)			(3,619)				(40,676)
53	12185, 12175	Company Rewards	366																		-
54	12175	Company Rewards	367																		-
55	12185	Company Rewards	369																		-
56	Total Monthly Depreciable Retirements	(Sum of Lines 54 thru 58)		\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	(1,209)	\$	(42,900)	\$	(44,110)
Cumulative Plant Retirements: Line of Business																					
58	12170, 12175, 12190	(Prior Mo. Line 62 + Current Mo. Line 54)	364	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	(143)	\$	(3,433)	\$	(3,433)
59	12170, 12175, 12190	(Prior Mo. Line 63 + Current Mo. Line 55)	365	-	-	-	-	-	-	-	-	-	-	-	(1,066)						(40,676)
60	12185, 12175	(Prior Mo. Line 64 + Current Mo. Line 56)	366	-	-	-	-	-	-	-	-	-	-	-	-						-
61	12175	(Prior Mo. Line 65 + Current Mo. Line 57)	367	-	-	-	-	-	-	-	-	-	-	-	-						-
62	12185	(Prior Mo. Line 66 + Current Mo. Line 58)	369	-	-	-	-	-	-	-	-	-	-	-	-						-
63	Total Cumulative Plant Retirements	(Sum of Lines 62 thru 66)		\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	(1,209)	\$	(44,110)	\$	(44,110)
Book Depreciation																					
65	Book Depreciation: Line of Business																				
66	12170, 12175, 12190	As Approved in DPU 17-05	364	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%	3.10%					3.10%	As Approved in DPU 17-05
67	12170, 12175, 12190	As Approved in DPU 17-05	365	3.09%	3.09%	3.09%	3.09%	3.09%	3.09%	3.09%	3.09%	3.09%	3.09%	3.09%	3.09%					3.09%	As Approved in DPU 17-05
68	12185, 12175	As Approved in DPU 17-05	366	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%					2.12%	As Approved in DPU 17-05
69	12175	As Approved in DPU 17-05	367	2.82%	2.82%	2.82%	2.82%	2.82%	2.82%	2.82%	2.82%	2.82%	2.82%	2.82%	2.82%					2.82%	As Approved in DPU 17-05
70	12185	As Approved in DPU 17-05	369	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%					2.60%	As Approved in DPU 17-05
Book Depreciation relating to Additions: Line of Business																					
72	12170, 12175, 12190	(Average of Current and Prior Mo. Line 33 * Line 71/2)	364	\$	-	\$	-	\$	-	\$	-	\$	-	\$	41	\$	271	\$	712	\$	6,780
73	12170, 12175, 12190	(Average of Current and Prior Mo. Line 34 * Line 71/2)	365	-	-	-	-	-	-	-	-	6	435	2,081	5,459					57,178	
74	12185, 12175	(Average of Current and Prior Mo. Line 35 * Line 71/2)	366	-	-	-	-	-	-	-	-	20	155	458	4,847					4,847	
75	12175	(Average of Current and Prior Mo. Line 36 * Line 71/2)	367	-	-	-	-	-	-	-	-	-	23	182	496					4,783	
76	12185	(Average of Current and Prior Mo. Line 37 * Line 71/2)	369	-	-	-	-	-	-	-	-	-	31	94	2,131					50,265	
77	Total Cumulative Book Depreciation Additions	(Sum of Lines 70 thru 82)		\$	-	\$	-	\$	-	\$	-	\$	6	\$	551	\$	2,783	\$	9,256	\$	123,953
Book Depreciation Relating to Retirements: Line of Business																					
84	12170, 12175, 12190	(Average of Current and Prior Mo. Line 62 * Line 71/2)	364	\$	-	\$	-	\$	-	\$	-	\$	-	\$	(9)	\$	(5)	\$	(11)	\$	(1,312)
85	12170, 12175, 12190	(Average of Current and Prior Mo. Line 63 * Line 71/2)	365	-	-	-	-	-	-	-	-	-	-	-	(1)		(3)		(3)		(123)
86	12185, 12175	(Average of Current and Prior Mo. Line 64 * Line 71/2)	366	-	-	-	-	-	-	-	-	-	-	-	-		-		-	-	-
87	12175	(Average of Current and Prior Mo. Line 65 * Line 71/2)	367	-	-	-	-	-	-	-	-	-	-	-	-		-		-	-	-
88	12185	(Average of Current and Prior Mo. Line 66 * Line 71/2)	369	-	-	-	-	-	-	-	-	-	-	-	-		-		-	-	-
89	Total Cumulative Book Depreciation Retirements	(Sum of Lines 86 thru 90)		\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	(2)	\$	(60)	\$	(1,423)
Cumulative Book Depreciation																					
91	12170, 12175, 12190	Line 83 + Line 91		\$	-	\$	-	\$	-	\$	-	\$	-	\$	6	\$	551	\$	2,783	\$	9,196
92	12170, 12175, 12190	Line 83 + Line 91		\$	-	\$	-	\$	-	\$	-	\$	-	\$	6	\$	551	\$	2,783	\$	9,196
Deferred Tax Calculations																					
94	Federal Tax Depreciation	Sch. 4, Line 25		\$	-	\$	-	\$	-	\$	-	\$	3,756	\$	5,848	\$	42,801	\$	99,257	\$	291,968
9																					

2018 Grid Modernization Investment
Recalculation of Vintage Investment

Line #	Reference/Plant Account		Jan-18 (a)	Feb-18 (b)	Mar-18 (c)	Apr-18 (d)	May-18 (e)	Jun-18 (f)	Jul-18 (g)	Aug-18 (h)	Sep-18 (i)	Oct-18 (j)	Nov-18 (k)	Dec-18 (l)
Depreciable Plant Additions														
1	Monthly Plant Additions: Line of Business													
2	12170, 12175, 12190	D.P.U. 19-23, Esh. ES-JGG-2, Line 4	364	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 45,711	\$ 150,639	\$ 92,657
3	12170, 12175, 12190	D.P.U. 19-23, Esh. ES-JGG-2, Line 8	365	-	-	-	-	-	-	-	5,219	348,668	670,284	797,688
4	12165, 12175	D.P.U. 19-23, Esh. ES-JGG-2, Line 11	366	-	-	-	-	-	-	-	-	31,077	130,842	120,224
5	12175	D.P.U. 19-23, Esh. ES-JGG-2, Line 13	367	-	-	-	-	-	-	-	-	31,077	130,842	76,766
6	12165	D.P.U. 19-23, Esh. ES-JGG-2, Line 15	369	-	-	-	-	-	-	-	-	19,624	-	1,233,105
7	Total Monthly Depreciable Plant Additions	(Sum of Lines 2 thru 6)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,219	\$ 476,157	\$ 1,082,606	\$ 2,320,439
8														
9	Less: Adjustments													
10	12170, 12175, 12190	Company Records	364	-	-	-	-	-	-	-	-	(6,259)	(10,446)	(30,740)
11	12170, 12175, 12190	Company Records	365	-	-	-	-	-	-	-	-	(6,259)	(10,446)	(30,740)
12	12165, 12175	Company Records	366	-	-	-	-	-	-	-	-	(6,259)	(10,446)	(30,740)
13	12175	Company Records	367	-	-	-	-	-	-	-	-	(6,259)	(10,446)	(30,740)
14	12165	Company Records	369	-	-	-	-	-	-	-	-	-	-	-
15	Total Adjustments	(Sum of Lines 10 thru 14)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (25,035)	\$ (41,782)	\$ (122,959)
16														
17	Revised Monthly Plant Additions: Line of Business													
18	12170, 12175, 12190	(Line 2 + Line 10)	364	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 39,452	\$ 140,194	\$ 61,917
19	12170, 12175, 12190	(Line 3 + Line 11)	365	-	-	-	-	-	-	-	5,219	342,409	659,838	766,948
20	12165, 12175	(Line 4 + Line 12)	366	-	-	-	-	-	-	-	-	24,818	120,396	89,484
21	12175	(Line 5 + Line 13)	367	-	-	-	-	-	-	-	-	24,818	120,396	46,027
22	12165	(Line 6 + Line 14)	369	-	-	-	-	-	-	-	-	19,624	-	1,233,105
23	Total Revised Monthly Depreciable Plant Additions	(Sum of Lines 18 thru 22)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,219	\$ 451,122	\$ 1,040,824	\$ 2,197,480
24														
25														
26	Cost of Removal: Line of Business													
27	12170, 12175, 12190	D.P.U. 19-23, Esh. ES-JGG-2, Line 26	364	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,157	\$ 664	\$ 8,809	\$ 8,151	\$ 8,146
28	12170, 12175, 12190	D.P.U. 19-23, Esh. ES-JGG-2, Line 30	365	-	-	-	-	-	-	1,364	4,686	21,578	21,606	16,118
29	12165, 12175	D.P.U. 19-23, Esh. ES-JGG-2, Line 32	366	-	-	-	-	-	-	1,154	466	8,218	7,243	7,908
30	12175	D.P.U. 19-23, Esh. ES-JGG-2, Line 34	367	-	-	-	-	-	-	1,154	466	8,218	7,243	7,908
31	12165	D.P.U. 19-23, Esh. ES-JGG-2, Line 36	369	-	-	-	-	-	-	-	-	-	-	2
32	Total Monthly Cost of Removal	(Sum of Lines 27 thru 31)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,829	\$ 6,282	\$ 46,823	\$ 44,243	\$ 40,081
33														
34	Less: Adjustments													
35	12170, 12175, 12190	Company Records	364	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (268)	\$ (120)	\$ (2,345)	\$ (1,978)	\$ (2,962)
36	12170, 12175, 12190	Company Records	365	-	-	-	-	-	-	(268)	(120)	(2,345)	(1,978)	(2,962)
37	12165, 12175	Company Records	366	-	-	-	-	-	-	(268)	(120)	(2,345)	(1,978)	(2,962)
38	12175	Company Records	367	-	-	-	-	-	-	(268)	(120)	(2,345)	(1,978)	(2,962)
39	12165	Company Records	369	-	-	-	-	-	-	-	-	-	-	-
40	Total Adjustments	(Sum of Lines 35 thru 39)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (1,073)	\$ (481)	\$ (9,378)	\$ (7,913)	\$ (11,848)
41														
42	Revised Monthly Cost of Removal													
43	12170, 12175, 12190	(Line 27 + Line 35)	364	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 889	\$ 544	\$ 6,464	\$ 6,172	\$ 5,184
44	12170, 12175, 12190	(Line 28 + Line 36)	365	-	-	-	-	-	-	1,096	4,566	19,233	19,628	13,156
45	12165, 12175	(Line 29 + Line 37)	366	-	-	-	-	-	-	886	346	5,874	5,265	4,946
46	12175	(Line 30 + Line 38)	367	-	-	-	-	-	-	886	346	5,874	5,265	4,946
47	12165	(Line 31 + Line 39)	369	-	-	-	-	-	-	-	-	-	-	2
48	Total Revised Monthly Cost of Removal	(Sum of Lines 43 thru 47)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,756	\$ 5,801	\$ 37,445	\$ 36,330	\$ 28,234

2020 Grid Modernization Cost Recovery
Calculation of Deferred Taxes for 2018 Grid Modernization Investment

Line #	Monthly Reference	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	CY 12/31/19	Annual Reference
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(o)
1	Federal Tax Depreciation														
2															
3	Tax Depreciation														
4	Total Monthly Depreciable Plant Additions	Sch. 2, Line 7 + Line 22	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,923	\$ 424,852	\$ 937,056	\$ 2,677,608	\$ 4,044,440	(Sum of Columns (a) thru (l))
5	20 YR MACRS Tax Depreciation Rates	Internal Revenue Code Section 168	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	7,219%	Internal Revenue Code Section 168
6	Total Federal Tax Depreciation	Line 4 * Line 5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 185	\$ 15,932	\$ 35,140	\$ 100,410	\$ 291,968	(Line 4 * Line 5)
7															
8	Monthly Tax Depreciation														
9	January		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
10	February			-	-	-	-	-	-	-	-	-	-	-	
11	March				-	-	-	-	-	-	-	-	-	-	
12	April				-	-	-	-	-	-	-	-	-	-	
13	May					-	-	-	-	-	-	-	-	-	
14	June						-	-	-	-	-	-	-	-	
15	July							-	-	-	-	-	-	-	
16	August								-	-	-	-	-	-	
17	September									46	46	46	46	46	
18	October										5,311	5,311	5,311	5,311	
19	November											17,570	17,570	17,570	
20	December												100,410	100,410	
21	Total Monthly Tax Depreciation	Line 9 through Line 20	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 46	\$ 5,357	\$ 22,927	\$ 123,337	\$ 123,337	
22															
23	Deduction for Cost of Removal	Sch. 2, Line 46	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,756	\$ 5,801	\$ 37,445	\$ 36,330	\$ 28,234	\$ 28,234	(Sum of Columns (a) thru (l))
24															
25	Total Federal Tax Depreciation and Cost of Removal	Sum of Lines 21 and 23	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,756	\$ 5,848	\$ 42,801	\$ 59,257	\$ 151,571	\$ 291,968	Sum of Lines 6 and 23
26															
27	State Tax Depreciation														
28															
29	Tax Depreciation														
30	Total Monthly Depreciable Plant Additions	Line 4	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,923	\$ 424,852	\$ 937,056	\$ 2,677,608	\$ 4,044,440	(Sum of Columns (a) thru (l))
31	20 YR MACRS Tax Depreciation Rates	Internal Revenue Code Section 168	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	3,750%	7,219%	Internal Revenue Code Section 168
32	Total State Tax Depreciation	Line 30 * Line 31	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 185	\$ 15,932	\$ 35,140	\$ 100,410	\$ 291,968	Line 30 * Line 31
33															
34	Monthly Tax Depreciation														
35	January		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
36	February			-	-	-	-	-	-	-	-	-	-	-	
37	March				-	-	-	-	-	-	-	-	-	-	
38	April				-	-	-	-	-	-	-	-	-	-	
39	May					-	-	-	-	-	-	-	-	-	
40	June						-	-	-	-	-	-	-	-	
41	July							-	-	-	-	-	-	-	
42	August								-	-	-	-	-	-	
43	September									46	46	46	46	46	
44	October										5,311	5,311	5,311	5,311	
45	November											17,570	17,570	17,570	
46	December												100,410	100,410	
47	Total Remaining Tax Depreciation	Line 35 through Line 46	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 46	\$ 5,357	\$ 22,927	\$ 123,337	\$ 123,337	
48															
49	Deduction for Cost of Removal	Line 23	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,756	\$ 5,801	\$ 37,445	\$ 36,330	\$ 28,234	\$ 28,234	(Sum of Columns (a) thru (l))
50															
51	Total State Tax Depreciation and Cost of Removal	Sum of Lines 47 and 49	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,756	\$ 5,848	\$ 42,801	\$ 59,257	\$ 151,571	\$ 291,968	Sum of Lines 32 and 50

Calculation of Revenue Requirement thru December 31, 2019

															Cumulative	
Reference Plant Account															YTD 12/31/19	
	Jan 19	Feb 19	Mar 19	Apr 19	May 19	Jun 19	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19				
Depreciable Plant Additions																
Monthly Plant Additions: Line of Business																
1	12105, 12190	Sch. 6, Line 20	362	\$ 3,715,368	\$ 345,685	\$ 47,422	\$ 32,464	\$ 126,936	\$ (4,088)	\$ 1,381,905	\$ (238,320)	\$ 7,082	\$ 18,363	\$ 47	\$ 7,984,614	
2	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 28	364	47,876	444,659	463,331	95,449	670,480	95,449	120,836	96,551	489,474	1,249,095	1,509,366	2,172,652	
3	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 30	365	422,215	381,626	544,009	1,240,165	1,640,779	1,255,793	792,027	1,708,622	1,603,238	2,875,186	37,857		
4	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 31	366	190,444	26,616	277,272	55,379	119,198	124,816	118,769	50,437	263,207	600,380	1,250,203	1,997,547	
5	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 32	367	77,966	13,137	384,417	78,107	95,928	43,155	(65,210)	52,030	448,874	1,715,146	3,963,345	2,303,779	
6	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 33	368	-	-	-	-	-	-	-	456,560	572,629	98,465	6,400		
7	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 34	369	86,884	(1,331)	180,609	-	8,537	14,696	2,524,150	139,182	879,286	2,146,676	784,554	2,040,441	
8	12170	Sch. 6, Line 35	371	-	-	-	-	-	-	-	-	-	-	-	-	
9	12105	Sch. 6, Line 36	373	24,312	427,015	147,027	327,970	429,147	(2,243,128)	224,862	(348,255)	-	-	-	-	
10	12180	Sch. 6, Line 37	390	-	-	-	-	-	-	-	-	-	-	-	-	
11	Total Monthly Depreciable Plant Additions	(Sum of Lines 2 thru 11)		\$ 4,483,064	\$ 1,175,407	\$ 2,044,148	\$ 1,553,017	\$ 2,703,952	\$ 3,114,834	\$ 3,768,182	\$ 2,273,432	\$ 2,931,886	\$ 8,011,768	\$ 6,683,919	\$ 105,361	
Monthly Plant Additions Allocations: Line of Business																
12	12105, 12190	(Line 1 divided by Line 4), Column (b)	362	26.59%	2.47%	0.34%	0.23%	4.83%	-0.04%	8.89%	-1.65%	0.05%	0.13%	0.00%	57.14%	
13	12105, 12170, 12175, 12180, 12185, 12190	(Line 2 divided by Line 4), Column (b)	364	0.74%	0.68%	7.13%	1.57%	1.95%	1.47%	0.91%	0.87%	10.60%	9.23%	23.21%	33.42%	
14	12105, 12170, 12175, 12180, 12185, 12190	(Line 3 divided by Line 4), Column (b)	365	2.77%	1.94%	3.02%	6.11%	7.97%	13.57%	10.54%	8.05%	5.89%	10.98%	18.47%		
15	12105, 12170, 12175, 12180, 12185, 12190	(Line 4 divided by Line 4), Column (b)	366	1.21%	0.53%	1.17%	1.17%	2.49%	2.38%	1.19%	2.52%	12.21%	25.61%	20.01%		
16	12105, 12170, 12175, 12180, 12185, 12190	(Line 5 divided by Line 4), Column (b)	367	1.10%	0.47%	5.82%	1.13%	1.49%	0.66%	0.84%	0.79%	6.68%	20.95%	35.68%		
17	12105, 12170, 12175, 12180, 12185, 12190	(Line 6 divided by Line 4), Column (b)	368	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.92%	4.51%	4.34%			
18	12105, 12170, 12175, 12180, 12185, 12190	(Line 7 divided by Line 4), Column (b)	369	0.92%	-0.01%	1.90%	0.00%	0.15%	0.03%	1.47%	9.27%	2.98%	12.07%	8.27%		
19	12170	(Line 8 divided by Line 4), Column (b)	371	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
20	12105	(Line 9 divided by Line 4), Column (b)	373	-2.40%	42.23%	-14.42%	-32.48%	-22.45%	-22.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
21	12180	(Line 11 divided by Line 4), Column (b)	390	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Overhead Burden Adjustment: Line of Business																
22	12105, 12190	(Line 15 + Sch. 9 Line 1, Col. (b) - (c) - (d))	362	(656,382)	(61,071)	(8,378)	(5,735)	(115,239)	865	(2443,138)	40,690	(1,254)	(3,241)	-	(148,616)	
23	12105, 12170, 12175, 12180, 12185, 12190	(Line 16 + Sch. 9 Line 1, Col. (b) - (c) - (d))	364	(12,499)	(1,404)	(2,114)	(1,264)	1,609	(1,723)	(20,864)	(28,878)	(35,080)	(45,508)	(65,000)		
24	12105, 12170, 12175, 12180, 12185, 12190	(Line 17 + Sch. 9 Line 1, Col. (b) - (c) - (d))	365	7,221	5,139	9,305	16,336	37,399	20,662	71,426	13,546	1,246	28,378	49,374		
25	12105, 12170, 12175, 12180, 12185, 12190	(Line 18 + Sch. 9 Line 4, Col. (b) - (c) - (d))	366	(10,980)	(2,727)	(28,413)	(5,675)	(12,293)	(15,293)	(12,171)	(6,091)	(26,971)	(61,522)	(128,119)	(204,093)	
26	12105, 12170, 12175, 12180, 12185, 12190	(Line 19 + Sch. 9 Line 5, Col. (b) - (c) - (d))	367	(2,019)	(1,129)	(13,656)	(1,740)	(5,549)	(1,363)	1,990	(1,875)	(6,821)	(49,039)	(84,909)		
27	12105, 12170, 12175, 12180, 12185, 12190	(Line 20 + Sch. 9 Line 6, Col. (b) - (c) - (d))	368	-	-	-	-	-	88,004	131,022	108,387	13,541	23,383	31,315		
28	12105, 12170, 12190	(Line 21 + Sch. 9 Line 7, Col. (b) - (c) - (d))	369	37,636	(577)	78,235	3,707	3,666	1,266,749	66,290	380,883	122,441	92,981	339,847	883,863	
29	12170	(Line 22 + Sch. 9 Line 8, Col. (b) - (c) - (d))	371	-	-	-	-	-	-	-	-	-	-	-	-	
30	12105	(Line 23 + Sch. 9 Line 9, Col. (b) - (c) - (d))	373	10,825	190,126	65,463	146,027	91,916	(998,743)	100,119	(155,059)	-	-	-	-	
31	12180	(Line 24 + Sch. 9 Line 10, Col. (b) - (c) - (d))	390	-	-	-	-	-	-	-	-	-	-	-	-	
32	Total Overhead Burden Adjustment	(Sum of Lines 27 thru 31)		\$ (615,077)	\$ 128,426	\$ 88,242	\$ 148,894	\$ 75,715	\$ 288,813	\$ 23,765	\$ 409,274	\$ 179,257	\$ 93,032	\$ 156,690	\$ (78,058)	
Cumulative Before Adjustment Depreciable Additions: Line of Business																
33	12105, 12190	(Prior Mts. Line 4) + Current Mts. Line 2)	362	3,715,368	4,061,053	4,108,476	4,149,940	4,815,879	4,810,981	6,192,891	5,962,571	5,968,633	5,988,016	5,988,063	13,972,676	
34	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 4) + Current Mts. Line 2)	364	47,876	92,335	555,666	664,214	781,059	876,395	823,586	880,138	2,819,507	4,239,937	4,328,963	5,605,815	
35	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 4) + Current Mts. Line 2)	365	422,215	923,842	1,287,913	2,248,075	3,462,215	7,277,820	8,536,613	9,322,648	11,079,264	12,609,641	15,568,617		
36	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 4) + Current Mts. Line 2)	366	190,444	133,000	410,333	465,711	565,679	730,485	629,524	888,701	1,151,908	1,752,288	3,002,571	5,000,118	
37	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 4) + Current Mts. Line 2)	367	77,966	109,392	493,739	590,826	688,910	711,399	660,290	780,219	1,149,094	2,064,240	4,246,204	6,603,512	
38	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 4) + Current Mts. Line 2)	368	-	-	-	-	-	730,792	922,613	1,379,172	1,953,081	2,660,296	2,882,265		
39	12105, 12170, 12190	(Prior Mts. Line 4) + Current Mts. Line 8)	369	86,884	85,523	266,162	27,718	28,915	3,323,764	332,946	422,232	454,893	744,612	9,946,564		
40	12170	(Prior Mts. Line 4) + Current Mts. Line 8)	371	-	-	-	-	-	-	-	-	-	-	-	-	
41	12105	(Prior Mts. Line 4) + Current Mts. Line 9)	373	24,312	451,266	163,383	506,123	1,355,470	(887,568)	(662,795)	(1,011,059)	(1,011,059)	(1,011,059)	(1,011,059)		
42	12180	(Prior Mts. Line 4) + Current Mts. Line 11)	390	-	-	-	-	-	-	-	-	-	-	-	-	
43	Cumulative Before Adjustment Depreciable Additions	(Sum of Lines 40 thru 42)		\$ 4,483,064	\$ 5,666,471	\$ 7,700,619	\$ 9,253,636	\$ 11,957,580	\$ 15,072,422	\$ 18,040,694	\$ 21,114,036	\$ 24,045,922	\$ 32,057,899	\$ 38,741,669	\$ 58,405,460	
Cumulative After Adjustment Depreciable Additions: Line of Business																
44	12105, 12190	(Prior Mts. Line 5) + Current Mts. Line 2 and 3)	362	3,058,986	3,343,600	3,382,645	3,499,373	3,965,073	3,561,041	5,088,813	4,969,183	4,915,013	4,930,132	4,930,171	11,504,169	
45	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 5) + Current Mts. Line 2 and 3)	364	46,418	89,522	538,749	624,284	757,257	849,688	853,326	1,291,927	2,733,705	4,497,091	4,979,091	6,303,751	
46	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 5) + Current Mts. Line 2 and 3)	365	425,456	796,221	1,289,596	2,259,906	3,521,262	5,733,453	7,402,291	8,521,262	11,273,968	12,907,473	15,833,834		
47	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 5) + Current Mts. Line 2 and 3)	366	191,657	118,455	386,385	457,889	525,657	637,689	750,634	1,033,878	1,572,727	2,664,881	4,487,746		
48	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 5) + Current Mts. Line 2 and 3)	367	79,118	105,362	475,923	548,287	643,965	685,758	623,538	660,683	1,071,676	2,763,021	4,909,315	6,363,966	
49	12105, 12170, 12190	(Prior Mts. Line 5) + Current Mts. Line 7 and 3)	369	124,519	122,612	381,456	393,719	414,781	4,605,879	480,766	1,144,638	1,706,385	2,415,135	2,573,013	2,796,266	
50	12105, 12170, 12175, 12180, 12185, 12190	(Prior Mts. Line 5) + Current Mts. Line 7 and 3)	371	-	-	-	-	-	-	-	-	-	-	-	-	
51	12170	(Prior Mts. Line 5) + Current Mts. Line 10 and 3)	373	35,336	62,277	86,747	1,308,764	1,958,987	(987,962)	(1,461,213)	(1,461,213)	(1,461,213)	-	1	-	
52	12105	(Prior Mts. Line 5) + Current Mts. Line 11 and 3)	390	-	-	-	-	-	-	-	-	-	-	-	-	
53	Cumulative After Adjustment Depreciable Additions	(Sum of Lines 52 thru 53)		\$ 3,863,187	\$ 5,169,020	\$ 7,301,411	\$ 9,003,322	\$ 11,786,980	\$ 15,190,366	\$ 18,962,581	\$ 21,666,289	\$ 24,776,432	\$ 33,718,572	\$ 40,570,181	\$ 59,452,073	
Cost of Removal: Line of Business																
54	12105, 12190	Sch. 6, Line 68	362	65,550	72,326	50,494	80,544	(25,243)	19,631	(444,979)	(7,048)	20,445	26,740	27,173	388,355	
55	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 69	364	(20,949)	(4,826)	(17,729)	(8,208)	2,112	(1,407)	21,134	21,365	21,509	21,698	22,382		
56	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 70	365	(18,253)	(3,115)	(63,280)	27,257	21,112	3,341	21,140	(3,568)	11,688	26,840	42,878		
57	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 71	366	(28,242)	(100)	3,136	13,240	(1,862)	5,220	12,769	8,711	21,999	16,657	20,741	23,008	
58	12105, 12170, 12175, 12180, 12185, 12190	Sch. 6, Line 72	367	(5,029)	(3,176)	4,549	6,043	(2,791)	6,863	15,274	27,781	26,478	21,578	18,839		
59	12105	Sch. 6, Line 73	368	-	-	-	-	800	7,411	11,814	25,604	14,995	24,725	756	1,119	
60	12105	Sch. 6, Line 74	369	-	-	-	-	-	-	-	31,183	11,665	11,665	8,763	(13,475)	
61	12105	Sch. 6, Line 75	373	-	-	-	-	-	-	-	-	-	-	-	-	
62	12105	Sch. 6, Line 76	374	-	-	-	-	-	-	-	-	-	-	-	-	
63	12105	Sch. 6, Line 77	375	-	-	-	-	-	-	-	-	-	-	-	-	
64	Total Monthly Cost of Removal	(Sum of Lines 66 thru 75)		\$ 4,824	\$ 60,999	\$ (8,363)	\$ 162,689	\$ (5,492)	\$ 40,666	\$ (862,149)	\$ 76,294	\$ 151,795	\$ 85,789	\$ 129,612	\$ 438,984	
Cumulative Cost of Removal																
65	12105, 12190	(Prior Mts. Line 78 + Current Mts. Line 76)	362	4,824	73,953											

2019 Grid Modernization Investment
Calculation of Revenue Requirement thru December 31, 2019

Line	Reference/Plant Account	Cumulative Revenue Requirement YTD 12/31/19											
		Jan-19 (a)	Feb-19 (b)	Mar-19 (c)	Apr-19 (d)	May-19 (e)	Jun-19 (f)	Jul-19 (g)	Aug-19 (h)	Sep-19 (i)	Oct-19 (j)	Nov-19 (k)	Dec-19 (l)
122	Book Depreciation relating to Additions: Line of Business												
123	12185, 12190	2,562	7,924	13,557	19,246	25,422	32,060	39,647	48,029	56,257	64,502	72,760	80,524
124	12165, 12170, 12175, 12180, 12185, 12190	60	236	1,647	2,562	4,360	6,435	8,564	10,688	12,766	15,262	20,215	41,778
125	12165, 12170, 12175, 12180, 12185, 12190	553	2,054	4,662	9,232	16,675	28,591	45,593	66,204	89,584	116,237	147,301	184,303
126	12165, 12170, 12175, 12180, 12190	84	274	705	1,400	2,233	3,361	4,482	5,604	6,724	7,844	8,964	10,084
127	12165, 12170, 12175, 12180, 12185, 12190	91	311	1,618	2,206	3,717	5,335	6,839	8,359	10,718	15,425	23,764	36,487
128	12185	-	-	-	-	-	-	614	2,754	6,563	12,076	18,700	25,705
129	12165, 12170, 12190	137	410	967	1,823	2,716	8,259	18,651	30,614	44,496	62,182	84,597	111,363
130	12170	-	-	-	-	-	-	-	-	-	0	0	0
131	12185	59	1,219	3,779	7,408	13,063	14,204	10,422	6,340	1,408	(1,523)	(8,455)	(13,386)
132	12180	-	-	-	-	-	-	-	-	-	-	-	-
133	Total Cumulative Book Depreciation Additions	\$ 3,547	\$ 12,424	\$ 25,736	\$ 44,036	\$ 68,185	\$ 98,145	\$ 134,822	\$ 179,062	\$ 230,253	\$ 295,926	\$ 380,326	\$ 492,804
134	Book Depreciation Relating to Retirements: Line of Business												
135	12185, 12190	-	-	-	-	-	(145)	(434)	(723)	(1,012)	(1,302)	(1,591)	(1,591)
136	12165, 12170, 12175, 12180, 12185, 12190	(1)	(3)	(7)	(13)	(23)	(40)	(60)	(92)	(140)	(197)	(261)	(350)
137	12165, 12170, 12175, 12180, 12185, 12190	(04)	(265)	(531)	(892)	(1,254)	(1,729)	(2,271)	(3,380)	(4,853)	(6,453)	(8,073)	(9,547)
138	12165, 12170, 12175, 12180, 12190	-	-	-	-	-	-	-	-	-	-	-	-
139	12165, 12170, 12175, 12180, 12185, 12190	-	-	-	-	-	-	-	(0)	(1)	(2)	(28)	(84)
140	12185	-	-	-	-	-	-	-	-	-	-	-	-
141	12165, 12170, 12190	-	-	-	-	-	-	-	-	-	-	-	-
142	12165, 12170, 12190	-	-	-	-	-	-	-	-	-	-	-	-
143	12170	-	-	-	-	-	-	-	-	-	-	-	-
144	12185	-	-	-	-	-	-	-	-	-	-	-	-
145	12180	-	-	-	-	-	-	-	-	-	-	-	-
146	Total Cumulative Book Depreciation Retirements	\$ (85)	\$ (240)	\$ (538)	\$ (895)	\$ (1,277)	\$ (1,779)	\$ (2,576)	\$ (3,966)	\$ (5,710)	\$ (7,664)	\$ (9,664)	\$ (11,972)
147	(Sum of Lines 135 thru 145)												
148	Cumulative Book Depreciation	\$ 3,463	\$ 12,180	\$ 25,198	\$ 43,130	\$ 66,909	\$ 96,366	\$ 132,246	\$ 175,157	\$ 224,537	\$ 288,262	\$ 370,662	\$ 480,832
149	Deferred Tax Calculation												
150	Federal Tax Depreciation	Sch. 7, Line 25	\$ 16,903	\$ 85,623	\$ 15,157	\$ 184,300	\$ 35,168	\$ 112,750	\$ (275,556)	\$ 183,007	\$ 287,676	\$ 333,447	\$ 395,736
151	Cumulative Federal Tax Depreciation	(Prior Mo. Line 152 + Current Mo. Line 151)	\$ 16,903	\$ 102,526	\$ 117,683	\$ 31,983	\$ 347,151	\$ 459,901	\$ 184,345	\$ 367,353	\$ 655,029	\$ 988,474	\$ 1,494,211
152	State Tax Depreciation	Sch. 7, Line 5i	\$ 16,903	\$ 85,623	\$ 15,157	\$ 184,300	\$ 35,168	\$ 112,750	\$ (275,556)	\$ 183,007	\$ 287,676	\$ 333,447	\$ 395,736
153	Cumulative State Tax Depreciation	(Prior Mo. Line 152 + Current Mo. Line 154)	\$ 16,903	\$ 102,526	\$ 117,683	\$ 31,983	\$ 347,151	\$ 459,901	\$ 184,345	\$ 367,353	\$ 655,029	\$ 988,474	\$ 1,494,211
154	Federal Book/Tax Timing Difference	(Line 152 - Line 148)	\$ 13,441	\$ 90,366	\$ 92,485	\$ 268,853	\$ 280,243	\$ 363,535	\$ 52,100	\$ 192,196	\$ 430,491	\$ 700,212	\$ 1,123,549
155	Federal Tax Rate	Schedule 10, Form 1	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
156	Deferred Federal Tax Reserve	(Line 157 * Line 158)	\$ 2,823	\$ 18,977	\$ 19,422	\$ 56,459	\$ 58,051	\$ 76,342	\$ 10,941	\$ 40,361	\$ 90,403	\$ 147,045	\$ 235,945
157	State Book/Tax Timing Difference	(Line 155 - Line 148)	\$ 13,441	\$ 90,366	\$ 92,485	\$ 268,853	\$ 280,243	\$ 363,535	\$ 52,100	\$ 192,196	\$ 430,491	\$ 700,212	\$ 1,123,549
158	State Tax Rate	Schedule 10, Form 1	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%
159	Deferred State Tax Reserve	(Line 160 * Line 162)	\$ 849	\$ 5,711	\$ 5,845	\$ 16,991	\$ 17,711	\$ 22,975	\$ 3,283	\$ 12,147	\$ 27,207	\$ 44,253	\$ 71,088
160	Rate Base Calculation												
161	Total Cumulative Grid Modernization Plant Investment	Line 60	\$ 3,870,011	\$ 5,242,944	\$ 7,365,971	\$ 9,230,571	\$ 12,004,746	\$ 15,458,249	\$ 18,888,047	\$ 21,647,046	\$ 24,909,984	\$ 33,937,913	\$ 40,919,134
162	Accumulated Reserve for Depreciation	Line 148 *-1	(1,463)	(12,160)	(25,198)	(43,130)	(66,909)	(96,366)	(132,246)	(175,157)	(224,537)	(288,262)	(370,662)
163	Cumulative Net Plant	(Line 161 + Line 162)	\$ 3,868,549	\$ 5,230,783	\$ 7,340,773	\$ 9,187,441	\$ 11,937,836	\$ 15,361,883	\$ 18,755,801	\$ 21,471,889	\$ 24,685,447	\$ 33,649,651	\$ 40,548,472
164	Deferred Tax Reserve	(Line 159 + Line 163)	(13,572)	(54,680)	(75,307)	(174,611)	(175,562)	(199,130)	(142,841)	(52,500)	(117,630)	(195,295)	(286,933)
165	Cumulative Month End/Year End Rate Base	(Line 164 + Line 163)	\$ 3,862,977	\$ 5,305,095	\$ 7,315,506	\$ 9,113,990	\$ 11,861,275	\$ 15,262,965	\$ 18,741,568	\$ 21,419,381	\$ 24,567,857	\$ 33,454,356	\$ 40,261,539
166	Revenue Requirement Calculation												
167	Average Rate Base	Mo. 1 - Line 170 / 2, then (Prior Mo. & Cur Mo. Line 170 / 2)	\$ 1,931,438	\$ 4,534,486	\$ 6,260,801	\$ 8,214,748	\$ 10,487,633	\$ 13,561,920	\$ 17,002,067	\$ 20,080,475	\$ 22,993,669	\$ 29,013,095	\$ 36,849,936
168	Pre-Tax BOR	Sch. 10, Col (b) Line 5	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%
169	Number of Days in the Month	Line 174 *- (Line 175 / 365)	0.79%	0.72%	0.79%	0.72%	0.79%	0.72%	0.79%	0.72%	0.79%	0.72%	0.79%
170	Monthly Applicable Pre-Tax BOR	Line 175 *- Line 176	\$ 15,321	\$ 32,489	\$ 49,664	\$ 63,662	\$ 83,934	\$ 104,111	\$ 134,871	\$ 189,290	\$ 176,515	\$ 230,149	\$ 292,986
171	Return and Taxes	Line 148 - Prior Mo. Line 148	3,463	8,698	13,037	17,933	23,778	29,457	35,880	42,911	49,380	63,725	82,400
172	Monthly Book Depreciation	Sch. 11, Line 12	-	-	-	-	-	-	-	-	-	-	-
173	Property Taxes	Line 177 thru 179	\$ 18,784	\$ 41,187	\$ 62,702	\$ 89,995	\$ 106,972	\$ 133,568	\$ 170,751	\$ 202,201	\$ 225,896	\$ 293,874	\$ 365,286
174	Monthly/Annual Revenue Requirement		\$ 18,784	\$ 41,187	\$ 62,702	\$ 89,995	\$ 106,972	\$ 133,568	\$ 170,751	\$ 202,201	\$ 225,896	\$ 293,874	\$ 365,286

2019 Grid Modernization Investment
Recalculation of Vintage Investment

Line	Reference	Plant Account		Jan-19 (a)	Feb-19 (b)	Mar-19 (c)	Apr-19 (d)	May-19 (e)	Jun-19 (f)	Jul-19 (g)	Aug-19 (h)	Sep-19 (i)	Oct-19 (j)	Nov-19 (k)	Dec-19 (l)
Depreciable Plant Additions															
1	Monthly Plant Additions: Line of Business														
2	12185, 12190	Exh. ES-JGG-2, Line 3	362	\$ 3,715,368	\$ 345,685	\$ 47,422	\$ 32,464	\$ 674,940	\$ (4,898)	\$ 1,381,909	\$ (230,320)	\$ 7,082	\$ 18,363	\$ 47	\$ 7,730,992
3	12165, 12170, 12175, 12180, 12185, 12190	Exh. ES-JGG-2, (Line 10 + Line 46)	364	47,876	44,459	463,331	51,102	126,836	95,346	(52,809)	56,551	689,474	1,249,985	1,509,366	2,172,852
4	12165, 12170, 12175, 12180, 12185, 12190	Exh. ES-JGG-2, (Line 17 + Line 48)	365	422,215	301,626	544,069	906,550	1,240,146	2,174,993	1,640,776	1,252,793	792,027	1,708,562	1,659,228	2,875,186
5	12165, 12170, 12175, 12180, 12190	Exh. ES-JGG-2, (Line 23 + Line 50)	366	106,444	26,616	277,272	7,935	119,968	124,816	118,769	59,437	263,207	600,380	1,250,283	1,997,547
6	12165, 12170, 12175, 12180, 12185, 12190	Exh. ES-JGG-2, (Line 30 + Line 52)	367	77,966	31,337	384,417	28,663	98,218	43,355	(55,210)	52,030	440,874	1,715,166	1,381,945	2,355,719
7	12185	Exh. ES-JGG-2, Line 32	368	-	-	-	-	-	-	370,702	551,909	456,560	572,629	98,495	131,909
8	12165, 12170, 12190	Exh. ES-JGG-2, (Line 36 + Line 54)	369	86,884	(1,331)	180,609	8,557	14,696	2,924,350	139,182	879,286	282,661	2,146,676	784,554	2,040,441
9	12170	Exh. ES-JGG-2, Line 38	371	-	-	-	-	-	-	-	-	-	7	-	-
10	12165	Exh. ES-JGG-2, (Line 40 + Line 56)	373	24,312	427,015	147,027	327,970	429,147	(2,243,128)	224,862	(348,255)	-	-	-	-
11	12180	Exh. ES-JGG-2, Line 42	390	-	-	-	-	-	-	-	-	-	-	-	105,583
12	Total Monthly Depreciable Plant Additions	(Sum of Lines 2 thru 11)		\$ 4,481,064	\$ 1,175,407	\$ 2,044,148	\$ 1,363,240	\$ 2,703,952	\$ 3,114,834	\$ 3,768,182	\$ 2,273,432	\$ 2,931,886	\$ 8,011,768	\$ 6,683,919	\$ 19,410,230
Adjustments															
15	12185, 12190	Company Records	362	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	253,621
16	12165, 12170, 12175, 12180, 12185, 12190	Company Records	364	-	-	-	47,444	-	-	-	-	-	-	-	-
17	12165, 12170, 12175, 12180, 12185, 12190	Company Records	365	-	-	-	47,444	-	-	-	-	-	-	-	-
18	12165, 12170, 12175, 12180, 12190	Company Records	366	-	-	-	47,444	-	-	-	-	-	-	-	-
19	12165, 12170, 12175, 12180, 12185, 12190	Company Records	367	-	-	-	47,444	-	-	-	-	-	-	-	-
20	12185	Company Records	368	-	-	-	-	-	-	-	-	-	-	-	-
21	12165, 12170, 12190	Company Records	369	-	-	-	-	-	-	-	-	-	-	-	-
22	12170	Company Records	371	-	-	-	-	-	-	-	-	-	-	-	-
23	12165	Company Records	373	-	-	-	-	-	-	-	-	-	-	-	-
24	12180	Company Records	390	-	-	-	-	-	-	-	-	-	-	-	-
25	Total Adjustments	(Sum of Lines 15 thru 24)		\$ -	\$ -	\$ -	\$ 189,777	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 253,621
Revised Monthly Plant Additions: Line of Business															
28	12185, 12190	(Line 2 + Line 15)	362	\$ 3,715,368	\$ 345,685	\$ 47,422	\$ 32,464	\$ 674,940	\$ (4,898)	\$ 1,381,909	\$ (230,320)	\$ 7,082	\$ 18,363	\$ 47	\$ 7,984,614
29	12165, 12170, 12175, 12180, 12185, 12190	(Line 3 + Line 16)	364	47,876	44,459	463,331	98,547	126,836	95,346	(52,809)	56,551	689,474	1,249,985	1,509,366	2,172,852
30	12165, 12170, 12175, 12180, 12185, 12190	(Line 4 + Line 17)	365	422,215	301,626	544,069	953,994	1,240,146	2,174,993	1,640,776	1,252,793	792,027	1,708,562	1,659,228	2,875,186
31	12165, 12170, 12175, 12180, 12190	(Line 5 + Line 18)	366	106,444	26,616	277,272	55,379	119,968	124,816	118,769	59,437	263,207	600,380	1,250,283	1,997,547
32	12165, 12170, 12175, 12180, 12185, 12190	(Line 6 + Line 19)	367	77,966	31,337	384,417	76,107	98,218	43,355	(55,210)	52,030	440,874	1,715,166	1,381,945	2,355,719
33	12185	(Line 7 + Line 20)	368	-	-	-	-	-	-	-	-	-	-	-	-
34	12165, 12170, 12190	(Line 8 + Line 21)	369	86,884	(1,331)	180,609	8,557	14,696	2,924,350	139,182	879,286	282,661	2,146,676	784,554	2,040,441
35	12170	(Line 9 + Line 22)	371	-	-	-	-	-	-	-	-	-	7	-	-
36	12165	(Line 10 + Line 23)	373	24,312	427,015	147,027	327,970	429,147	(2,243,128)	224,862	(348,255)	-	-	-	-
37	12180	(Line 11 + Line 24)	390	-	-	-	-	-	-	-	-	-	-	-	105,583
38	Total Revised Monthly Depreciable Plant Additions	(Sum of Lines 28 thru 37)		\$ 4,481,064	\$ 1,175,407	\$ 2,044,148	\$ 1,553,017	\$ 2,703,952	\$ 3,114,834	\$ 3,768,182	\$ 2,273,432	\$ 2,931,886	\$ 8,011,768	\$ 6,683,919	\$ 19,663,851
Cost of Removal: Line of Business															
41	12185, 12190	Exh. ES-JGG-2, Line 68	362	\$ 65,550	\$ 72,326	\$ 50,494	\$ 80,544	\$ (25,243)	\$ 19,631	\$ (443,973)	\$ (7,048)	\$ 20,445	\$ 28,740	\$ 27,173	\$ 308,355
42	12170, 12175, 12185, 12190	Exh. ES-JGG-2, (Line 73 + Line 97)	364	(20,094)	364	(4,263)	10,085	(487)	8,200	20,886	13,124	21,395	26,699	23,506	25,302
43	12165, 12170, 12175, 12185, 12190	Exh. ES-JGG-2, (Line 79 + Line 99)	365	(16,235)	(315)	(63,280)	19,583	21,112	3,341	21,140	(3,568)	33,446	21,898	26,940	42,878
44	12170, 12175, 12190	Exh. ES-JGG-2, (Line 83 + Line 101)	366	(20,242)	(100)	3,136	5,687	(1,882)	5,220	12,709	6,711	21,999	16,657	20,741	23,008
45	12165, 12170, 12175, 12185, 12190	Exh. ES-JGG-2, (Line 89 + Line 103)	367	(5,022)	(3,176)	4,549	11,012	(3,791)	6,053	15,274	10,287	27,848	26,478	21,731	40,769
46	12185	Exh. ES-JGG-2, Line 91	368	-	-	-	-	800	7,411	11,814	25,604	14,995	24,725	756	1,819
47	12165	Exh. ES-JGG-2, Line 93	369	867	-	-	5,084	-	-	31,183	11,665	(59,408)	8,763	(11,147)	-
48	-	-	371	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	373	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	390	-	-	-	-	-	-	-	-	-	-	-	-
51	Total Monthly Cost of Removal	(Sum of Lines 42 thru 51)		\$ 4,824	\$ 69,099	\$ (9,363)	\$ 131,996	\$ (9,492)	\$ 49,856	\$ (362,149)	\$ 76,294	\$ 151,795	\$ 85,789	\$ 129,612	\$ 430,984
Adjustments															
54	12185, 12190	Company Records	362	-	-	-	7,673	-	-	-	-	-	-	-	-
55	12170, 12175, 12185, 12190	Company Records	364	-	-	-	7,673	-	-	-	-	-	-	-	-
56	12165, 12170, 12175, 12185, 12190	Company Records	365	-	-	-	7,673	-	-	-	-	-	-	-	-
57	12170, 12175, 12190	Company Records	366	-	-	-	7,673	-	-	-	-	-	-	-	-
58	12165, 12170, 12175, 12185, 12190	Company Records	367	-	-	-	7,673	-	-	-	-	-	-	-	-
59	12185	Company Records	368	-	-	-	-	-	-	-	-	-	-	-	-
60	12165	Company Records	369	-	-	-	-	-	-	-	-	-	-	-	-
61	-	-	371	-	-	-	-	-	-	-	-	-	-	-	-
62	-	-	373	-	-	-	-	-	-	-	-	-	-	-	-
63	-	-	390	-	-	-	-	-	-	-	-	-	-	-	-
64	Total Adjustments	(Sum of Lines 55 thru 64)		\$ -	\$ -	\$ -	\$ 30,693	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Revised Monthly Cost of Removal															
67	12185, 12190	(Line 42 + Line 55)	362	\$ 65,550	\$ 72,326	\$ 50,494	\$ 80,544	\$ (25,243)	\$ 19,631	\$ (443,973)	\$ (7,048)	\$ 20,445	\$ 28,740	\$ 27,173	\$ 308,355
68	12170, 12175, 12185, 12190	(Line 43 + Line 56)	364	(20,094)	364	(4,263)	17,759	(487)	8,200	20,886	13,124	21,395	26,699	23,506	25,302
69	12165, 12170, 12175, 12185, 12190	(Line 44 + Line 57)	365	(16,235)	(315)	(63,280)	27,257	21,112	3,341	21,140	(3,568)	33,446	21,898	26,940	42,878
70	12170, 12175, 12190	(Line 45 + Line 58)	366	(20,242)	(100)	3,136	13,960	(1,882)	5,220	12,709	6,711	21,999	16,657	20,741	23,008
71	12165, 12170, 12175, 12185, 12190	(Line 46 + Line 59)	367	(5,022)	(3,176)	4,549	18,685	(3,791)	6,053	15,274	10,287	27,848	26,478	21,731	40,769
72	12185	(Line 47 + Line 60)	368	-	-	-	-	800	7,411	11,814	25,604	14,995	24,725	756	1,819
73	12165	(Line 48 + Line 61)	369	867	-	-	5,084	-	-	31,183	11,665	(59,408)	8,763	(11,147)	-
74	-	(Line 49 + Line 62)	371	-	-	-	-	-	-	-	-	-	-	-	-
75	-	(Line 50 + Line 63)	373	-	-	-	-	-	-	-	-	-	-	-	-
76	-	(Line 51 + Line 64)	390	-	-	-	-	-	-	-	-	-	-	-	-
77	Total Revised Monthly Cost of Removal	(Sum of Lines 68 thru 77)		\$ 4,824	\$ 69,099	\$ (9,363)	\$ 162,689	\$ (9,492)	\$ 49,856	\$ (362,149)	\$ 76,294	\$ 151,795	\$ 85,789	\$ 129,612	\$ 430,984

2020 Grid Modernization Cost Recovery
Calculation of Deferred Taxes for 2019 Grid Modernization Investment

	Monthly Reference	Jan-19 (a)	Feb-19 (b)	Mar-19 (c)	Apr-19 (d)	May-19 (e)	Jun-19 (f)	Jul-19 (g)	Aug-19 (h)	Sep-19 (i)	Oct-19 (j)	Nov-19 (k)	Dec-19 (l)	
1	Federal Tax Depreciation													
2														
3	Tax Depreciation													
4	Total Monthly Depreciable Plant Additions	Sch. 5, Line 12 + Line 37	\$ 3,865,187	\$ 1,303,833	\$ 2,132,391	\$ 1,701,911	\$ 2,783,667	\$ 3,403,647	\$ 3,791,947	\$ 2,682,705	\$ 3,111,143	\$ 8,942,140	\$ 6,851,609	\$ 18,881,892
5	20 YR MACRS Tax Depreciation Rates	Internal Revenue Code Section 168	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%
6	Total Federal Tax Depreciation	Line 4 * Line 5	\$ 144,945	\$ 48,894	\$ 79,965	\$ 63,822	\$ 104,388	\$ 127,637	\$ 142,198	\$ 100,601	\$ 116,668	\$ 335,330	\$ 256,935	\$ 708,071
7														
8	Monthly Tax Depreciation													
9	January		\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079
10	February			4,445	4,445	4,445	4,445	4,445	4,445	4,445	4,445	4,445	4,445	4,445
11	March				7,997	7,997	7,997	7,997	7,997	7,997	7,997	7,997	7,997	7,997
12	April					7,091	7,091	7,091	7,091	7,091	7,091	7,091	7,091	7,091
13	May						13,049	13,049	13,049	13,049	13,049	13,049	13,049	13,049
14	June							18,234	18,234	18,234	18,234	18,234	18,234	18,234
15	July								23,700	23,700	23,700	23,700	23,700	23,700
16	August									20,120	20,120	20,120	20,120	20,120
17	September										29,167	29,167	29,167	29,167
18	October											111,777	111,777	111,777
19	November												128,468	128,468
20	December													708,071
21	Total Monthly Tax Depreciation	Line 9 through Line 20	\$ 12,079	\$ 16,524	\$ 24,520	\$ 31,611	\$ 44,660	\$ 62,894	\$ 86,594	\$ 106,714	\$ 135,881	\$ 247,657	\$ 376,125	\$ 1,084,196
22														
23	Deduction for Cost of Removal	Sch. 5, Line 76	\$ 4,824	\$ 69,099	\$ (9,363)	\$ 162,689	\$ (9,492)	\$ 49,856	\$ (362,149)	\$ 76,294	\$ 151,795	\$ 85,789	\$ 129,612	\$ 430,984
24														
25	Total Federal Tax Depreciation and Cost of Removal	Sum of Lines 21 and 23	\$ 16,903	\$ 85,623	\$ 15,157	\$ 194,300	\$ 35,168	\$ 112,750	\$ (275,556)	\$ 183,007	\$ 287,675	\$ 333,447	\$ 505,736	\$ 1,515,180
26														
27	State Tax Depreciation													
28														
29	Tax Depreciation													
30	Total Monthly Depreciable Plant Additions	Line 4	\$ 3,865,187	\$ 1,303,833	\$ 2,132,391	\$ 1,701,911	\$ 2,783,667	\$ 3,403,647	\$ 3,791,947	\$ 2,682,705	\$ 3,111,143	\$ 8,942,140	\$ 6,851,609	\$ 18,881,892
31	20 YR MACRS Tax Depreciation Rates	Internal Revenue Code Section 168	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%	3.750%
32	Total State Tax Depreciation	Line 30 * Line 31	\$ 144,945	\$ 48,894	\$ 79,965	\$ 63,822	\$ 104,388	\$ 127,637	\$ 142,198	\$ 100,601	\$ 116,668	\$ 335,330	\$ 256,935	\$ 708,071
33														
34	Monthly Tax Depreciation													
35	January		\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079	\$ 12,079
36	February			4,445	4,445	4,445	4,445	4,445	4,445	4,445	4,445	4,445	4,445	4,445
37	March				7,997	7,997	7,997	7,997	7,997	7,997	7,997	7,997	7,997	7,997
38	April					7,091	7,091	7,091	7,091	7,091	7,091	7,091	7,091	7,091
39	May						13,049	13,049	13,049	13,049	13,049	13,049	13,049	13,049
40	June							18,234	18,234	18,234	18,234	18,234	18,234	18,234
41	July								23,700	23,700	23,700	23,700	23,700	23,700
42	August									20,120	20,120	20,120	20,120	20,120
43	September										29,167	29,167	29,167	29,167
44	October											111,777	111,777	111,777
45	November												128,468	128,468
46	December													708,071
47	Total Remaining Tax Depreciation	Line 35 through Line 46	\$ 12,079	\$ 16,524	\$ 24,520	\$ 31,611	\$ 44,660	\$ 62,894	\$ 86,594	\$ 106,714	\$ 135,881	\$ 247,657	\$ 376,125	\$ 1,084,196
48														
49	Deduction for Cost of Removal	Line 23	\$ 4,824	\$ 69,099	\$ (9,363)	\$ 162,689	\$ (9,492)	\$ 49,856	\$ (362,149)	\$ 76,294	\$ 151,795	\$ 85,789	\$ 129,612	\$ 430,984
50														
51	Total State Tax Depreciation and Cost of Removal	Sum of Lines 47 and 49	\$ 16,903	\$ 85,623	\$ 15,157	\$ 194,300	\$ 35,168	\$ 112,750	\$ (275,556)	\$ 183,007	\$ 287,675	\$ 333,447	\$ 505,736	\$ 1,515,180

2020 Grid Modernization Cost Recovery
Calculation of Reallocation of Capitalized Overheads and Burdens for Rate Making Purposes
For the Year Ending December 31, 2018

<u>Line</u>	<u>Line of Business</u>	<u>Plant Account</u>	Actual 2018 Direct Capital <u>Costs</u> (a)	Percentage of Direct <u>Costs</u> (b)	Actual 2018 Overheads <u>Capitalized</u> (c)	Percentage of Total <u>Overheads</u> (d)	Actual 2018 Total Capital <u>Costs</u> (e) (a) + (c)	Normalized 2019 <u>Overheads</u> (f) (b) * (c) line 8	O&M Adjustment to <u>Overheads</u> (g)	Normalized 2018 <u>Capital Costs</u> (h) (a) + (f) + (g)
1	12170, 12175, 12190	364	\$ 182,271	0%	\$ 137,093	0%	\$ 319,364	\$ 91,284	\$ -	\$ 273,555
2	12170, 12175, 12190	365	1,188,105	1%	695,675	1%	1,883,780	595,022	-	1,783,126
3	12165, 12175	366	189,470	0%	117,855	0%	307,325	94,890	-	284,360
4	12175	367	146,082	0%	117,592	0%	263,674	73,160	-	219,242
5	12165	369	1,210,136	1%	42,401	0%	1,252,537	606,055	-	1,816,192
6	Subtotal: Grid Modernization Investment		\$ 2,916,064	1%	\$ 1,110,616	1%	\$ 4,026,680	\$ 1,460,411	-	4,376,475
7	All Other Non-Grid Modernization Capital		204,138,853	99%	102,585,790	99%	306,724,643	102,235,995	-	306,374,848
8	Total Capital Costs as Booked		<u>\$ 207,054,917</u>	<u>100%</u>	<u>\$ 103,696,406</u>	<u>100%</u>	<u>\$ 310,751,323</u>	<u>\$ 103,696,406</u>	<u>\$ -</u>	<u>\$ 310,751,323</u>

Note: Highlighted amounts represent a revision from D.P.U. 19-23.

2020 Grid Modernization Cost Recovery
Calculation of Reallocation of Capitalized Overheads and Burdens for Rate Making Purposes
For the Year Ending December 31, 2019

<u>Line</u>	<u>Line of Business</u>	<u>Plant Account</u>	Actual 2019 Direct Capital <u>Costs</u> (a)	Percentage of Direct <u>Costs</u> (b)	Actual 2019 Overheads <u>Capitalized</u> (c)	Percentage of Total <u>Overheads</u> (d)	Actual 2019 Total Capital <u>Costs</u> (e) (a) + (c)	Normalized 2019 <u>Overheads</u> (f) (b) * (c) line 8	O&M Adjustment to <u>Overheads</u> (g)	Normalized 2019 <u>Capital Costs</u> (h) (a) + (f) + (g)
1	12185, 12190	362	7,691,239	3%	6,224,812	4%	13,916,052	3,756,305	-	11,447,544
2	12165, 12170, 12175, 12180, 12185, 12190	364	4,287,207	1%	2,291,882	2%	6,579,089	2,093,818	-	6,381,025
3	12165, 12170, 12175, 12180, 12185, 12190	365	10,676,876	4%	4,948,235	3%	15,625,112	5,214,452	-	15,891,329
4	12165, 12170, 12175, 12180, 12190	366	3,046,213	1%	2,000,105	1%	5,046,317	1,487,732	-	4,533,945
5	12165, 12170, 12175, 12180, 12185, 12190	367	4,346,003	1%	2,360,491	2%	6,706,495	2,122,533	-	6,468,537
6	12185	368	1,873,290	1%	396,839	0%	2,270,129	914,891	-	2,788,181
7	12165, 12170, 12190	369	9,125,913	3%	347,660	0%	9,473,573	4,456,981	-	13,582,894
8	12170	371	1	0%	7	0%	7	0	-	1
9	12165	373	(981,744)	0%	(29,306)	0%	(1,011,050)	(479,471)	-	(1,461,215)
10	12180	390	84,441	0%	21,142	0%	105,583	41,240	-	125,681
11	Subtotal: Grid Modernization Investment		\$ 40,149,439	14%	\$ 18,561,868	13%	\$ 58,711,307	\$ 19,608,481	-	59,757,920
12	All Other Non-Grid Modernization Capital		250,004,052	86%	123,145,447	87%	373,149,499	122,098,833	-	372,102,885
13	Total Capital Costs as Booked		<u>\$ 290,153,491</u>	<u>100%</u>	<u>\$ 141,707,314</u>	<u>100%</u>	<u>\$ 431,860,805</u>	<u>\$ 141,707,314</u>	<u>\$ -</u>	<u>\$ 431,860,805</u>

**2020 Grid Modernization Cost Recovery
Calculation of Rate of Return and Capital Structure**

<u>Line #</u>	<u>Description</u>	<u>Capital Ratio</u> (a)	<u>Cost</u> (b)	<u>Weighted Cost</u> (c)	<u>Tax Gross-up Factor (1)</u> (d)	<u>Pre-Tax Rate of Return (2)</u> (e)
D.P.U. 17-05 (effective January 1, 2018)						
1	Debt	45.67%	4.21%	1.92%		1.92%
2	Preferred Stock	0.74%	4.56%	0.03%	72.68%	<u>0.05%</u>
3	Equity	<u>53.59%</u>	<u>10.00%</u>	<u>5.36%</u>	72.68%	<u>7.37%</u>
4						
5	Total	<u>100.00%</u>		<u>7.31%</u>		<u>9.34%</u>

NOTE:(1) Tax Gross-up Factor:

Federal Rate	21.00%
State Rate	<u>8.00%</u>
Effective State Rate = State Rate * (1 - Federal Rate)	6.32%
Effective State and Federal Tax Rate	T
Net Income After Taxes on Income	1 - T
State and Federal Taxes / Net Income After Taxes on Income	T / (1 - T)
	0.37589

(2) Line 2 col. (e) = Line 2 col. (c) / Line 2 col. (d)

Line 3 col. (e) = Line 3 col. (c) / Line 3 col. (d)

**2020 Grid Modernization Cost Recovery
Calculation of Grid Modernization Property Tax**

<u>Line #</u>	<u>Description</u>	<u>Vintage Year</u>	<u>Reference</u>	<u>2018</u> <u>(a)</u>	<u>2019</u> <u>(b)</u>
1	Plant in Service	2018	Schedule 2, Line 111	\$ 4,156,005	\$ 4,156,005
2	Accumulated Depreciation		Schedule 2, Line 112	(9,196)	(122,530)
3	Net Plant in Service		Line 1 + Line 2	\$ 4,146,809	\$ 4,033,475
4	Net Plant in Service subject to Property Tax Expense		Prior Year Line 3	\$ -	\$ 4,146,809
5	Property Tax Rate		NOTE 1	<u>2.56%</u>	<u>2.56%</u>
			Year 1 = 0; Year 2 = Line 4 * Line 5 * 50%; after Year 2 = Line 4 * Line 5		
6	Vintage Year Property Tax Expense			\$ -	\$ 53,125
7	Plant in Service	2019	Schedule 5, Line 166	\$ -	\$ 60,232,010
8	Accumulated Depreciation		Schedule 5, Line 167	-	(480,832)
9	Net Plant in Service		Line 7 + Line 8	\$ -	\$ 59,751,178
10	Net Plant in Service subject to Property Tax Expense		Prior Year Line 9	\$ -	\$ -
11	Property Tax Rate		NOTE 1	<u>2.56%</u>	<u>2.56%</u>
			Year 1 = 0; Year 2 = Line 4 * Line 5 * 50%; after Year 2 = Line 4 * Line 5		
12	Vintage Year Property Tax Expense			\$ -	\$ -

NOTE:

(1) Per D.P.U. 17-05 : Property Tax Rate Calculation:

Plant in Service	6,112,706,947
Accumulated Depreciation	(1,906,385,564)
Net Plant in Service	4,206,321,383
Rate Year Property Tax Expense	107,775,046
Property Tax Rate	<u>2.56%</u>

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental O&M Expense

Line #	Description	Reference	January (a)	February (b)	March (c)	April (d)	May (e)	June (f)	July (g)	August (h)	September (i)	October (j)	November (k)	December (l)	Total (m)
1	Incremental Payroll-related Expense	Sch. 12, Page 13, Line 22	\$ 29,595	\$ 31,727	\$ 33,318	\$ 33,901	\$ 34,131	\$ 45,066	\$ 26,916	\$ 25,110	\$ 33,813	\$ 33,047	\$ 48,905	\$ 26,816	\$ 402,346
2															
3	Incremental External Contractor Expense	Sch. 12, Page 12, Line 1090	\$ 1,176,258	\$ 717,239	\$ 659,184	\$ 621,095	\$ 493,913	\$ 1,095,931	\$ 631,165	\$ 552,162	\$ 619,990	\$ 379,653	\$ 219,761	\$ 58,155	\$ 7,224,506
4															
5	Total Incremental O&M Expense	Line 1 + Line 3	\$ 1,205,853	\$ 748,966	\$ 692,501	\$ 654,996	\$ 528,044	\$ 1,140,997	\$ 658,081	\$ 577,272	\$ 653,803	\$ 412,700	\$ 268,666	\$ 84,972	\$ 7,626,852

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

Line #	Vendor Name	Invoice Number	Vendor Invoice	Line of Business	Project	Work Order	Total Invoice	Grid Modernization Capital	Grid Modernization Expense	Grid Modernization Total	Distribution Total	January	February	March	April	May	June	July	August	September	October	November	December	Total
1	ADVANCED ENERGY GROUP	911112321450	AEG 082419	12165	EV210000	EVEXP021	\$ 15,000	\$ -	\$ -	15,000	15,000	-	-	-	-	-	-	-	-	-	-	-	-	15,000
2	ALAN SPAULDING	911111994195	NU1902	12165	EV210000	EVEXP021	600	5	475	480	120	-	-	-	475	-	-	-	-	-	-	-	-	475
3	ALAN SPAULDING	911111994195	NU1902	12165	EV410000	EVEXP041	600	1	119	120	480	-	-	-	-	-	-	-	-	-	-	-	-	119
4	ALAN SPAULDING	911112032255	NU1905	12165	EV210000	EVEXP021	600	5	475	480	120	-	-	-	475	-	-	-	-	-	-	-	-	475
5	ALAN SPAULDING	911112032255	NU1905	12165	EV410000	EVEXP041	600	1	119	120	480	-	-	-	119	-	-	-	-	-	-	-	-	119
6	ALAN SPAULDING	911112012719	NU1907	12165	EV210000	EVEXP021	1,726	14	1,367	1,381	345	-	-	-	1,367	-	-	-	-	-	-	-	-	1,367
7	ALAN SPAULDING	911112012719	NU1907	12165	EV410000	EVEXP041	1,726	3	342	345	1,381	-	-	-	342	-	-	-	-	-	-	-	-	342
8	ALAN SPAULDING	911112027004	NU1908	12165	EV410000	EVEXP041	1,400	277	1,400	280	1,120	-	-	-	277	-	-	-	-	-	-	-	-	1,400
9	ALAN SPAULDING	911112039526	NU1910	12165	EV210000	EVEXP021	1,650	13	1,307	1,320	330	-	-	-	-	1,307	-	-	-	-	-	-	-	1,307
10	ALAN SPAULDING	911112039526	NU1910	12165	EV410000	EVEXP041	1,650	3	327	330	1,320	-	-	-	327	-	-	-	-	-	-	-	-	327
11	ALAN SPAULDING	911112058789	NU1917	12165	EV410000	EVEXP041	1,344	3	266	269	1,075	-	-	-	266	-	-	-	-	-	-	-	-	266
12	ALAN SPAULDING	911112069380	NU1920	12165	EV210000	EVEXP021	1,200	12	948	960	240	-	-	-	-	-	948	-	-	-	-	-	-	948
13	ALAN SPAULDING	911112069380	NU1920	12165	EV410000	EVEXP041	1,200	-	240	240	960	-	-	-	-	-	-	-	-	-	-	-	-	240
14	ALAN SPAULDING	911112079298	NU1925	12165	EV410000	EVEXP041	188	0	37	38	150	-	-	-	-	-	37	-	-	-	-	-	-	37
15	ALAN SPAULDING	911112090680	NU1929	12165	EV410000	EVEXP041	1,350	3	267	270	1,080	-	-	-	267	-	-	-	-	-	-	-	-	267
16	ALAN SPAULDING	911112101641	NU1930	12165	EV410000	EVEXP041	600	1	119	120	480	-	-	-	119	-	-	-	-	-	-	-	-	119
17	ALAN SPAULDING	911112171854	NU1954	12165	EV410000	EVEXP041	600	1	119	120	480	-	-	-	-	-	-	-	119	-	-	-	-	119
18	ALT WHEELS	911112171415	1092	12165	EV210000	EVEXP021	3,000	-	2,400	2,400	600	-	-	-	-	-	-	-	-	-	-	-	-	2,400
19	ALT WHEELS	911112171415	1092	12165	EV410000	EVEXP041	3,000	-	600	3,000	2,400	-	-	-	-	-	-	-	-	-	-	-	-	600
20	AM LITHOGRAPHY CORP	911112048448	101089	12165	EV210000	EVEXP021	335	-	335	335	-	-	-	-	-	335	-	-	-	-	-	-	-	335
21	AM LITHOGRAPHY CORP	911112323597	10110	12165	EV210000	EVEXP021	124	(3)	124	127	-	-	-	-	-	-	-	127	-	-	-	-	-	127
22	ASPLUNDH CONSTRUCTION CORP	911111859345	49R50918	12190	WD00300	6AR22186	35,876	3,865	5	3,870	32,006	5	-	-	-	-	-	-	-	-	-	-	-	35,876
23	ASPLUNDH CONSTRUCTION CORP	911111859345	49R50918	12190	WD00300	6AR22185	35,876	11	4,990	30,886	11	-	-	-	-	-	-	-	-	-	-	-	-	35,876
24	ASPLUNDH CONSTRUCTION CORP	911111870560	50R50918	12170	WD00208	6AR22178	47,411	13	8,737	38,674	13	-	-	-	-	-	-	-	-	-	-	-	-	47,411
25	ASPLUNDH CONSTRUCTION CORP	911111870560	50R50918	12170	WD00208	6AR22179	47,411	252	252	48,163	47,411	252	-	-	-	-	-	-	-	-	-	-	-	47,411
26	ASPLUNDH CONSTRUCTION CORP	911111870560	50R50918	12190	WD00300	6AR22180	47,411	12,842	465	13,307	34,104	465	-	-	-	-	-	-	-	-	-	-	-	47,411
27	ASPLUNDH CONSTRUCTION CORP	911111929582	05R53619	12190	WD00300	6AR22236	43,961	26	6,545	37,390	37,390	-	-	26	-	-	-	-	-	-	-	-	-	43,961
28	ASPLUNDH CONSTRUCTION CORP	911111940452	06R53619	12170	WD00208	6AR22181	29,240	6	4,215	25,025	25,025	-	-	-	6	-	-	-	-	-	-	-	-	29,240
29	ASPLUNDH CONSTRUCTION CORP	911111940452	06R53619	12170	WD00208	6AR22267	29,240	90	90	29,330	29,330	-	-	-	90	-	-	-	-	-	-	-	-	29,330
30	ASPLUNDH CONSTRUCTION CORP	911111940452	06R53619	12170	WD00208	6AR22131	29,240	246	6,794	22,446	22,446	-	-	-	246	-	-	-	-	-	-	-	-	29,240
31	ASPLUNDH CONSTRUCTION CORP	911111940452	06R53619	12170	WD00208	6AR22132	29,240	381	10,154	18,705	18,705	-	-	-	-	-	-	-	-	-	-	-	-	29,240
32	ASPLUNDH CONSTRUCTION CORP	911111950909	07R53619	12190	WD00300	6AR22237	27,125	8	5,497	21,628	21,628	-	-	-	8	-	-	-	-	-	-	-	-	27,125
33	ASPLUNDH CONSTRUCTION CORP	911111950909	07R53619	12190	WD00300	6AR22239	27,125	29	5,119	22,006	22,006	-	-	-	29	-	-	-	-	-	-	-	-	27,125
34	ASPLUNDH CONSTRUCTION CORP	911111950909	07R53619	12170	WD00208	6AR22132	27,125	2,885	106	23,991	24,134	106	-	-	-	-	-	-	-	-	-	-	-	27,125
35	ASPLUNDH CONSTRUCTION CORP	911111960768	08R53619	12190	WD00300	6AR22236	25,302	5,098	21	5,119	20,183	21	-	-	-	-	-	-	-	-	-	-	-	25,302
36	ASPLUNDH CONSTRUCTION CORP	911111960768	08R53619	12170	WD00208	6AR22131	25,302	2,587	94	2,681	22,621	94	-	-	-	94	-	-	-	-	-	-	-	25,302
37	ASPLUNDH CONSTRUCTION CORP	911111960768	08R53619	12170	WD00208	6AR22267	25,302	116	7,937	17,346	17,346	-	-	-	116	-	-	-	-	-	-	-	-	25,302
38	ASPLUNDH CONSTRUCTION CORP	911111960783	08R53419	12170	WD00208	6S822359	12,776	3	2,050	10,726	10,726	-	-	-	3	-	-	-	-	-	-	-	-	12,776
39	ASPLUNDH CONSTRUCTION CORP	911111960783	08R53419	12170	WD00208	6S822367	12,776	770	23	792	11,983	23	-	-	23	-	-	-	-	-	-	-	-	12,776
40	ASPLUNDH CONSTRUCTION CORP	911111981356	10R53619	12190	WD00300	6AR22248	11,488	7,788	12	3,698	7,788	12	-	-	-	12	-	-	-	-	-	-	-	11,488
41	ASPLUNDH CONSTRUCTION CORP	911111981356	10R53619	12170	WD00208	6AR22267	11,488	2,438	48	9,048	9,048	48	-	-	-	-	-	-	-	-	-	-	-	11,488
42	ASPLUNDH CONSTRUCTION CORP	911111981375	11R53419	12170	WD00208	6S822358	30,443	5,496	284	24,664	24,664	-	-	-	284	-	-	-	-	-	-	-	-	30,443
43	ASPLUNDH CONSTRUCTION CORP	911111993562	12R53419	12170	WD00208	6AR22358	48,842	4,343	213	44,499	44,499	-	-	-	-	-	-	-	-	-	-	-	-	48,842
44	ASPLUNDH CONSTRUCTION CORP	911112000972	13R53619	12170	WD00208	6AR22241	38,216	15	10,818	10,833	27,383	15	-	-	-	-	-	-	-	-	-	-	-	38,216
45	ASPLUNDH CONSTRUCTION CORP	911112000972	13R53619	12190	WD00300	6AR22256	38,216	81	5,340	32,776	32,776	-	-	-	-	-	-	-	-	-	-	-	-	38,216
46	ASPLUNDH CONSTRUCTION CORP	911112000984	13R53419	12170	WD00208	6S822358	50,276	3,645	188	3,633	46,444	188	-	-	-	-	-	-	-	-	-	-	-	50,276
47	ASPLUNDH CONSTRUCTION CORP	911112000984	13R53419	12170	WD00208	6S822502	50,276	3,456	610	4,066	46,210	610	-	-	-	-	-	-	-	-	-	-	-	50,276
48	ASPLUNDH CONSTRUCTION CORP	911112012926	14R53619	12170	WD00208	6AR22181	31,577	3	1,760	29,817	29,817	3	-	-	-	-	-	-	-	-	-	-	-	31,577
49	ASPLUNDH CONSTRUCTION CORP	911112012926	14R53619	12170	WD00208	6AR22241	31,577	2,697	4	2,899	28,677	4	-	-										

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

Vendor Invoice										Grid Modernization Capital		Grid Modernization Expense		Grid Modernization Total		Distribution												Number												Total	
Line #	Vendor Name	Invoice Number	Line of Business	Project	Work Order	Total Invoice	January	February	March	April	May	June	July	August	September	October	November	December	Total	January	February	March	April	May	June	July	August	September	October	November	December	Total									
1	ADVANCED ENERGY GROUP	911112321450	AEG 092419	12165	EVEX10000	EVEX0021	\$ 15,000	\$ -	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,000									
104	ASPLUNDH CONSTRUCTION CORP	911112090891	20R53519	12170	WD00001	68R22372	15,204	1,639	56	15,200	1,695	13,510	-	-	-	-	-	56	-	-	-	-	-	56	-	-	-	-	-	-	56										
105	ASPLUNDH CONSTRUCTION CORP	911112090891	20R53519	12170	WD00028	68R22358	15,204	1,210	62	15,200	1,273	13,927	-	-	-	-	-	62	-	-	-	-	-	62	-	-	-	-	-	-	62										
106	ASPLUNDH CONSTRUCTION CORP	911112090891	20R53519	12185	WD00038	68S20328	15,204	1,344	76	15,200	1,474	13,726	-	-	-	-	-	76	-	-	-	-	-	76	-	-	-	-	-	-	76										
107	ASPLUNDH CONSTRUCTION CORP	911112090891	20R53519	12185	WD00008	68R20331	15,204	1,266	78	15,200	1,344	13,856	-	-	-	-	-	78	-	-	-	-	-	78	-	-	-	-	-	-	78										
108	ASPLUNDH CONSTRUCTION CORP	911112090891	20R53519	12170	WD00028	68R22361	15,204	3,841	92	15,200	3,933	11,271	-	-	-	-	-	92	-	-	-	-	-	92	-	-	-	-	-	-	92										
109	ASPLUNDH CONSTRUCTION CORP	911112090933	21R53419	12170	WD00001	68S20371	35,313	2,264	3	35,310	2,264	33,046	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-	3										
110	ASPLUNDH CONSTRUCTION CORP	911112090933	21R53419	12170	WD00028	68R22531	35,313	6,410	9	35,310	6,419	28,894	-	-	-	-	-	9	-	-	-	-	-	9	-	-	-	-	-	-	9										
111	ASPLUNDH CONSTRUCTION CORP	911112090933	21R53419	12170	WD00001	68S20374	35,313	2,417	22	35,310	2,439	32,874	-	-	-	-	-	22	-	-	-	-	-	22	-	-	-	-	-	-	22										
112	ASPLUNDH CONSTRUCTION CORP	911112090933	21R53419	12170	WD00001	68S20376	35,313	4,820	236	35,310	5,056	30,256	-	-	-	-	-	236	-	-	-	-	-	236	-	-	-	-	-	-	236										
113	ASPLUNDH CONSTRUCTION CORP	911112100141	22R53619	12170	WD00001	6A920240	20,784	1,217	20	20,784	1,227	19,557	-	-	-	-	-	20	-	-	-	-	-	20	-	-	-	-	-	-	20										
114	ASPLUNDH CONSTRUCTION CORP	911112100141	22R53619	12170	WD00001	6A920238	20,784	1,071	50	20,784	1,122	19,662	-	-	-	-	-	50	-	-	-	-	-	50	-	-	-	-	-	-	50										
115	ASPLUNDH CONSTRUCTION CORP	911112100142	22R53719	12170	WD00001	6A920240	31,480	6,443	104	31,480	6,547	24,933	-	-	-	-	-	104	-	-	-	-	-	104	-	-	-	-	-	-	104										
116	ASPLUNDH CONSTRUCTION CORP	911112100162	22R53419	12170	WD00001	68S20371	29,686	3,630	5	29,686	3,635	26,051	-	-	-	-	-	5	-	-	-	-	-	5	-	-	-	-	-	-	5										
117	ASPLUNDH CONSTRUCTION CORP	911112100162	22R53419	12170	WD00028	68R22531	29,686	4,125	5	29,686	4,125	25,561	-	-	-	-	-	5	-	-	-	-	-	5	-	-	-	-	-	-	5										
118	ASPLUNDH CONSTRUCTION CORP	911112100162	22R53419	12170	WD00001	68S20362	29,686	2,039	51	29,686	2,039	27,647	-	-	-	-	-	51	-	-	-	-	-	51	-	-	-	-	-	-	51										
119	ASPLUNDH CONSTRUCTION CORP	911112100162	22R53419	12170	WD00028	68R22502	29,686	2,805	147	29,686	2,952	26,734	-	-	-	-	-	147	-	-	-	-	-	147	-	-	-	-	-	-	147										
120	ASPLUNDH CONSTRUCTION CORP	911112100162	22R53419	12185	WD00008	68S20324	29,686	2,804	181	29,686	3,005	26,681	-	-	-	-	-	181	-	-	-	-	-	181	-	-	-	-	-	-	181										
121	ASPLUNDH CONSTRUCTION CORP	911112110268	23R53619	12170	WD00001	6A920732	38,691	9,022	10	38,691	9,032	29,659	-	-	-	-	-	10	-	-	-	-	-	10	-	-	-	-	-	-	10										
122	ASPLUNDH CONSTRUCTION CORP	911112110268	23R53619	12170	WD00001	6A920239	38,691	6,896	571	38,691	7,468	31,223	-	-	-	-	-	571	-	-	-	-	-	571	-	-	-	-	-	-	571										
123	ASPLUNDH CONSTRUCTION CORP	911112110269	23R53719	12170	WD00001	6A920238	25,825	8,200	385	25,825	8,585	17,240	-	-	-	-	-	385	-	-	-	-	-	385	-	-	-	-	-	-	385										
124	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12170	WD00001	68S20370	44,680	1,296	1	44,680	1,296	43,383	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	1										
125	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12170	WD00001	68S20371	44,680	1,737	3	44,680	1,737	42,943	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-	3										
126	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12170	WD00028	68R22369	44,680	1,514	3	44,680	1,517	43,163	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-	3										
127	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12170	WD00028	68R22531	44,680	1,991	3	44,680	1,994	42,686	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-	3										
128	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12185	WD00008	68S20293	44,680	1,260	69	44,680	1,329	43,351	-	-	-	-	-	69	-	-	-	-	-	69	-	-	-	-	-	-	69										
129	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12185	WD00008	68S20313	44,680	1,260	69	44,680	1,329	43,351	-	-	-	-	-	69	-	-	-	-	-	69	-	-	-	-	-	-	69										
130	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12170	WD00001	68S20374	44,680	5,978	92	44,680	6,070	38,610	-	-	-	-	-	92	-	-	-	-	-	92	-	-	-	-	-	-	92										
131	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12170	WD00001	68S20324	44,680	1,185	131	44,680	2,173	42,506	-	-	-	-	-	131	-	-	-	-	-	131	-	-	-	-	-	-	131										
132	ASPLUNDH CONSTRUCTION CORP	911112110278	23R53419	12170	WD00001	68S20376	44,680	11,346	556	44,680	11,903	32,777	-	-	-	-	-	556	-	-	-	-	-	556	-	-	-	-	-	-	556										
133	ASPLUNDH CONSTRUCTION CORP	911112127500	24R53619	12170	WD00001	6A920730	40,559	1,728	5	40,559	1,734	38,825	-	-	-	-	-	5	-	-	-	-	-	5	-	-	-	-	-	-	5										
134	ASPLUNDH CONSTRUCTION CORP	911112127500	24R53619	12170	WD00001	6A920238	40,559	1,778	84	40,559	1,862	38,697	-	-	-	-	-	84	-	-	-	-	-	84	-	-	-	-	-	-	84										
135	ASPLUNDH CONSTRUCTION CORP	911112127500	24R53619	12170	WD00001	6A920239	40,559	1,791	84	40,559	1,793	38,765	-	-	-	-	-	84	-	-	-	-	-	84	-	-	-	-	-	-	84										
136	ASPLUNDH CONSTRUCTION CORP	911112139559	25R53619	12190	WD00000	6A822183	30,662	7,568	41	30,662	7,580	23,082	-	-	-	-	-	41	-	-	-	-	-	41	-	-	-	-	-	-	41										
137	ASPLUNDH CONSTRUCTION CORP	911112139559	25R53619	12170	WD00028	6A822182	30,662	1,912	81	30,662	1,903	28,759	-	-	-	-	-	81	-	-	-	-	-	81	-	-	-	-	-	-	81										
138	ASPLUNDH CONSTRUCTION CORP	911112139560	25R53719	12170	WD00028	6A822181	23,479	3,379	5	23,479	3,384	20,095	-	-	-	-	-	5	-	-	-	-	-	5	-	-	-	-	-	-	5										
139	ASPLUNDH CONSTRUCTION CORP	911112139560	25R53719	12190	WD00001	6A822184	34,246	5,352	8	34,246	5,360	28,886	-	-	-	-	-	8	-	-	-	-	-	8	-	-	-	-	-	-	8										
140	ASPLUNDH CONSTRUCTION CORP	911112139561	26R53619	12190	WD00000	6A822184	34,246	1,771	3	34,246	1,773	32,473	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-													

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

Exhibit ES-JGG-6a Exhibit ES-JGG-6b																										
Line #	Vendor Name	Invoice Number	Vendor Invoice	Line of Business	Project	Work Order	Total Invoice	Grid Modernization Capital	Grid Modernization Expense	Grid Modernization Total	Distribution Total	January	February	March	April	May	June	July	August	September	October	November	December	Total	Reference	
1	ADVANCED ENERGY GROUP	9111212321450	AEG 092419	12165	EV210000	EVEK-P021	\$ 15,000	-	\$ 15,000	15,000	15,000	-													15,000	0001
206	ASPLUNDH CONSTRUCTION CORP	911121291351	2R853419	12185	WD000008	69S02109		4,749	3,266	1,322	4,082								1,322	-	-	-	-	-	1,322	0809
207	ASPLUNDH CONSTRUCTION CORP	911121208361	3ZRS3619	12185	WD000008	6A320160		47,246	3,356	4,746	3,579									-	-	-	-	-	4,367	0812
208	ASPLUNDH CONSTRUCTION CORP	911121208361	3ZRS3619	12185	WD000008	6A320160		47,246	3,356	4,746	3,579										-	-	-	-	4,367	0812
209	ASPLUNDH CONSTRUCTION CORP	911121208361	3ZRS3619	12185	WD000008	6A320111		47,246	3,356	4,746	3,579										-	-	-	-	4,367	0812
210	ASPLUNDH CONSTRUCTION CORP	911121208439	31RS3419	12185	WD000008	69S02003		39,596	2,612	218	2,630									-	-	-	-	-	218	0854
211	ASPLUNDH CONSTRUCTION CORP	911121208439	31RS3419	12185	WD000008	69S02003		39,596	2,612	218	2,630									-	-	-	-	-	218	0854
212	ASPLUNDH CONSTRUCTION CORP	911121208439	31RS3419	12185	WD000008	69S02007		39,596	2,612	218	2,630									-	-	-	-	-	218	0854
213	ASPLUNDH CONSTRUCTION CORP	911121208439	31RS3419	12185	WD000008	69S02007		39,596	2,612	218	2,630									-	-	-	-	-	218	0854
214	ASPLUNDH CONSTRUCTION CORP	911121208439	31RS3419	12185	WD000008	69S02007		39,596	2,612	218	2,630									-	-	-	-	-	218	0854
215	ASPLUNDH CONSTRUCTION CORP	911121208465	3ZRS3419	12170	WD000298	68S22369		18,178	6	6	4,109									-	-	-	-	-	6	0871
216	ASPLUNDH CONSTRUCTION CORP	911121208465	3ZRS3419	12185	WD000008	69S02028		18,178	3,982	224	4,153									-	-	-	-	-	224	0871
217	ASPLUNDH CONSTRUCTION CORP	911121208465	3ZRS3419	12185	WD000008	69S02028		18,178	3,982	224	4,153									-	-	-	-	-	224	0871
218	ASPLUNDH CONSTRUCTION CORP	911121208465	3ZRS3419	12185	WD000008	69S02028		18,178	3,982	224	4,153									-	-	-	-	-	224	0871
219	ASPLUNDH CONSTRUCTION CORP	911121208465	3ZRS3419	12185	WD000008	69S02028		18,178	3,982	224	4,153									-	-	-	-	-	224	0871
220	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
221	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
222	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
223	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
224	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
225	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
226	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
227	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
228	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
229	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
230	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
231	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
232	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
233	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
234	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
235	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
236	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
237	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
238	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
239	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
240	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
241	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
242	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
243	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
244	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
245	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
246	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
247	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
248	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
249	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
250	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
251	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
252	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
253	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
254	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
255	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
256	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
257	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
258	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
259	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
260	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
261	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
262	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
263	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS3619	12185	WD000008	6A320165		43,277	3,617	234	3,851									-	-	-	-	-	234	0882
264	ASPLUNDH CONSTRUCTION CORP	91112220438	3ZRS																							

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

Exhibit ES-JGG-6a																								
Exhibit ES-JGG-6a																								
Reference																								
Line #	Vendor Name	Invoice Number	Number	Line of Business	Project	Work Order	Total Invoice	Grid Modernization Capital	Grid Modernization Expense	Grid Modernization Total	Distribution Total	January	February	March	April	May	June	July	August	September	October	November	December	Total
308	ADVANCED ENERGY GROUP	91111222146	AEG-09249	12165	EV210000	EVEXP001	\$ 15,000	\$ -	\$ -	15,000	\$ -													15,000
309	BOSTON POLICE DEPARTMENT	911112222376	BP00078249	12175	18328	02320169	50,873	318	50	368	50,505						50							2624
310	BOSTON POLICE DEPARTMENT	911112222376	BP00078249	12175	18328	02320189	50,873	222	422	222	50,651						222							222
311	BOSTON POLICE DEPARTMENT	911112222377	BP00078459	12175	18328	02327367	39,987	603	43	368	39,421							43						43
312	BOSTON POLICE DEPARTMENT	911112222377	BP00078459	12175	18328	02319970	39,987	301	67	368	39,619													67
313	BOSTON POLICE DEPARTMENT	911112222377	BP00078459	12175	18328	02332189	39,987	188	886	1,074	38,913							886						886
314	BOSTON POLICE DEPARTMENT	911112233013	BP00078691	12175	18328	02332189	40,911	(148)	332	184	40,727								332					332
315	BOSTON POLICE DEPARTMENT	911112255988	BP00078855	12175	18326	02317855	40,678	346	18	368	40,310													18
316	BOSTON POLICE DEPARTMENT	911112255988	BP00078855	12175	18328	02319959	40,678	272	152	424	40,254							22						22
317	BOSTON POLICE DEPARTMENT	911112255988	BP00078855	12175	18328	02348077	40,678	176	192	368	40,310													192
318	BOSTON POLICE DEPARTMENT	911112265747	BP00079411	12175	18328	02291598	40,365	297	152	368	39,963								162					162
319	BOSTON POLICE DEPARTMENT	911112265787	BP00079610	12175	18328	02291598	40,365	331	93	424	31,863								93					3281
320	BOSTON POLICE DEPARTMENT	911112265787	BP00079610	12175	18328	02348077	40,365	176	192	368	31,919								192					192
321	BOSTON POLICE DEPARTMENT	911112280351	BP00079965	12175	18326	02320191	32,279	314	54	368	32,711													3378
322	BOSTON POLICE DEPARTMENT	911112280351	BP00079965	12175	18328	02341460	33,079	191	177	368	33,079													3310
323	BOSTON POLICE DEPARTMENT	911112280351	BP00080176	12175	18326	02320191	33,625	314	54	368	33,257													3480
324	BOSTON POLICE DEPARTMENT	911112280351	BP00080176	12175	18328	02341468	33,625	324	324	368	33,257													3480
325	BOSTON POLICE DEPARTMENT	911112290425	BP00080347	12175	18328	02319959	36,291	71	36,291	368	35,923													3578
326	BOSTON POLICE DEPARTMENT	911112299744	BP00080511	12175	18328	02337264	30,593	347	21	368	30,225													3687
327	BOSTON POLICE DEPARTMENT	911112299744	BP00080511	12175	18326	02320190	30,593	313	55	368	30,225													3687
328	BOSTON POLICE DEPARTMENT	911112299744	BP00080511	12175	18326	02320206	30,593	287	81	368	30,225													3687
329	BOSTON POLICE DEPARTMENT	911112306610	BP00080745	12175	18328	02322002	48,378	350	18	368	48,010													3777
330	BOSTON POLICE DEPARTMENT	911112306610	BP00080745	12175	18326	02320190	48,378	313	55	368	48,010													3777
331	BOSTON POLICE DEPARTMENT	911112306610	BP00080745	12175	18326	02320206	48,378	331	93	424	47,954													3777
332	BOSTON POLICE DEPARTMENT	911112306610	BP00080745	12175	18328	02291598	48,378	106	318	424	47,954													3777
333	BOSTON POLICE DEPARTMENT	911112306610	BP00080745	12175	18328	02350332	48,378	1235	(414)	368	48,378													3777
334	BOSTON POLICE DEPARTMENT	911112311605	BP00080980	12175	18328	02351101	42,434	349	19	368	42,066													3922
335	BOSTON POLICE DEPARTMENT	911112311605	BP00080980	12175	18328	02348077	42,434	181	368	42,066														3922
336	BOSTON POLICE DEPARTMENT	911112311605	BP00080980	12175	18328	02350332	42,434	895	17	368	42,066													3922
337	BOSTON POLICE DEPARTMENT	911112319429	BP00081188	12175	18328	02319959	44,308	297	71	368	43,940													4050
338	BOSTON POLICE DEPARTMENT	911112319429	BP00081188	12175	18328	02332189	44,308	220	148	368	43,940													4050
339	BOSTON POLICE DEPARTMENT	911112337427	BP00081381	12175	18328	02332200	41,738	350	18	368	41,370													4186
340	BOSTON POLICE DEPARTMENT	911112343015	BP00081570	12175	18328	02332200	41,738	350	18	368	41,370													4186
341	BOSTON POLICE DEPARTMENT	911112343015	BP00081570	12175	18328	02351101	43,358	330	38	368	42,990													4311
342	BOSTON POLICE DEPARTMENT	911112367954	BP00081805	12175	18328	02319970	35,385	300	68	368	35,017													4443
343	BOSTON POLICE DEPARTMENT	911112370090	BP00082231	12175	18328	02348074	43,635	-	184	184	43,451													4551
344	BOSTON POLICE DEPARTMENT	911112370091	BP00082439	12175	18326	02367025	35,655	179	264	368	35,391													4555
345	BSC GROUP INC	911112056912	9135880	12185	W0000008	68822407	584	526	58	584							58							58
346	BSC GROUP INC	911112056917	9135888	12185	W0000008	68920189	43	4	39	43														4
347	BSC GROUP INC	911112113569	9136244	12185	W0000008	68920188	261	22	239	22	261													4
348	BSC GROUP INC	911112113570	9136248	12185	W0000008	68920188	22	235	230	22	261													4
349	BSC GROUP INC	911112176479	9136548	12185	W0000008	68920192	1,764	1,638	126	1,764														0003
350	BSC GROUP INC	911112304970	9137539	12185	W0000008	68822409	303	282	20	303														0011
351	BSC GROUP INC	911112366309	9137937	12185	W0000008	68822409	234	219	15	234														0015
352	CAMBRIDGE ARTS COUNCIL FUND INC	911112049963	4-22-2019	12165	EV210000	EVEXP001	5,000	1,250	1,250	3,750					1,250									1,250
353	CAMBRIDGE ARTS COUNCIL FUND INC	911112049963	4-22-2019	12165	EV210000	EVEXP001	5,000	1,250	1,250	3,750					1,250									1,250
354	CAPE COD BLUE ECONOMY FOUNDATIC	911112196870	CCBEF-1	12165	EV210000	EVEXP002	4,000	-	4,000	4,000														4,000
355	CHARGEPOINT INC	911112179408	INSG630	12165	EV210000	EVEXP002	1,315	-	1,315	1,315														1,315
356	CHARGEPOINT INC	911112179409	INSG589	12165	EV210000	EVEXP002	14,091	-	14,091	14,091														14,091
357	CITY OF CHELSEA	911112253611	19-020-DV	12170	18326	02326717	1,813	331	431	1,382														1,382
358	CITY OF CHELSEA	911112348419	19-092-DV	12170	18326	02326700	1,725	1,725	642	1,725														1,725
359	CITY OF CHELSEA	911112357603	19-098-DV	12170	18326	02326700	3,058	253	613	2,645														613
360	CITY OF CHELSEA	911112360765	19-1020-DV	12170	18326	02326720	6,321	869	1,366	2,235	4,086													1,366
361	CITY OF CHELSEA	911112370170	19-1046-DV	12170	18326	02326720	4,165	507	344	2,587	3,608													3,608
362	CITY OF CHELSEA	911112370170	19-1046-DV	12170	18326	02326700	4,165	1,023	294	1,294	2,872													2,872
363	CITY OF CHELSEA	911112370170	19-1046-DV	12170	18326	02326725	4,165	482	459	942	3,224													942
364	CITY OF CHELSEA	911112370184	19-1064-DV	12170	18326	02326721	3,450	406	567	862	2,587													2,587
365	CITY OF CHELSEA	911112370184	19-1064-DV	12170	18326	02326726	3,450	73	790	862	2,587													790
366	CITY OF CHELSEA	911112084421	15791	12170	18326	02326714	15791	968	271	968	1,596													968
367	CITY OF CHELSEA	911112103399	15860	12170	18326	02326714	2,904	697	271	968	1,596													968
368	CITY OF CHELSEA	911112174222	15907	12170	18326	02326502	484	382	102	484														102
369	CITY OF CHELSEA	911112423286	15763	12170	18326	02326714	1,210	61	68	1,150														68
370	CITY OF NEW BEDFORD	911112045749	19001559	12170	18326	02316867	7,040	618	182	800	6,240													182
371	CITY OF NEW BEDFORD	911112045750	19001555	12170	18326	02316867	5,280	679	121	800	4,480													121
372	CITY OF NEW BEDFORD	911112045751	19001633	12170	18326	02316867	9,240	679	121	800	8,440													121
373																								

Exhibit ES-JGG-6a/
Exhibit ES-JGG-6b

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

		Vendor Invoice		Line of Business	Project	Work Order	Grid Modernization		Grid Modernization		Grid Modernization		Distribution												Exhibit ES-JGC-6a Exhibit ES-JGC-6b			
Line #	Vendor Name	Invoice Number	Number				Total Invoice	Capital	Expense	Total	Total	Total	January	February	March	April	May	June	July	August	September	October	November	December	Total	Reference		
1	ADVANCED ENERGY GROUP	91112321450	AEG 092419	12165	EVS10000	EVEXP021	\$ 15,000	\$ -	\$ -	15,000	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	4	-	-	-	-	-	15,000	\$ -	\$ -	15,000	0001
513	DANIEL BURKE ELECTRICAL	91112215248	10710	12170	WD00001	6820031	3,146	4	3,142	3,146	3,146	4	-	-	-	-	-	4	-	-	-	-	-	-	-	4	-	1003
514	DANIEL BURKE ELECTRICAL	91112215253	10719	12170	WD00001	6820031	4,495	53	4,442	4,495	4,495	53	-	-	-	-	-	53	-	-	-	-	-	-	-	53	-	1006
515	DANIEL BURKE ELECTRICAL	91112215256	10720	12170	WD00001	6820038	3,078	5	3,073	3,078	3,078	5	-	-	-	-	-	5	-	-	-	-	-	-	-	5	-	1009
516	DANIEL BURKE ELECTRICAL	91112215263	10721	12170	WD00028	68822357	3,146	7	3,140	3,146	3,146	7	-	-	-	-	-	7	-	-	-	-	-	-	-	7	-	1012
517	DANIEL BURKE ELECTRICAL	91112215266	10742	12185	WD00008	6820196	24,037	4,711	24,037	24,037	24,037	4,711	-	-	-	-	-	4,711	-	-	-	-	-	-	-	4,711	-	1015
518	DANIEL BURKE ELECTRICAL	91112215267	10761	12185	WD00008	6820196	14,523	11,677	2,846	14,523	14,523	11,677	-	-	-	-	-	2,846	-	-	-	-	-	-	-	11,677	-	1022
519	DANIEL BURKE ELECTRICAL	91112227132	10770	12185	WD00008	6820196	5,376	4,323	1,054	5,376	5,376	4,323	-	-	-	-	-	1,054	-	-	-	-	-	-	-	1,054	-	1027
520	DANIEL BURKE ELECTRICAL	91112257725	10791	12185	WD00008	6820192	20,201	16,434	3,767	20,201	20,201	16,434	-	-	-	-	-	-	3,767	-	-	-	-	-	-	3,767	-	1030
521	DANIEL BURKE ELECTRICAL	91112257733	10818	12185	WD00008	6820192	6,346	5,163	1,183	6,346	6,346	5,163	-	-	-	-	-	1,183	-	-	-	-	-	-	-	1,183	-	1037
522	DANIEL BURKE ELECTRICAL	91112257735	10823	12185	WD00008	6820192	1,629	1,325	304	1,629	1,629	1,325	-	-	-	-	-	304	-	-	-	-	-	-	-	304	-	1040
523	DANIEL BURKE ELECTRICAL	91112257736	10824	12185	WD00008	6820192	15,445	12,565	2,880	15,445	15,445	12,565	-	-	-	-	-	2,880	-	-	-	-	-	-	-	2,880	-	1043
524	DANIEL BURKE ELECTRICAL	91112257737	10826	12185	WD00008	6820323	6,159	4,632	1,528	6,159	6,159	4,632	-	-	-	-	-	1,528	-	-	-	-	-	-	-	1,528	-	1048
525	DANIEL BURKE ELECTRICAL	91112257746	10836	12185	WD00008	6820323	6,159	5,740	419	6,159	6,159	5,740	-	-	-	-	-	419	-	-	-	-	-	-	-	419	-	1051
526	DANIEL BURKE ELECTRICAL	91112267001	10817	12185	WD00008	6820190	8,045	6,763	1,282	8,045	8,045	6,763	-	-	-	-	-	1,282	-	-	-	-	-	-	-	1,282	-	1054
527	DANIEL BURKE ELECTRICAL	91112267074	10868	12185	WD00008	6820198	16,949	14,637	2,312	16,949	16,949	14,637	-	-	-	-	-	2,312	-	-	-	-	-	-	-	2,312	-	1058
528	DANIEL BURKE ELECTRICAL	91112267077	10846	12185	WD00008	6820198	-	567	489	567	567	489	-	-	-	-	-	77	-	-	-	-	-	-	-	77	-	1065
529	DANIEL BURKE ELECTRICAL	91112267082	10847	12185	WD00008	6820192	6,053	1,129	4,924	6,053	6,053	1,129	-	-	-	-	-	1,129	-	-	-	-	-	-	-	1,129	-	1068
530	DANIEL BURKE ELECTRICAL	91112282847	10554	12170	WD00028	68822513	7,090	6,881	209	7,090	7,090	6,881	-	-	-	-	-	209	-	-	-	-	-	-	-	209	-	1071
531	DANIEL BURKE ELECTRICAL	91112288095	10887	12185	WD00008	6820190	10,346	8,697	1,649	10,346	10,346	8,697	-	-	-	-	-	-	-	-	-	-	-	-	-	1,649	-	1074
532	DANIEL BURKE ELECTRICAL	91112288099	10892	12185	WD00008	6820190	2,512	2,111	400	2,512	2,512	2,111	-	-	-	-	-	-	400	-	-	-	-	-	-	400	-	1077
533	DANIEL BURKE ELECTRICAL	91112288216	10935	12185	WD00008	6820190	17,553	14,755	2,798	17,553	17,553	14,755	-	-	-	-	-	2,798	-	-	-	-	-	-	-	2,798	-	1080
534	DANIEL BURKE ELECTRICAL	91112288221	10937	12185	WD00008	6820194	9,982	7,660	2,323	9,982	9,982	7,660	-	-	-	-	-	2,323	-	-	-	-	-	-	-	2,323	-	1085
535	DANIEL BURKE ELECTRICAL	91112290199	10792	12185	WD00008	6820192	3,314	2,696	618	3,314	3,314	2,696	-	-	-	-	-	618	-	-	-	-	-	-	-	618	-	1088
536	DANIEL BURKE ELECTRICAL	91112292002	10790	12185	WD00008	6820196	8,045	6,459	1,577	8,045	8,045	6,459	-	-	-	-	-	1,577	-	-	-	-	-	-	-	1,577	-	1091
537	DANIEL BURKE ELECTRICAL	911123233808	10947	12185	WD00008	6820190	15,158	12,750	2,418	15,158	15,158	12,750	-	-	-	-	-	2,418	-	-	-	-	-	-	-	2,418	-	1094
538	DANIEL BURKE ELECTRICAL	911123233809	10963	12185	WD00008	6820190	15,159	12,743	2,416	15,159	15,159	12,743	-	-	-	-	-	2,416	-	-	-	-	-	-	-	2,416	-	1100
539	DANIEL BURKE ELECTRICAL	91112333624	11017	12185	WD00008	68822406	9,717	7,787	1,930	9,717	9,717	7,787	-	-	-	-	-	-	-	-	-	-	-	-	-	1,930	-	1106
540	DANIEL BURKE ELECTRICAL	9111233964	10955	12185	WD00008	6820192	706	575	132	706	706	575	-	-	-	-	-	132	-	-	-	-	-	-	-	132	-	1109
541	DANIEL BURKE ELECTRICAL	91112347735	10884	12185	WD00008	6820198	16,673	14,399	2,274	16,673	16,673	14,399	-	-	-	-	-	2,274	-	-	-	-	-	-	-	2,274	-	1111
542	DANIEL BURKE ELECTRICAL	91112347737	10886	12185	WD00008	6820198	314	271	43	314	314	271	-	-	-	-	-	43	-	-	-	-	-	-	-	43	-	1116
543	DANIEL BURKE ELECTRICAL	91112347738	10893	12185	WD00008	6820194	35,166	26,984	8,182	35,166	35,166	26,984	-	-	-	-	-	8,182	-	-	-	-	-	-	-	8,182	-	1119
544	DANIEL BURKE ELECTRICAL	91112347747	10900	12185	WD00008	6820198	2,363	2,041	322	2,363	2,363	2,041	-	-	-	-	-	322	-	-	-	-	-	-	-	322	-	1129
545	DANIEL BURKE ELECTRICAL	91112363318	11026	12185	WD00008	68822406	23,667	19,967	3,700	23,667	23,667	19,967	-	-	-	-	-	-	-	-	-	-	-	-	-	3,700	-	1132
546	DANIEL BURKE ELECTRICAL	91112363324	11032	12170	WD00028	68822362	7,333	7,332	1	7,333	7,333	7,332	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	1139
547	DANIEL BURKE ELECTRICAL	91112363327	11033	12185	WD00008	68822406	1,993	1,598	396	1,993	1,993	1,598	-	-	-	-	-	396	-	-	-	-	-	-	-	396	-	1142
548	DANIEL BURKE ELECTRICAL	91112363328	11038	12170	WD00028	68822362	13,954	13,954	0	13,954	13,954	13,954	-	-	-	-	-	0	-	-	-	-	-	-	-	0	-	1145
549	DANIEL BURKE ELECTRICAL	91112376520	11044	12185	WD00008	68822408	18,305	11,665	6,640	18,305	18,305	11,665	-	-	-	-	-	6,640	-	-	-	-	-	-	-	6,640	-	1150
550	DANIEL BURKE ELECTRICAL	91112376524	11046	12170	WD00028	68822362	2,178	2,178	0	2,178	2,178	2,178	-	-	-	-	-	0	-	-	-	-	-	-	-	0	-	1155
551	DANIEL BURKE ELECTRICAL	91112376530	11058	12185	WD00008	68202247	1,132	272	860	1,132	1,132	272	-	-	-	-	-	860	-	-	-	-	-	-	-	860	-	1158
552	DANIEL BURKE ELECTRICAL	91112376531	11062	12185	WD00008	68822408	5,923	2,148	3,775	5,923	5,923	2,148	-	-	-	-	-	3,77										

Exhibit ES-JGG-6a/
Exhibit ES-JGG-6b

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

Exhibit ES-JGG-6a/ Exhibit ES-JGG-6b																										
Line #	Vendor Name	Invoice Number	Vendor Invoice	Line of Business	Project	Work Order	Total Invoice	Grid Modernization Capital	Grid Modernization Expense	Grid Modernization Total	Distribution Total	January	February	March	April	May	June	July	August	September	October	November	December	Total	Reference	
1	ADVANCED ENERGY GROUP	91112231450	AEG 092419	12165	EV210000	EVEXP0021	\$ 15,000	-	\$	15,000	\$	-	-	-	-	-	-	-	-	-	-	-	-	-	15,000	0001
717	MIRRA CO INC	91112231529	M004436	12175	18328	02291598	3,512	-	2,810	-	702	-	3,512	-	-	-	-	-	-	-	-	-	-	-	702	1557
718	MIRRA CO INC	91112231530	M004437	12175	18328	02351101	1,456	-	1,388	-	68	-	1,456	-	-	-	-	-	-	-	-	-	-	-	68	1559
719	MIRRA CO INC	91112231700	M004443	12175	18328	02319599	8,273	-	6,828	-	1,444	-	8,273	-	-	-	-	-	-	-	-	-	-	-	1,444	1561
720	MIRRA CO INC	91112231834	M004345	12175	18328	02319970	3,144	-	2,624	-	520	-	3,144	-	-	-	-	-	-	-	-	-	-	-	520	1564
721	MIRRA CO INC	91112239029	M004502	12175	18328	02341468	15,462	-	243	-	162	-	405	-	15,057	-	-	-	-	-	-	-	-	-	162	1567
722	MIRRA CO INC	91112251570	M004568	12175	18328	02291598	12,395	-	246	-	159	-	405	-	11,990	-	-	-	-	-	-	-	-	-	159	1577
723	MIRRA CO INC	91112251572	M004570	12175	18328	02351101	440	-	419	-	21	-	440	-	-	-	-	-	-	-	-	-	-	-	21	1584
724	MIRRA CO INC	91112268922	M004703	12175	18328	02355932	3,464	-	1,746	-	1,718	-	3,464	-	-	-	-	-	-	-	-	-	-	-	1,718	1587
725	MIRRA CO INC	91112268936	M004710	12175	18328	02319863	3,733	-	2,986	-	746	-	3,733	-	-	-	-	-	-	-	-	-	-	-	746	1589
726	MIRRA CO INC	91112268937	M004708	12175	18328	02319970	3,464	-	2,883	-	581	-	3,464	-	-	-	-	-	-	-	-	-	-	-	581	1591
727	MIRRA CO INC	91112268947	M004699	12175	18328	02291598	11,660	-	246	-	159	-	405	-	11,255	-	-	-	-	-	-	-	-	-	159	1594
728	MIRRA CO INC	91112280298	M004825	12175	18328	02340862	19,492	-	238	-	166	-	405	-	19,087	-	-	-	-	-	-	-	-	-	166	1602
729	MIRRA CO INC	91112280319	M004822	12175	18328	02351101	19,492	-	444	-	222	-	466	-	19,026	-	-	-	-	-	-	-	-	-	22	1613
730	MIRRA CO INC	91112280406	M004802	12175	18328	02319870	3,144	-	2,515	-	629	-	3,144	-	-	-	-	-	-	-	-	-	-	-	629	1623
731	MIRRA CO INC	91112300642	M004950	12175	18328	02319735	1,760	-	1,408	-	352	-	1,760	-	-	-	-	-	-	-	-	-	-	-	352	1625
732	MIRRA CO INC	91112309961	M005078	12175	18328	02354744	2,824	-	1,417	-	2,824	-	2,824	-	-	-	-	-	-	-	-	-	-	-	1,407	1627
733	MIRRA CO INC	91112309964	M005079	12175	18328	02329178	2,824	-	1,753	-	1,071	-	2,824	-	-	-	-	-	-	-	-	-	-	-	1,071	1629
734	MIRRA CO INC	91112345047	M005274	12175	18328	02319877	1,760	-	879	-	881	-	1,760	-	-	-	-	-	-	-	-	-	-	-	881	1631
735	MIRRA CO INC	91112354341	M005346	12175	18328	02354744	440	-	221	-	219	-	440	-	-	-	-	-	-	-	-	-	-	-	219	1636
736	MIRRA CO INC	91112373665	M005440	12175	18328	02319970	3,344	-	2,783	-	561	-	3,344	-	-	-	-	-	-	-	-	-	-	-	561	1641
737	MIRRA CO INC	91112373702	M005456	12175	18328	02319877	8,160	-	4,075	-	4,085	-	8,160	-	-	-	-	-	-	-	-	-	-	-	4,085	1643
738	MIRRA CO INC	91112373754	M005480	12175	18328	02319970	22,519	-	18,741	-	3,778	-	22,519	-	-	-	-	-	-	-	-	-	-	-	3,778	1645
739	MORAN ENVIRONMENTAL RECOVERY	91112268452	82495	12170	18326	02316003	3,965	-	3,316	-	649	-	3,965	-	-	-	-	-	-	-	-	-	-	-	649	1650
740	MORAN ENVIRONMENTAL RECOVERY	91112307811	83666	12170	18326	02326713	2,113	-	1,517	-	597	-	2,113	-	-	-	-	-	-	-	-	-	-	-	597	1661
741	NAIOP MASSACHUSETTS	91112052242	95599	12165	EV210000	EVEXP0021	3,500	-	2,800	-	700	-	3,500	-	-	-	-	-	2,800	-	-	-	-	-	700	1671
742	NAIOP MASSACHUSETTS	91112052242	95599	12165	EV410000	EVEXP0041	3,500	-	2,800	-	700	-	3,500	-	-	-	-	-	700	-	-	-	-	-	700	1671
743	NAVIGANT	91112077709	0100041141	12195	19666	GMPPNAV00	101,241	-	101,241	-	101,241	-	-	-	-	-	-	-	-	-	-	-	-	-	101,241	1672
744	NAVIGANT	91112103789	01000419168	12195	19666	GMPPNAV00	44,702	-	44,702	-	44,702	-	-	-	-	-	-	-	-	-	-	-	-	-	44,702	1676
745	NAVIGANT	91112267264	0100046373	12195	19666	GMPPNAV00	43,394	-	43,394	-	43,394	-	-	-	-	-	-	-	-	-	-	-	-	-	43,394	1679
746	OASIS CHARGER CORPORATION	91112236895	1982	12165	EV410000	EVEXP0041	8,289	-	8,289	-	8,289	-	-	-	-	-	-	-	-	-	-	-	-	-	8,289	1682
747	OASIS CHARGER CORPORATION	91112236896	1983	12165	EV410000	EVEXP0041	9,572	-	9,572	-	9,572	-	-	-	-	-	-	-	-	-	-	-	-	-	9,572	1683
748	OASIS CHARGER CORPORATION	91112236898	1984	12165	EV410000	EVEXP0041	8,289	-	8,289	-	8,289	-	-	-	-	-	-	-	-	-	-	-	-	-	8,289	1684
749	RIGGS DISTLER & COMPANY INC.	91112172588	OC26TE013	12170	WD000208	6AR21128	22,923	-	3,561	-	5	-	3,566	-	19,357	-	-	-	-	-	-	-	-	-	5	1685
750	RIGGS DISTLER & COMPANY INC.	91112233932	OC26TE042	12185	WD000308	6A920162	52,984	-	5,398	-	354	-	5,753	-	47,231	-	-	-	-	-	-	-	-	-	354	1693
751	RILEY BROTHERS INC	91111955185	NUP18-681	12175	18328	02291488	70	-	47	-	23	-	70	-	-	23	-	-	-	-	-	-	-	-	23	1703
752	RILEY BROTHERS INC	91111955564	NUP19-190	12175	18328	02290637	8,754	-	202	-	8,754	-	-	-	-	-	-	-	-	-	-	-	-	-	202	1708
753	SHEERIN CONSTRUCTION CORP	91111896457	7547	12175	18328	02291493	19,224	-	148	-	220	-	368	-	18,856	-	220	-	-	-	-	-	-	-	220	1714
754	SHEERIN CONSTRUCTION CORP	91111896457	7547	12175	18328	02291492	19,224	-	369	-	368	-	18,856	-	(1)	-	-	-	-	-	-	-	-	-	369	1714
755	SHEERIN CONSTRUCTION CORP	91111918993	7604	12175	18328	02291604	20,393	-	2,146	-	580	-	2,736	-	-	580	-	-	-	-	-	-	-	-	580	1728
756	SHEERIN CONSTRUCTION CORP	91111944177	7616	12175	18328	02291604	16,749	-	317	-	79	-	16,353	-	-	-	-	-	-	-	-	-	-	-	79	1735
757	SHEERIN CONSTRUCTION CORP	91112005723	7651	12190	18329	02316790	3,584	-	3,799	-	214	-	3,799	-	-	-	214	-	-	-	-	-	-	-	214	1748
758	SHEERIN CONSTRUCTION CORP	91112005813	7680	12175	18328	02291604	1,431	-	25	-	4	-	1,401	-	-	4	-	-	-	-	-	-	-	-	4	1752
759	SHEERIN CONSTRUCTION CORP	91112276404	7860	12175	18328	02291604	20,481	-	382	-	440	-	20,481	-	-	-	-	-	-	-	-	-	-	-	382	1763
760	SHEERIN CONSTRUCTION CORP	91112287976	7869	12175	18328	02291604	18	-	124	-	18	-	124	-												

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

[illegible]

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

Line #	Vendor Name	Invoice Number	Vendor Invoice Number	Line of Business	Project	Work Order	Total Invoice	Grid Modernization Capital	Grid Modernization Expense	Grid Modernization Total	Distribution Total	January	February	March	April	May	June	July	August	September	October	November	December	Total
921	ADVANCED ENERGY GROUP	911112231450	ALC 002419	12170	EVS0000	EVSX0021		-	15,000	\$														15,000
922	TRC ENGINEERS LLC	911112143777	128649	12170	18326	02326712	24,395	107	5,000	\$	15,000			24,228					59	-				15,000
923	TRC ENGINEERS LLC	911112143777	128649	12170	18326	02326713	24,395	245	61		24,395			24,088					61	-				61
924	TRC ENGINEERS LLC	911112171299	129054	12185	WD00008	6802404	3,230	51	21		3,159			3,159					21	-				21
925	TRC ENGINEERS LLC	911112171299	129054	12185	WD00008	6802087	3,230	380	64		444			2,786					64	-				64
926	TRC ENGINEERS LLC	911112171299	129054	12185	WD00008	6802020	2,342	940	225		1,166			1,176					225	-				225
927	TRC ENGINEERS LLC	911112171299	129054	12185	WD00008	6802016	3,230	416	28		444			2,786					28	-				28
928	TRC ENGINEERS LLC	911112171299	129054	12185	WD00008	6802404	3,230	482	124		606			2,624					124	-				124
929	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326194	34,553	175	19		34,359								19	-				19
930	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326197	34,553	340	21		34,193								21	-				21
931	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02331183	34,553	325	36		34,193								36	-				36
932	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326193	34,553	267	40		34,247								40	-				40
933	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326201	34,553	201	49		34,304								49	-				49
934	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326725	34,553	193	93		34,304								93	-				93
935	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326725	34,553	103	78		34,276								78	-				78
936	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326721	34,553	483	267		33,804								267	-				267
937	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326713	34,553	751	304		33,499								304	-				304
938	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326724	34,553	1,772	135		32,753								135	-				135
939	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326191	34,553	861	336		33,356								336	-				336
940	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326176	34,553	1,247	349		32,957								349	-				349
941	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02316093	34,553	1,574	394		32,985								394	-				394
942	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326723	34,553	2,031	409		32,113								409	-				409
943	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02332178	34,553	371	45		34,137								45	-				45
944	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326719	34,553	702	130		33,721								130	-				130
945	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02316883	34,553	1,199	131		33,223								131	-				131
946	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02331179	34,553	910	154		34,489								154	-				154
947	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02316395	34,553	1,119	158		33,277								158	-				158
948	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02316885	34,553	1,172	130		33,223								130	-				130
949	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326717	34,553	1,330	159		33,223								159	-				159
950	TRC ENGINEERS LLC	911112184790	129237	12170	18326	02326178	34,553	814	185		33,554								185	-				185
951	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326193	34,969	211	11		34,747								11	-				11
952	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326191	34,969	144	22		34,802								22	-				22
953	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02332171	34,969	298	33		34,936								33	-				33
954	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326717	34,969	89	144		34,825								55	-				55
955	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02316395	34,969	405	57		34,507								57	-				57
956	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326724	34,969	324	363		34,984								61	-				61
957	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02331179	34,969	369	63		34,537								63	-				63
958	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326190	34,969	410	65		34,494								65	-				65
959	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326723	34,969	384	78		34,507								78	-				78
960	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02316893	34,969	395	79		34,494								79	-				79
961	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02332183	34,969	1,110	122		32,737								122	-				122
962	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326178	34,969	2,136	142		32,691								142	-				142
963	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326719	34,969	780	144		34,045								144	-				144
964	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02332188	34,969	1,352	147		33,470								147	-				147
965	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326726	34,969	314	400		34,460								186	-				186
966	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02332178	34,969	2,031	246		32,278								246	-				246
967	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326725	34,969	453	268		34,691								268	-				268
968	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326713	34,969	1,809	320		34,430								320	-				320
969	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326715	34,969	1,685	704		32,580								704	-				704
970	TRC ENGINEERS LLC	911112186001	129334	12170	18326	02326001	34,969	2,968	728		31,273								728	-				728
971	TRC ENGINEERS LLC	911112220370	129758	12185	WD00008	68020188	2,007	12	48		1,959								12	-				12
972	TRC ENGINEERS LLC	911112220370	129758	12185	WD00008	68024049	2,007	95	90		1,951								90	-				90
973	TRC ENGINEERS LLC	911112220370	129758	12185	WD00008	68024007	2,007	353	91		444			1,563					91	-				91
974	TRC ENGINEERS LLC	911112220370	129758	12185	WD00008	68020220	2,007	351	94		444			1,563					93	-				93
975	TRC ENGINEERS LLC	911112220370	129758	12185	WD00008	68024044	2,007	395	160		555			1,452					160	-				160
976	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02316893	41,446	185	37		41,224								37	-				37
977	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02326178	41,446	181	41		41,224								41	-				41
978	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02332171	41,446	1,189	130		40,116								130	-				130
979	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02326190	41,446	1,495	145		40,382								145	-				145
980	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02316395	41,446	1,197	148		40,245								148	-				148
981	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02332188	41,446	1,400	152		39,894								152	-				152
982	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02326721	41,446	375	208		40,863								208	-				208
983	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02326717	41,446	376	211		40,833								211	-				211
984	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02326726	41,446	453	268		40,724								268	-				268
985	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02326725	41,446	470	279		40,696								279	-				279
986	TRC ENGINEERS LLC	911112233559	129923	12170	18326	02326193	41,446	870	96		40,530						</							

Exhibit ES-JGG-6a/
Exhibit ES-JGG-6b

2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental External Contractor Expense

Line #		Vendor Name	Invoice Number	Number	Line of Business	Project	Work Order	Total Invoice	Grid Modernization Capital	Grid Modernization Expense	Grid Modernization Total	Distribution Total	January	February	March	April	May	June	July	August	September	October	November	December	Total	Reference		
1021	ADVANCED ENERGY GROUP		9111223140	12105	12105	EV210000	EV210000	15,000	\$ -	\$ -	15,000	15,000	-	-	-	-	-	-	-	-	-	-	-	-	15,000	-	0001	
1022	TRC ENGINEERS LLC		9111227363	12170	12170	18326	18326	36,724	369	19	389	36,335	-	-	-	-	-	-	19	-	-	-	-	-	-	19	2663	
1024	TRC ENGINEERS LLC		9111227364	130575	12170	18326	02320193	36,724	316	17	333	36,391	-	-	-	-	-	-	-	17	-	-	-	-	-	17	2663	
1025	TRC ENGINEERS LLC		9111227364	130575	12170	18326	02320197	36,724	392	24	416	36,309	-	-	-	-	-	-	-	24	-	-	-	-	-	24	2663	
1026	TRC ENGINEERS LLC		9111227364	130575	12170	18326	02321173	36,724	112	112	1,064	35,660	-	-	-	-	-	-	-	-	-	-	-	-	-	112	2663	
1027	TRC ENGINEERS LLC		9111227364	130575	12170	18326	0232184	36,724	937	127	1,064	35,660	-	-	-	-	-	-	-	-	127	-	-	-	-	127	2663	
1028	TRC ENGINEERS LLC		9111227364	130575	12170	18326	0232186	36,724	1,037	160	1,197	35,527	-	-	-	-	-	-	-	-	-	-	-	-	-	160	2663	
1029	TRC ENGINEERS LLC		9111227364	130575	12170	18326	02318676	36,724	896	178	1,064	35,660	-	-	-	-	-	-	-	-	-	-	-	-	-	178	2663	
1030	TRC ENGINEERS LLC		9111227364	130575	12170	18326	02318680	36,724	1,108	222	1,330	35,394	-	-	-	-	-	-	-	-	-	-	-	-	-	222	2663	
1031	TRC ENGINEERS LLC		9111227364	130575	12170	18326	02326702	36,724	423	673	250	-	-	-	-	-	-	-	-	-	250	-	-	-	-	250	2663	
1032	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02320194	61,665	293	15	308	61,357	-	-	-	-	-	-	-	-	15	-	-	-	-	15	2683	
1034	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02321174	61,665	174	182	356	61,472	-	-	-	-	-	-	-	-	-	182	-	-	-	182	2683	
1034	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02320197	61,665	462	27	462	61,203	-	-	-	-	-	-	-	-	-	27	-	-	-	-	27	2683
1035	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02320193	61,665	658	35	693	60,972	-	-	-	-	-	-	-	-	-	35	-	-	-	-	35	2683
1036	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02321168	61,665	179	43	222	61,443	-	-	-	-	-	-	-	-	-	43	-	-	-	-	43	2683
1037	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02321173	61,665	710	64	774	61,053	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64	2683
1038	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02321171	61,665	730	86	817	60,849	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86	2683
1039	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02321184	61,665	719	98	817	60,849	-	-	-	-	-	-	-	-	-	-	-	-	-	-	98	2683
1040	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02320190	61,665	865	136	1,001	60,664	-	-	-	-	-	-	-	-	-	-	-	-	-	-	136	2683
1041	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02316876	61,665	717	150	867	60,789	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150	2683
1042	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02316880	61,665	1,078	216	1,295	60,371	-	-	-	-	-	-	-	-	-	216	-	-	-	-	216	2683
1044	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02316903	61,665	4,150	43	4,983	56,682	-	-	-	-	-	-	-	-	-	43	-	-	-	-	43	2683
1044	TRC ENGINEERS LLC		9111227360	130577	12170	18326	02311938	61,665	2,740	1,221	3,961	57,705	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,221	2683
1045	TRC ENGINEERS LLC		9111227360	130572	12170	18326	02321174	61,665	347	84	431	61,024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	84	2683
1046	TRC ENGINEERS LLC		9111227360	130573	12170	18326	02321174	8,250	518	54	572	7,678	-	-	-	-	-	-	-	-	-	54	-	-	-	-	54	2726
1047	TRC ENGINEERS LLC		9111227360	130573	12170	18326	02321173	8,250	543	607	7,643	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	607	2726
1048	TRC ENGINEERS LLC		9111227360	130573	12170	18326	02318676	8,250	837	168	1,005	7,246	-	-	-	-	-	-	-	-	-	-	-	-	-	-	168	2726
1049	TRC ENGINEERS LLC		9111227360	130573	12170	18326	02321168	8,250	717	171	888	7,362	-	-	-	-	-	-	-	-	-	-	-	-	-	-	171	2726
1050	TRC ENGINEERS LLC		9111227360	130573	12170	18326	02316880	8,250	901	1,082	7,169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,082	2726
1051	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	68922409	6,917	217	55	273	6,645	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	2737
1052	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	6A921604	6,917	185	63	250	6,669	-	-	-	-	-	-	-	-	-	-	55	-	-	-	185	2737
1053	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	6A921603	6,917	161	247	361	6,557	-	-	-	-	-	-	-	-	-	-	-	-	-	-	247	2737
1054	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	6A921606	6,917	93	268	361	6,557	-	-	-	-	-	-	-	-	-	-	-	-	-	-	268	2737
1055	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	6A921606	6,917	111	302	414	6,504	-	-	-	-	-	-	-	-	-	-	-	-	-	-	302	2737
1056	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	6A921602	6,917	159	439	604	6,294	-	-	-	-	-	-	-	-	-	-	-	-	-	-	439	2737
1057	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	6A921601	6,917	121	361	583	6,335	-	-	-	-	-	-	-	-	-	-	-	-	-	-	361	2737
1058	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	6A921600	6,917	94	600	694	6,224	-	-	-	-	-	-	-	-	-	-	-	-	-	-	600	2737
1059	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	68922247	6,917	1,012	1,193	5,724	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,193	2737
1060	TRC ENGINEERS LLC		9111229897	130918	12185	WD000308	68922137	6,917	1,015	1,010	5,907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,010	2737
1061	TRC ENGINEERS LLC		91112361623	131578	12170	18326	02321174	2,394	241	25	266	2,128	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	2744
1062	TRC ENGINEERS LLC		91112361623	131578	12170	18326	02321168	2,394	859	205	1,064	1,330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	205	2744
1063	TRC ENGINEERS LLC		91112361636	131563	12170	18326	02318903	80,896	92	19	111	80,775	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	2747
1064	TRC ENGINEERS LLC		91112361636	131563	12170	18326	02321180	80,896	1,275	167	1,442	79,459	-	-	-	-	-	-	-	-	-	-	-	-	-	-	167	2747
1065	TRC ENGINEERS LLC		91112361636	131563	12170	18326	02321168	80,896	1,373	328	1,701	79,185	-	-	-	-	-	-	-	-	-	-	-	-	-	-	328	2747
1066	TRC ENGINEERS LLC		91112361636	131563	12170	18326	02321171	80,896	207	24	231	80,655	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	2747
1067	TRC ENGINEERS LLC		91112361636	131563	12170	18326	02321174	80,896	322	34	356	80,530	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	2747
1068	TRC ENGINEERS LLC		91112361636	131563	12170	18326	02311938	80,896	77	111	188	80,775	-	-	-	-	-	-	-	-	-	-	-	-	-	-	111	2747
1069	TRC ENGINEERS LLC		91112361636	131563	12170	18326	02321184	80,896	407	55	462	80,424	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	2747
1070	TRC ENGINEERS LLC		91112365717	131594	12185	WD000308	68920316	2,125	125	8	133	1,992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	2789
1071	TRC ENGINEERS LLC		91112365717	131594	12185	WD000308	68822404	2,125	67	50	67	2,059	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	2789
1072	TRC ENGINEERS LLC		91112365717	131594	12185	WD000308	68922247	2,125	253	333	586	1,793	-	-	-	-	-	-	-	-	-	-	-	-	-	-	253	2789
1073	TRC ENGINEERS LLC		91112365717	131594	12185	WD000308	68822406	2,125	173	26	200	1,925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	2789
1074	TRC ENGINEERS LLC		91112366224	131579 V2	12170	18326	02321174	38,284	43	5	48	38,236	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	2793
1075	TRC ENGINEERS LLC		91112366224	131579 V2	12170	18326	02321165	38,284	23	35	266	38,018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	2793
1076	TRC ENGINEERS LLC		91112366224	131579 V2	12170	18326	02321173	38,284	93	93	861	37,423	-	-	-	-	-	-	-	-	-	-	-	-	-	-	93	2793
1077	TRC ENGINEERS LLC		91112366224	131579 V2	12170	18326	02321169	38,284	1,568	161	1,729	36,555	-	-	-	-	-	-	-	-	-	-	-	-	-	-	161	2793
1078	TRC ENGINEERS LLC		91112366224																									

**2020 Grid Modernization Cost Recovery
2019 Grid Modernization Incremental O&M Payroll Expense**

Line #	Description	Employee Number	January (a)	February (b)	March (c)	April (d)	May (e)	June (f)	July (g)	August (h)	September (i)	October (j)	November (k)	December (l)	Total (m)
1	Employee Expense Other	1	\$ -	\$ -	\$ 30	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30
2		2	9	-	-	-	-	-	-	4	25	20	22	(36)	44
3		3	-	115	103	75	75	75	75	75	75	75	75	-	818
4			\$ 9	\$ 115	\$ 133	\$ 75	\$ 75	\$ 75	\$ 75	\$ 79	\$ 100	\$ 95	\$ 97	\$ (36)	\$ 892
5															
6	Mileage	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 102	\$ -	\$ 58	\$ 232	\$ 133	\$ 102	\$ 101	\$ 727
7		2	34	-	-	-	-	-	30	31	318	224	255	(444)	448
8		3	346	406	487	367	432	820	378	231	536	452	737	302	5,494
9			\$ 380	\$ 406	\$ 487	\$ 367	\$ 432	\$ 922	\$ 408	\$ 320	\$ 1,086	\$ 809	\$ 1,094	\$ (41)	\$ 6,669
10															
11	Payroll	1	\$ 5,558	\$ 6,212	\$ 6,538	\$ 6,138	\$ 6,820	\$ 6,820	\$ 6,138	\$ 5,456	\$ 6,138	\$ 6,479	\$ 8,866	\$ 6,138	\$ 77,298
12		2	5,885	5,558	6,109	6,733	6,733	9,763	2,230	6,733	6,060	5,723	9,090	3,261	73,880
13		3	9,285	10,377	10,923	11,249	10,686	15,186	10,686	5,624	10,686	10,124	15,186	9,280	129,291
14			\$ 20,727	\$ 22,146	\$ 23,571	\$ 24,120	\$ 24,239	\$ 31,769	\$ 19,054	\$ 17,813	\$ 22,884	\$ 22,326	\$ 33,141	\$ 18,679	\$ 280,469
15															
16	Payroll-related Overheads														
17	Non-Productive Time Overhead (1)		\$ 3,660	\$ 3,911	\$ 4,163	\$ 4,260	\$ 4,281	\$ 5,610	\$ 3,365	\$ 3,146	\$ 4,041	\$ 4,199	\$ 6,234	\$ 3,514	\$ 50,383
18	Payroll Benefits (2)		4,819	5,149	4,964	5,080	5,105	6,691	4,013	3,752	5,703	5,618	8,340	4,700	63,933
19	Total Payroll-related Overheads		\$ 8,479	\$ 9,060	\$ 9,127	\$ 9,339	\$ 9,386	\$ 12,301	\$ 7,378	\$ 6,898	\$ 9,744	\$ 9,817	\$ 14,573	\$ 8,214	\$ 114,317
20															
21															
22	Total Incremental Payroll-related Expense		\$ 29,595	\$ 31,727	\$ 33,318	\$ 33,901	\$ 34,131	\$ 45,066	\$ 26,916	\$ 25,110	\$ 33,813	\$ 33,047	\$ 48,905	\$ 26,816	\$ 402,346

24 **Notes:**
25 (1) Line 17 = Jan-Sept: Line 14 * 17.66%; Oct-Dec: Line 14 * 18.81%
26 (2) Line 18 = Jan-Feb: (Line 14 + Line 17) * 19.76%; March-Aug: (Line 14 + Line 17) * 17.90%; Sept-Dec: (Line 14 + Line 17) * 21.18%

**2020 Grid Modernization Cost Recovery
Calculation of 2020 Grid Modernization Factor (GMF)**

Line No.	Service Area/ Territory (a)	Rate Class (b)	Forecast Sales (c)	Distribution Allocator (d)	Target Revenue (e)	Proposed Rate (f)
1	All	R-1/R-2	6,607,922,492	41.145%	\$4,293,043	\$0.00065
2	All	R-3/R-4	933,347,815	4.575%	\$477,353	\$0.00051
3	Greater Boston	G-1/T-1	498,971,673	3.446%	\$359,553	\$0.00072
4	Greater Boston	G-2/T-2	6,311,183,953	27.907%	\$2,911,798	\$0.00046
5	Greater Boston	G3/WR	2,905,378,691	7.998%	\$834,506	\$0.00029
6	Cambridge	G-0/G-1/G-6	234,585,534	0.829%	\$86,497	\$0.00037
7	Cambridge	G-2	545,913,901	1.329%	\$138,667	\$0.00025
8	Cambridge	G3/SB1	610,322,947	0.856%	\$89,314	\$0.00015
9	Cambridge	G-4	5,050,524	0.012%	\$1,252	\$0.00025
10	Cambridge	G-5	6,363,511	0.018%	\$1,878	\$0.00030
11	South	G-1/G-7	1,001,934,753	3.930%	\$410,054	\$0.00041
12	South	G-2	433,236,668	1.088%	\$113,521	\$0.00026
13	South	G-3	385,124,576	0.610%	\$63,647	\$0.00017
14	South	G-4	2,218,385	0.008%	\$835	\$0.00038
15	South	G-5	11,558,293	0.053%	\$5,530	\$0.00048
16	South	G-6	4,585,067	0.008%	\$835	\$0.00018
17	Western MA	23/24/G-0/T-0	565,798,237	2.626%	\$273,995	\$0.00048
18	Western MA	G-2/T-4	356,746,172	1.159%	\$120,929	\$0.00034
19	Western MA	T-2	657,925,387	1.495%	\$155,987	\$0.00024
20	Western MA	T-5	402,016,828	0.498%	\$51,961	\$0.00013
21	Eastern MA	S-1/S-2	80,741,332	0.315%	\$32,867	\$0.00041
22	Western MA	S-1/S-2	29,985,979	0.095%	\$9,912	\$0.00033
23		Total	22,590,912,717	100.000%	\$10,433,935	\$0.00046

**2020 Grid Modernization Cost Recovery
2019 Calculation of Adjustment to Total Capitalized Overheads**

	<u>2019 Actual Amount</u> (a)	<u>Rate Year Recovery</u> <u>per D.P.U. 17-05, Inflated</u> <u>at 0.51%</u> (b)	<u>Adjustment to Capitalized</u> <u>Overheads</u> (c)=(a)-(b)
<u>Labor Overheads Charged to Expense</u>			
Healthcare Expense	\$21,806,817	\$21,387,615	\$419,202
Other Employee Benefits Expense	\$11,993,105	\$8,367,411	\$3,625,694
Administrative & General Salaries Expense	\$44,906,921	\$43,220,261	\$1,686,660
Nonproductive Payroll Expense	\$20,542,028	\$21,690,582	(\$1,148,554)
Payroll Tax Expense	\$14,294,168	\$10,498,520	\$3,795,648
Miscellaneous Distribution Expenses	\$8,235,336	\$7,379,881	\$855,456
Total Labor Overheads Charged to Expense	<u>\$121,778,375</u>	<u>\$112,544,270</u>	<u>\$9,234,105</u>
<u>Clearing Account Burdens</u>			
Stores Handling and Lobby Stock Expense	\$1,593,873	\$2,729,575	(\$1,135,702)
Vehicle Expense	<u>\$10,803,418</u>	<u>\$14,060,070</u>	<u>(\$3,256,652)</u>
Total Labor Overheads and Burdens Expense	<u>\$134,175,666</u>	<u>\$129,333,915</u>	<u>\$4,841,751</u>

Notes:

Column (a) Per Company Books

Column (b) D.P.U. 17-05-F Compliance Filing dated June 8, 2018, inflated at 0.51% as filed in D.P.U. 18-101.

Pension and PBOP costs are excluded from the overhead and burdens test baseline and actuals.

**Eastern Massachusetts
Summary of Bill Impact Analysis
Proposed July 1, 2020**

	<u>Service Area</u>	<u>Rate</u>	<u>Season</u>	<u>Monthly</u>		<u>Month</u>			<u>Annual</u>		
				<u>kWh</u>	<u>kW</u>	<u>Total Change</u>	<u>% Change</u>		<u>Total Change</u>	<u>% Change</u>	
1	EMA	R-1		516		\$ 0.30	0.2%		\$ 3.60	0.2%	
2	EMA	R-2		488		\$ 0.18	0.2%		\$ 2.16	0.2%	
3	EMA	R-3		740		\$ 0.34	0.2%		\$ 4.08	0.2%	
4	EMA	R-4		874		\$ 0.26	0.2%		\$ 3.12	0.2%	
5	Boston	G-1ND	Winter	493		\$ 0.32	0.3%		\$ 3.84	0.3%	
6	Boston	G-1ND	Summer	464		\$ 0.30	0.2%		\$ 3.60	0.2%	
7	Boston	G-1DMD	Winter	300	3	\$ 0.20	0.3%		\$ 2.40	0.3%	
8	Boston	G-1DMD	Winter	1,250	5	\$ 0.81	0.3%		\$ 9.72	0.3%	
9	Boston	G-1DMD	Winter	2,000	5	\$ 1.30	0.3%		\$ 15.60	0.3%	
10	Boston	G-1DMD	Summer	300	3	\$ 0.20	0.2%		\$ 2.40	0.2%	
11	Boston	G-1DMD	Summer	1,250	5	\$ 0.81	0.3%		\$ 9.72	0.3%	
12	Boston	G-1DMD	Summer	2,000	5	\$ 1.30	0.3%		\$ 15.60	0.3%	
13	Boston	G-2	Winter	3,400	17	\$ 1.39	0.2%		\$ 16.68	0.2%	
14	Boston	G-2	Winter	7,200	24	\$ 2.95	0.2%		\$ 35.40	0.2%	
15	Boston	G-2	Winter	13,950	31	\$ 5.72	0.2%		\$ 68.64	0.2%	
16	Boston	G-2	Summer	3,600	18	\$ 1.48	0.2%		\$ 17.76	0.2%	
17	Boston	G-2	Summer	7,800	26	\$ 3.20	0.2%		\$ 38.40	0.2%	
18	Boston	G-2	Summer	14,850	33	\$ 6.09	0.2%		\$ 73.08	0.2%	
19	Boston (NEMA)	G-3	Winter	150,500	430	\$ 39.13	0.2%		\$ 469.56	0.2%	
20	Boston (NEMA)	G-3	Winter	360,000	800	\$ 93.60	0.2%		\$ 1,123.20	0.2%	
21	Boston (NEMA)	G-3	Winter	802,450	1,459	\$ 208.63	0.2%		\$ 2,503.56	0.2%	
22	Boston (NEMA)	G-3	Summer	177,100	506	\$ 46.04	0.1%		\$ 552.48	0.1%	
23	Boston (NEMA)	G-3	Summer	477,000	1,060	\$ 124.02	0.2%		\$ 1,488.24	0.2%	
24	Boston (NEMA)	G-3	Summer	1,155,550	2,101	\$ 300.45	0.2%		\$ 3,605.40	0.2%	
25	Boston (SEMA)	G-3	Winter	150,500	430	\$ 39.13	0.2%		\$ 469.56	0.2%	
26	Boston (SEMA)	G-3	Winter	360,000	800	\$ 93.60	0.2%		\$ 1,123.20	0.2%	
27	Boston (SEMA)	G-3	Winter	802,450	1,459	\$ 208.63	0.2%		\$ 2,503.56	0.2%	
28	Boston (SEMA)	G-3	Summer	177,100	506	\$ 46.04	0.2%		\$ 552.48	0.2%	
29	Boston (SEMA)	G-3	Summer	477,000	1,060	\$ 124.02	0.2%		\$ 1,488.24	0.2%	
30	Boston (SEMA)	G-3	Summer	1,155,550	2,101	\$ 300.45	0.2%		\$ 3,605.40	0.2%	
31	Boston	T-1	Winter	509		\$ 0.33	0.3%		\$ 3.96	0.3%	
32	Boston	T-1	Summer	287		\$ 0.19	0.2%		\$ 2.28	0.2%	
33	Boston (NEMA)	T-2	Winter	70,350	201	\$ 28.85	0.2%		\$ 346.20	0.2%	
34	Boston (NEMA)	T-2	Winter	126,450	281	\$ 51.84	0.3%		\$ 622.08	0.3%	
35	Boston (NEMA)	T-2	Winter	164,450	299	\$ 67.42	0.3%		\$ 809.04	0.3%	
36	Boston (NEMA)	T-2	Summer	86,100	246	\$ 35.30	0.2%		\$ 423.60	0.2%	
37	Boston (NEMA)	T-2	Summer	143,550	319	\$ 58.86	0.2%		\$ 706.32	0.2%	
38	Boston (NEMA)	T-2	Summer	193,600	352	\$ 79.38	0.2%		\$ 952.56	0.2%	
39	Boston (SEMA)	T-2	Winter	70,350	201	\$ 28.85	0.2%		\$ 346.20	0.2%	
40	Boston (SEMA)	T-2	Winter	126,450	281	\$ 51.84	0.3%		\$ 622.08	0.3%	
41	Boston (SEMA)	T-2	Winter	164,450	299	\$ 67.42	0.3%		\$ 809.04	0.3%	
42	Boston (SEMA)	T-2	Summer	86,100	246	\$ 35.30	0.2%		\$ 423.60	0.2%	
43	Boston (SEMA)	T-2	Summer	143,550	319	\$ 58.86	0.2%		\$ 706.32	0.2%	
44	Boston (SEMA)	T-2	Summer	193,600	352	\$ 79.38	0.3%		\$ 952.56	0.3%	
45	Cambridge	G-0		593		\$ 0.19	0.2%		\$ 2.28	0.2%	

**Eastern Massachusetts
Summary of Bill Impact Analysis
Proposed July 1, 2020**

Service Area	Rate	Season	Monthly		Month		Annual	
			kWh	kW	Total Change	% Change	Total Change	% Change
46 Cambridge	G-1		4,750	19	\$ 1.57	0.2%	\$ 18.84	0.2%
47 Cambridge	G-1		9,100	26	\$ 3.00	0.2%	\$ 36.00	0.2%
48 Cambridge	G-1		16,000	32	\$ 5.28	0.2%	\$ 63.36	0.2%
49 Cambridge	G-2		79,450	227	\$ 17.48	0.1%	\$ 209.76	0.1%
50 Cambridge	G-2		140,400	312	\$ 30.88	0.1%	\$ 370.56	0.1%
51 Cambridge	G-2		155,650	283	\$ 34.24	0.2%	\$ 410.88	0.2%
52 Cambridge	G-3		320,800	802	\$ 44.91	0.1%	\$ 538.92	0.1%
53 Cambridge	G-3		585,000	1,170	\$ 81.90	0.1%	\$ 982.80	0.1%
54 Cambridge	G-3		715,200	1,192	\$ 100.13	0.1%	\$ 1,201.56	0.1%
55 Cambridge	G-4		14,400	36	\$ 3.17	0.1%	\$ 38.04	0.1%
56 Cambridge	G-4		19,000	38	\$ 4.18	0.1%	\$ 50.16	0.1%
57 Cambridge	G-4		21,000	35	\$ 4.62	0.1%	\$ 55.44	0.1%
58 Cambridge	G-5		4,756		\$ 1.28	0.1%	\$ 15.36	0.1%
59 Cambridge	G-6		593		\$ 0.20	0.2%	\$ 2.40	0.2%
60 South	G-1		400	2	\$ 0.15	0.2%	\$ 1.80	0.2%
61 South	G-1		5,700	19	\$ 2.11	0.2%	\$ 25.32	0.2%
62 South	G-1		10,800	27	\$ 4.00	0.2%	\$ 48.00	0.2%
63 South	G-1S		450	9	\$ 0.17	0.1%	\$ 2.04	0.1%
64 South	G-1S		1,200	8	\$ 0.45	0.1%	\$ 5.40	0.1%
65 South	G-1S		2,700	9	\$ 1.00	0.2%	\$ 12.00	0.2%
66 South	G-2		61,500	205	\$ 14.15	0.2%	\$ 169.80	0.2%
67 South	G-2		85,600	214	\$ 19.69	0.2%	\$ 236.28	0.2%
68 South	G-2		126,500	253	\$ 29.09	0.2%	\$ 349.08	0.2%
69 South	G-3		373,100	1,066	\$ 55.97	0.1%	\$ 671.64	0.1%
70 South	G-3		354,600	788	\$ 53.19	0.1%	\$ 638.28	0.1%
71 South	G-3		614,900	1,118	\$ 92.24	0.1%	\$ 1,106.88	0.1%
72 South	G-4		7,800	52	\$ 2.65	0.2%	\$ 31.80	0.2%
73 South	G-4		6,750	27	\$ 2.29	0.2%	\$ 27.48	0.2%
74 South	G-4		9,450	27	\$ 3.21	0.2%	\$ 38.52	0.2%
75 South	G-5		1,472		\$ 0.63	0.2%	\$ 7.56	0.2%
76 South	G-6		60,748		\$ 9.72	0.1%	\$ 116.64	0.1%
77 South	G-7		7,000	20	\$ 2.59	0.2%	\$ 31.08	0.2%
78 South	G-7		15,500	31	\$ 5.74	0.2%	\$ 68.88	0.2%
79 South	G-7		11,700	18	\$ 4.33	0.2%	\$ 51.96	0.2%
80 South	G-7S		450	9	\$ 0.17	0.1%	\$ 2.04	0.1%
81 South	G-7S		1,500	10	\$ 0.55	0.2%	\$ 6.60	0.2%
82 South	G-7S		3,900	13	\$ 1.44	0.2%	\$ 17.28	0.2%

**Western Massachusetts
Summary of Bill Impact Analysis
Proposed July 1, 2020**

	<u>Service</u>	<u>Rate</u>	Monthly		Month		Annual	
			kWh	kW	Total Change	% Change	Total Change	% Change
1	WMA	R-1	516		\$ 0.30	0.2%	\$ 3.60	0.2%
2	WMA	R-2	488		\$ 0.18	0.3%	\$ 2.16	0.3%
3	WMA	R-3	740		\$ 0.35	0.2%	\$ 4.20	0.2%
4	WMA	R-4	874		\$ 0.26	0.2%	\$ 3.12	0.2%
5	WMA	23	644		\$ 0.28	0.2%	\$ 3.32	0.2%
6	WMA	24	1,300	13	\$ 0.56	0.2%	\$ 6.71	0.2%
7	WMA	24	4,200	21	\$ 1.81	0.2%	\$ 21.67	0.2%
8	WMA	24	7,200	24	\$ 3.10	0.2%	\$ 37.15	0.2%
9	WMA	G-0	900	6	\$ 0.39	0.2%	\$ 4.64	0.2%
10	WMA	G-0	3,300	11	\$ 1.42	0.2%	\$ 17.03	0.2%
11	WMA	G-0	7,650	17	\$ 3.29	0.2%	\$ 39.47	0.2%
12	WMA	T-0	150	1	\$ 0.06	0.1%	\$ 0.77	0.1%
13	WMA	T-0	1,200	4	\$ 0.52	0.2%	\$ 6.19	0.2%
14	WMA	T-0	4,500	10	\$ 1.93	0.2%	\$ 23.22	0.2%
15	WMA	G-2	23,750	95	\$ 7.36	0.2%	\$ 88.35	0.2%
16	WMA	G-2	42,000	84	\$ 13.02	0.2%	\$ 156.24	0.2%
17	WMA	G-2	42,300	94	\$ 13.11	0.2%	\$ 157.36	0.2%
18	WMA	T-4	17,500	70	\$ 5.43	0.2%	\$ 65.10	0.2%
19	WMA	T-4	37,100	106	\$ 11.50	0.2%	\$ 138.01	0.2%
20	WMA	T-4	53,550	119	\$ 16.60	0.2%	\$ 199.21	0.2%
21	WMA	T-2	143,500	410	\$ 31.57	0.1%	\$ 378.84	0.1%
22	WMA	T-2	256,950	571	\$ 56.53	0.2%	\$ 678.35	0.2%
23	WMA	T-2	319,000	580	\$ 70.18	0.2%	\$ 842.16	0.2%
24	WMA	T-5	1,394,050	3,983	\$ 167.29	0.1%	\$ 2,007.43	0.1%
25	WMA	T-5	3,084,750	6,855	\$ 370.17	0.1%	\$ 4,442.04	0.1%
26	WMA	T-5	2,485,450	4,519	\$ 298.25	0.1%	\$ 3,579.05	0.1%

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate R-1 Residential

	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
1									
2	<u>kWh</u>								
3	100	\$17.90	\$12.52	\$30.42	\$17.95	\$12.52	\$30.47	\$0.05	0.2%
4	200	\$28.79	\$25.03	\$53.82	\$28.91	\$25.03	\$53.94	\$0.12	0.2%
5	300	\$39.69	\$37.55	\$77.24	\$39.86	\$37.55	\$77.41	\$0.17	0.2%
6	400	\$50.58	\$50.07	\$100.65	\$50.82	\$50.07	\$100.89	\$0.24	0.2%
7	500	\$61.48	\$62.59	\$124.07	\$61.77	\$62.59	\$124.36	\$0.29	0.2%
8	600	\$72.38	\$75.10	\$147.48	\$72.72	\$75.10	\$147.82	\$0.34	0.2%
9	700	\$83.27	\$87.62	\$170.89	\$83.68	\$87.62	\$171.30	\$0.41	0.2%
10	800	\$94.17	\$100.14	\$194.31	\$94.63	\$100.14	\$194.77	\$0.46	0.2%
11	900	\$105.06	\$112.65	\$217.71	\$105.59	\$112.65	\$218.24	\$0.53	0.2%
12	1,000	\$115.96	\$125.17	\$241.13	\$116.54	\$125.17	\$241.71	\$0.58	0.2%
13	1,250	\$143.20	\$156.46	\$299.66	\$143.93	\$156.46	\$300.39	\$0.73	0.2%
14	1,500	\$170.44	\$187.76	\$358.20	\$171.31	\$187.76	\$359.07	\$0.87	0.2%
15	2,000	\$224.92	\$250.34	\$475.26	\$226.08	\$250.34	\$476.42	\$1.16	0.2%
16	Avg 516	\$63.22	\$64.59	\$127.81	\$63.52	\$64.59	\$128.11	\$0.30	0.2%

		Current	Proposed	
		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
17				
18				
19	Customer Charge	\$7.00	\$7.00	\$ -
20	Distribution Energy	\$0.04764	\$0.04764	\$ -
21	Revenue Decoupling	\$0.00089	\$0.00089	\$ -
22	Solar Massachusetts Renewable Target	\$0.00192	\$0.00192	\$ -
23	Residential Assistance Adjustment Factor	\$0.00481	\$0.00481	\$ -
24	Pension Adjustment Factor	\$0.00078	\$0.00078	\$ -
25	Net Metering Recovery Surcharge	\$0.00625	\$0.00625	\$ -
26	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
27	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
28	Storm Cost Recovery Adjustment Factor	\$0.00359	\$0.00359	\$ -
29	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
30	Basic Service Cost True Up Factor	\$0.00029	\$0.00029	\$ -
31	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
32	Solar Expansion Cost Recovery Factor	\$0.00106	\$0.00106	\$ -
33	Vegetation Management	\$0.00150	\$0.00150	\$ -
34	Tax Act Credit Factor	(\$0.00205)	(\$0.00205)	\$ -
35	Grid Modernization	\$0.00007	\$0.00065	\$0.00058
36	Transition	\$0.00002	\$0.00002	\$ -
37	Transmission Energy	\$0.02730	\$0.02730	\$ -
38	Energy Efficiency Reconciliation Factor	\$0.01140	\$0.01140	\$ -
39	System Benefits Charge	\$0.00250	\$0.00250	\$ -
40	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
41	Basic Service Charge	\$0.12517	\$0.12517	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate R-2 Residential Assistance

	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
1									
2	<u>kWh</u>								
3	100	\$10.89	\$8.01	\$18.90	\$10.93	\$8.01	\$18.94	\$0.04	0.2%
4	200	\$17.30	\$16.02	\$33.32	\$17.37	\$16.02	\$33.39	\$0.07	0.2%
5	300	\$23.71	\$24.03	\$47.74	\$23.82	\$24.03	\$47.85	\$0.11	0.2%
6	400	\$30.12	\$32.04	\$62.16	\$30.27	\$32.04	\$62.31	\$0.15	0.2%
7	500	\$36.53	\$40.05	\$76.58	\$36.72	\$40.05	\$76.77	\$0.19	0.2%
8	600	\$42.94	\$48.07	\$91.01	\$43.16	\$48.07	\$91.23	\$0.22	0.2%
9	700	\$49.35	\$56.08	\$105.43	\$49.61	\$56.08	\$105.69	\$0.26	0.2%
10	800	\$55.76	\$64.09	\$119.85	\$56.06	\$64.09	\$120.15	\$0.30	0.3%
11	900	\$62.17	\$72.10	\$134.27	\$62.51	\$72.10	\$134.61	\$0.34	0.3%
12	1,000	\$68.58	\$80.11	\$148.69	\$68.95	\$80.11	\$149.06	\$0.37	0.2%
13	1,250	\$84.61	\$100.14	\$184.75	\$85.07	\$100.14	\$185.21	\$0.46	0.2%
14	1,500	\$100.63	\$120.16	\$220.79	\$101.19	\$120.16	\$221.35	\$0.56	0.3%
15	2,000	\$132.68	\$160.22	\$292.90	\$133.43	\$160.22	\$293.65	\$0.75	0.3%
16	Avg 488	\$35.76	\$39.09	\$74.85	\$35.94	\$39.09	\$75.03	\$0.18	0.2%

	Current	Proposed	
	<u>Rates</u>	<u>Rates</u>	<u>Change</u>
17			
18			
19	Customer Charge	\$7.00	\$ -
20	Distribution Energy	\$0.04764	\$ -
21	Revenue Decoupling	\$0.00089	\$ -
22	Solar Massachusetts Renewable Target	\$0.00192	\$ -
23	Residential Assistance Adjustment Factor	\$0.00481	\$ -
24	Pension Adjustment Factor	\$0.00078	\$ -
25	Net Metering Recovery Surcharge	\$0.00625	\$ -
26	Long Term Renewable Contract Adjustment	\$0.00049	\$ -
27	AG Consulting Expense	\$0.00000	\$ -
28	Storm Cost Recovery Adjustment Factor	\$0.00359	\$ -
29	Storm Reserve Adjustment	\$0.00000	\$ -
30	Basic Service Cost True Up Factor	\$0.00029	\$ -
31	Solar Program Cost Adjustment Factor	\$0.00000	\$ -
32	Solar Expansion Cost Recovery Factor	\$0.00106	\$ -
33	Vegetation Management	\$0.00150	\$ -
34	Tax Act Credit Factor	(\$0.00205)	\$ -
35	Grid Modernization	\$0.00007	\$0.00065
36	Transition	\$0.00002	\$ -
37	Transmission Energy	\$0.02730	\$ -
38	Energy Efficiency Reconciliation Factor	\$0.00260	\$ -
39	System Benefits Charge	\$0.00250	\$ -
40	Renewable Energy Charge	\$0.00050	\$ -
41	Basic Service Charge	\$0.12517	\$ -
42	Low Income Discount	36%	0%

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate R-3 Residential Space Heating

	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
1									
2	<u>kWh</u>								
3	100	\$16.76	\$12.52	\$29.28	\$16.80	\$12.52	\$29.32	\$0.04	0.1%
4	200	\$26.51	\$25.03	\$51.54	\$26.60	\$25.03	\$51.63	\$0.09	0.2%
5	300	\$36.27	\$37.55	\$73.82	\$36.41	\$37.55	\$73.96	\$0.14	0.2%
6	400	\$46.02	\$50.07	\$96.09	\$46.21	\$50.07	\$96.28	\$0.19	0.2%
7	500	\$55.78	\$62.59	\$118.37	\$56.01	\$62.59	\$118.60	\$0.23	0.2%
8	600	\$65.54	\$75.10	\$140.64	\$65.81	\$75.10	\$140.91	\$0.27	0.2%
9	700	\$75.29	\$87.62	\$162.91	\$75.61	\$87.62	\$163.23	\$0.32	0.2%
10	800	\$85.05	\$100.14	\$185.19	\$85.42	\$100.14	\$185.56	\$0.37	0.2%
11	900	\$94.80	\$112.65	\$207.45	\$95.22	\$112.65	\$207.87	\$0.42	0.2%
12	1,000	\$104.56	\$125.17	\$229.73	\$105.02	\$125.17	\$230.19	\$0.46	0.2%
13	1,250	\$128.95	\$156.46	\$285.41	\$129.53	\$156.46	\$285.99	\$0.58	0.2%
14	1,500	\$153.34	\$187.76	\$341.10	\$154.03	\$187.76	\$341.79	\$0.69	0.2%
15	2,000	\$202.12	\$250.34	\$452.46	\$203.04	\$250.34	\$453.38	\$0.92	0.2%
16	Avg 740	\$79.19	\$92.63	\$171.82	\$79.53	\$92.63	\$172.16	\$0.34	0.2%

		Current	Proposed	
		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
17				
18				
19	Customer Charge	\$7.00	\$7.00	\$ -
20	Distribution Energy	\$0.04161	\$0.04161	\$ -
21	Revenue Decoupling	\$0.00071	\$0.00071	\$ -
22	Solar Massachusetts Renewable Target	\$0.00153	\$0.00153	\$ -
23	Residential Assistance Adjustment Factor	\$0.00383	\$0.00383	\$ -
24	Pension Adjustment Factor	\$0.00075	\$0.00075	\$ -
25	Net Metering Recovery Surcharge	\$0.00498	\$0.00498	\$ -
26	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
27	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
28	Storm Cost Recovery Adjustment Factor	\$0.00286	\$0.00286	\$ -
29	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
30	Basic Service Cost True Up Factor	\$0.00023	\$0.00023	\$ -
31	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
32	Solar Expansion Cost Recovery Factor	\$0.00084	\$0.00084	\$ -
33	Vegetation Management	\$0.00145	\$0.00145	\$ -
34	Tax Act Credit Factor	(\$0.00163)	(\$0.00163)	\$ -
35	Grid Modernization	\$0.00005	\$0.00051	\$0.00046
36	Transition	\$0.00002	\$0.00002	\$ -
37	Transmission Energy	\$0.02544	\$0.02544	\$ -
38	Energy Efficiency Reconciliation Factor	\$0.01140	\$0.01140	\$ -
39	System Benefits Charge	\$0.00250	\$0.00250	\$ -
40	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
41	Basic Service Charge	\$0.12517	\$0.12517	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate R-4 Residential Assistance Space Heating

1	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
3	100	\$10.16	\$8.01	\$18.17	\$10.19	\$8.01	\$18.20	\$0.03	0.2%
4	200	\$15.84	\$16.02	\$31.86	\$15.90	\$16.02	\$31.92	\$0.06	0.2%
5	300	\$21.52	\$24.03	\$45.55	\$21.61	\$24.03	\$45.64	\$0.09	0.2%
6	400	\$27.20	\$32.04	\$59.24	\$27.32	\$32.04	\$59.36	\$0.12	0.2%
7	500	\$32.88	\$40.05	\$72.93	\$33.03	\$40.05	\$73.08	\$0.15	0.2%
8	600	\$38.56	\$48.07	\$86.63	\$38.74	\$48.07	\$86.81	\$0.18	0.2%
9	700	\$44.24	\$56.08	\$100.32	\$44.45	\$56.08	\$100.53	\$0.21	0.2%
10	800	\$49.93	\$64.09	\$114.02	\$50.16	\$64.09	\$114.25	\$0.23	0.2%
11	900	\$55.61	\$72.10	\$127.71	\$55.87	\$72.10	\$127.97	\$0.26	0.2%
12	1,000	\$61.29	\$80.11	\$141.40	\$61.58	\$80.11	\$141.69	\$0.29	0.2%
13	1,250	\$75.49	\$100.14	\$175.63	\$75.86	\$100.14	\$176.00	\$0.37	0.2%
14	1,500	\$89.69	\$120.16	\$209.85	\$90.13	\$120.16	\$210.29	\$0.44	0.2%
15	2,000	\$118.09	\$160.22	\$278.31	\$118.68	\$160.22	\$278.90	\$0.59	0.2%
16	Avg 874	\$54.13	\$70.02	\$124.15	\$54.39	\$70.02	\$124.41	\$0.26	0.2%

17		Current	Proposed	
18		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
19	Customer Charge	\$7.00	\$7.00	\$ -
20	Distribution Energy	\$0.04161	\$0.04161	\$ -
21	Revenue Decoupling	\$0.00071	\$0.00071	\$ -
22	Solar Massachusetts Renewable Target	\$0.00153	\$0.00153	\$ -
23	Residential Assistance Adjustment Factor	\$0.00383	\$0.00383	\$ -
24	Pension Adjustment Factor	\$0.00075	\$0.00075	\$ -
25	Net Metering Recovery Surcharge	\$0.00498	\$0.00498	\$ -
26	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
27	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
28	Storm Cost Recovery Adjustment Factor	\$0.00286	\$0.00286	\$ -
29	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
30	Basic Service Cost True Up Factor	\$0.00023	\$0.00023	\$ -
31	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
32	Solar Expansion Cost Recovery Factor	\$0.00084	\$0.00084	\$ -
33	Vegetation Management	\$0.00145	\$0.00145	\$ -
34	Tax Act Credit Factor	(\$0.00163)	(\$0.00163)	\$ -
35	Grid Modernization	\$0.00005	\$0.00051	\$0.00046
36	Transition	\$0.00002	\$0.00002	\$ -
37	Transmission Energy	\$0.02544	\$0.02544	\$ -
38	Energy Efficiency Reconciliation Factor	\$0.00260	\$0.00260	\$ -
39	System Benefits Charge	\$0.00250	\$0.00250	\$ -
40	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
41	Basic Service Charge	\$0.12517	\$0.12517	\$ -
42	Low Income Discount	36%	36%	0%

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate R-1 Residential

	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
1									
2	<u>kWh</u>								
3	100	\$17.82	\$11.67	\$29.49	\$17.88	\$11.67	\$29.55	\$0.06	0.2%
4	200	\$28.64	\$23.33	\$51.97	\$28.75	\$23.33	\$52.08	\$0.11	0.2%
5	300	\$39.45	\$35.00	\$74.45	\$39.63	\$35.00	\$74.63	\$0.18	0.2%
6	400	\$50.27	\$46.66	\$96.93	\$50.50	\$46.66	\$97.16	\$0.23	0.2%
7	500	\$61.09	\$58.33	\$119.42	\$61.38	\$58.33	\$119.71	\$0.29	0.2%
8	600	\$71.91	\$70.00	\$141.91	\$72.26	\$70.00	\$142.26	\$0.35	0.2%
9	700	\$82.73	\$81.66	\$164.39	\$83.13	\$81.66	\$164.79	\$0.40	0.2%
10	800	\$93.54	\$93.33	\$186.87	\$94.01	\$93.33	\$187.34	\$0.47	0.3%
11	900	\$104.36	\$104.99	\$209.35	\$104.88	\$104.99	\$209.87	\$0.52	0.2%
12	1,000	\$115.18	\$116.66	\$231.84	\$115.76	\$116.66	\$232.42	\$0.58	0.3%
13	1,250	\$142.23	\$145.83	\$288.06	\$142.95	\$145.83	\$288.78	\$0.72	0.2%
14	1,500	\$169.27	\$174.99	\$344.26	\$170.14	\$174.99	\$345.13	\$0.87	0.3%
15	2,000	\$223.36	\$233.32	\$456.68	\$224.52	\$233.32	\$457.84	\$1.16	0.3%
16	Avg 516	\$62.82	\$60.20	\$123.02	\$63.12	\$60.20	\$123.32	\$0.30	0.2%

	Current	Proposed	
	<u>Rates</u>	<u>Rates</u>	<u>Change</u>
17			
18			
19	Customer Charge	\$7.00	\$ -
20	Distribution Energy	\$0.04764	\$ -
21	Revenue Decoupling	\$0.00089	\$ -
22	Solar Massachusetts Renewable Target	\$0.00192	\$ -
23	Residential Assistance Adjustment Factor	\$0.00481	\$ -
24	Pension Adjustment Factor	\$0.00078	\$ -
25	Net Metering Recovery Surcharge	\$0.00625	\$ -
26	Long Term Renewable Contract Adjustment	\$0.00049	\$ -
27	AG Consulting Expense	\$0.00000	\$ -
28	Storm Cost Recovery Adjustment Factor	\$0.00110	\$ -
29	Storm Reserve Adjustment	\$0.00000	\$ -
30	Basic Service Cost True Up Factor	\$0.00029	\$ -
31	Solar Program Cost Adjustment Factor	\$0.00000	\$ -
32	Solar Expansion Cost Recovery Factor	\$0.00106	\$ -
33	Vegetation Management	\$0.00150	\$ -
34	Tax Act Credit Factor	(\$0.00205)	\$ -
35	Grid Modernization	\$0.00007	\$0.00065
36	Transition	\$0.00002	\$ -
37	Transmission Energy	\$0.02730	\$ -
38	Energy Efficiency Reconciliation Factor	\$0.01311	\$ -
39	System Benefits Charge	\$0.00250	\$ -
40	Renewable Energy Charge	\$0.00050	\$ -
41	Basic Service Charge	\$0.11666	\$ -

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate R-2 Residential Assistance

1	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
3	100	\$10.66	\$7.47	\$18.13	\$10.69	\$7.47	\$18.16	\$0.03	0.2%
4	200	\$16.83	\$14.93	\$31.76	\$16.91	\$14.93	\$31.84	\$0.08	0.3%
5	300	\$23.01	\$22.40	\$45.41	\$23.12	\$22.40	\$45.52	\$0.11	0.2%
6	400	\$29.19	\$29.86	\$59.05	\$29.34	\$29.86	\$59.20	\$0.15	0.3%
7	500	\$35.37	\$37.33	\$72.70	\$35.55	\$37.33	\$72.88	\$0.18	0.2%
8	600	\$41.54	\$44.80	\$86.34	\$41.77	\$44.80	\$86.57	\$0.23	0.3%
9	700	\$47.72	\$52.26	\$99.98	\$47.98	\$52.26	\$100.24	\$0.26	0.3%
10	800	\$53.90	\$59.73	\$113.63	\$54.20	\$59.73	\$113.93	\$0.30	0.3%
11	900	\$60.08	\$67.20	\$127.28	\$60.41	\$67.20	\$127.61	\$0.33	0.3%
12	1,000	\$66.25	\$74.66	\$140.91	\$66.62	\$74.66	\$141.28	\$0.37	0.3%
13	1,250	\$81.70	\$93.33	\$175.03	\$82.16	\$93.33	\$175.49	\$0.46	0.3%
14	1,500	\$97.14	\$111.99	\$209.13	\$97.70	\$111.99	\$209.69	\$0.56	0.3%
15	2,000	\$128.03	\$149.32	\$277.35	\$128.77	\$149.32	\$278.09	\$0.74	0.3%
16	Avg 488	\$34.63	\$36.44	\$71.07	\$34.81	\$36.44	\$71.25	\$0.18	0.3%

17		Current	Proposed	
18		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
19	Customer Charge	\$7.00	\$7.00	\$ -
20	Distribution Energy	\$0.04764	\$0.04764	\$ -
21	Revenue Decoupling	\$0.00089	\$0.00089	\$ -
22	Solar Massachusetts Renewable Target	\$0.00192	\$0.00192	\$ -
23	Residential Assistance Adjustment Factor	\$0.00481	\$0.00481	\$ -
24	Pension Adjustment Factor	\$0.00078	\$0.00078	\$ -
25	Net Metering Recovery Surcharge	\$0.00625	\$0.00625	\$ -
26	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
27	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
28	Storm Cost Recovery Adjustment Factor	\$0.00110	\$0.00110	\$ -
29	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
30	Basic Service Cost True Up Factor	\$0.00029	\$0.00029	\$ -
31	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
32	Solar Expansion Cost Recovery Factor	\$0.00106	\$0.00106	\$ -
33	Vegetation Management	\$0.00150	\$0.00150	\$ -
34	Tax Act Credit Factor	(\$0.00205)	(\$0.00205)	\$ -
35	Grid Modernization	\$0.00007	\$0.00065	\$0.00058
36	Transition	\$0.00002	\$0.00002	\$ -
37	Transmission Energy	\$0.02730	\$0.02730	\$ -
38	Energy Efficiency Reconciliation Factor	\$0.00145	\$0.00145	\$ -
39	System Benefits Charge	\$0.00250	\$0.00250	\$ -
40	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
41	Basic Service Charge	\$0.11666	\$0.11666	\$ -
42	Low Income Discount	36%	36%	0%

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate R-3 Residential Space Heating

1	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
3	100	\$16.73	\$11.67	\$28.40	\$16.78	\$11.67	\$28.45	\$0.05	0.2%
4	200	\$26.46	\$23.33	\$49.79	\$26.55	\$23.33	\$49.88	\$0.09	0.2%
5	300	\$36.19	\$35.00	\$71.19	\$36.33	\$35.00	\$71.33	\$0.14	0.2%
6	400	\$45.92	\$46.66	\$92.58	\$46.10	\$46.66	\$92.76	\$0.18	0.2%
7	500	\$55.65	\$58.33	\$113.98	\$55.88	\$58.33	\$114.21	\$0.23	0.2%
8	600	\$65.37	\$70.00	\$135.37	\$65.65	\$70.00	\$135.65	\$0.28	0.2%
9	700	\$75.10	\$81.66	\$156.76	\$75.43	\$81.66	\$157.09	\$0.33	0.2%
10	800	\$84.83	\$93.33	\$178.16	\$85.20	\$93.33	\$178.53	\$0.37	0.2%
11	900	\$94.56	\$104.99	\$199.55	\$94.98	\$104.99	\$199.97	\$0.42	0.2%
12	1,000	\$104.29	\$116.66	\$220.95	\$104.75	\$116.66	\$221.41	\$0.46	0.2%
13	1,250	\$128.61	\$145.83	\$274.44	\$129.19	\$145.83	\$275.02	\$0.58	0.2%
14	1,500	\$152.94	\$174.99	\$327.93	\$153.63	\$174.99	\$328.62	\$0.69	0.2%
15	2,000	\$201.58	\$233.32	\$434.90	\$202.50	\$233.32	\$435.82	\$0.92	0.2%
16	Avg 740	\$78.99	\$86.33	\$165.32	\$79.34	\$86.33	\$165.67	\$0.35	0.2%

17		Current	Proposed	
18		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
19	Customer Charge	\$7.00	\$7.00	\$ -
20	Distribution Energy	\$0.04161	\$0.04161	\$ -
21	Revenue Decoupling	\$0.00071	\$0.00071	\$ -
22	Solar Massachusetts Renewable Target	\$0.00153	\$0.00153	\$ -
23	Residential Assistance Adjustment Factor	\$0.00383	\$0.00383	\$ -
24	Pension Adjustment Factor	\$0.00075	\$0.00075	\$ -
25	Net Metering Recovery Surcharge	\$0.00498	\$0.00498	\$ -
26	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
27	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
28	Storm Cost Recovery Adjustment Factor	\$0.00088	\$0.00088	\$ -
29	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
30	Basic Service Cost True Up Factor	\$0.00023	\$0.00023	\$ -
31	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
32	Solar Expansion Cost Recovery Factor	\$0.00084	\$0.00084	\$ -
33	Vegetation Management	\$0.00145	\$0.00145	\$ -
34	Tax Act Credit Factor	(\$0.00163)	(\$0.00163)	\$ -
35	Grid Modernization	\$0.00005	\$0.00051	\$0.00046
36	Transition	\$0.00002	\$0.00002	\$ -
37	Transmission Energy	\$0.02544	\$0.02544	\$ -
38	Energy Efficiency Reconciliation Factor	\$0.01311	\$0.01311	\$ -
39	System Benefits Charge	\$0.00250	\$0.00250	\$ -
40	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
41	Basic Service Charge	\$0.11666	\$0.11666	\$ -

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate R-4 Residential Assistance Space Heating

1	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
3	100	\$9.96	\$7.47	\$17.43	\$9.99	\$7.47	\$17.46	\$0.03	0.2%
4	200	\$15.44	\$14.93	\$30.37	\$15.50	\$14.93	\$30.43	\$0.06	0.2%
5	300	\$20.92	\$22.40	\$43.32	\$21.01	\$22.40	\$43.41	\$0.09	0.2%
6	400	\$26.40	\$29.86	\$56.26	\$26.52	\$29.86	\$56.38	\$0.12	0.2%
7	500	\$31.88	\$37.33	\$69.21	\$32.03	\$37.33	\$69.36	\$0.15	0.2%
8	600	\$37.36	\$44.80	\$82.16	\$37.54	\$44.80	\$82.34	\$0.18	0.2%
9	700	\$42.84	\$52.26	\$95.10	\$43.05	\$52.26	\$95.31	\$0.21	0.2%
10	800	\$48.32	\$59.73	\$108.05	\$48.56	\$59.73	\$108.29	\$0.24	0.2%
11	900	\$53.80	\$67.20	\$121.00	\$54.07	\$67.20	\$121.27	\$0.27	0.2%
12	1,000	\$59.28	\$74.66	\$133.94	\$59.58	\$74.66	\$134.24	\$0.30	0.2%
13	1,250	\$72.98	\$93.33	\$166.31	\$73.35	\$93.33	\$166.68	\$0.37	0.2%
14	1,500	\$86.68	\$111.99	\$198.67	\$87.13	\$111.99	\$199.12	\$0.45	0.2%
15	2,000	\$114.09	\$149.32	\$263.41	\$114.68	\$149.32	\$264.00	\$0.59	0.2%
16	Avg 874	\$52.38	\$65.25	\$117.63	\$52.64	\$65.25	\$117.89	\$0.26	0.2%

17		Current	Proposed	
18		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
19	Customer Charge	\$7.00	\$7.00	\$ -
20	Distribution Energy	\$0.04161	\$0.04161	\$ -
21	Revenue Decoupling	\$0.00071	\$0.00071	\$ -
22	Solar Massachusetts Renewable Target	\$0.00153	\$0.00153	\$ -
23	Residential Assistance Adjustment Factor	\$0.00383	\$0.00383	\$ -
24	Pension Adjustment Factor	\$0.00075	\$0.00075	\$ -
25	Net Metering Recovery Surcharge	\$0.00498	\$0.00498	\$ -
26	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
27	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
28	Storm Cost Recovery Adjustment Factor	\$0.00088	\$0.00088	\$ -
29	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
30	Basic Service Cost True Up Factor	\$0.00023	\$0.00023	\$ -
31	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
32	Solar Expansion Cost Recovery Factor	\$0.00084	\$0.00084	\$ -
33	Vegetation Management	\$0.00145	\$0.00145	\$ -
34	Tax Act Credit Factor	(\$0.00163)	(\$0.00163)	\$ -
35	Grid Modernization	\$0.00005	\$0.00051	\$0.00046
36	Transition	\$0.00002	\$0.00002	\$ -
37	Transmission Energy	\$0.02544	\$0.02544	\$ -
38	Energy Efficiency Reconciliation Factor	\$0.00145	\$0.00145	\$ -
39	System Benefits Charge	\$0.00250	\$0.00250	\$ -
40	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
41	Basic Service Charge	\$0.11666	\$0.11666	\$ -
42	Low Income Discount	36%	36%	0%

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-1 Small General Service (Non Demand)**

	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
		<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
1									
2	kWh								
3	20	\$10.07	\$2.40	\$12.47	\$10.08	\$2.40	\$12.48	\$0.01	0.1%
4	50	\$13.17	\$6.00	\$19.17	\$13.20	\$6.00	\$19.20	\$0.03	0.2%
5	90	\$17.30	\$10.81	\$28.11	\$17.36	\$10.81	\$28.17	\$0.06	0.2%
6	150	\$23.50	\$18.01	\$41.51	\$23.60	\$18.01	\$41.61	\$0.10	0.2%
7	230	\$31.77	\$27.62	\$59.39	\$31.92	\$27.62	\$59.54	\$0.15	0.3%
8	350	\$44.17	\$42.02	\$86.19	\$44.39	\$42.02	\$86.41	\$0.22	0.3%
9	500	\$59.67	\$60.04	\$119.71	\$59.99	\$60.04	\$120.03	\$0.32	0.3%
10	750	\$85.50	\$90.05	\$175.55	\$85.99	\$90.05	\$176.04	\$0.49	0.3%
11	1,300	\$142.33	\$156.09	\$298.42	\$143.17	\$156.09	\$299.26	\$0.84	0.3%
12	2,000	\$214.66	\$240.14	\$454.80	\$215.96	\$240.14	\$456.10	\$1.30	0.3%
13	Avg 493	\$58.94	\$59.19	\$118.13	\$59.26	\$59.19	\$118.45	\$0.32	0.3%

	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
		<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
14									
15	kWh								
16	20	\$10.64	\$2.40	\$13.04	\$10.66	\$2.40	\$13.06	\$0.02	0.2%
17	50	\$14.61	\$6.00	\$20.61	\$14.64	\$6.00	\$20.64	\$0.03	0.1%
18	90	\$19.90	\$10.81	\$30.71	\$19.96	\$10.81	\$30.77	\$0.06	0.2%
19	150	\$27.83	\$18.01	\$45.84	\$27.93	\$18.01	\$45.94	\$0.10	0.2%
20	230	\$38.41	\$27.62	\$66.03	\$38.56	\$27.62	\$66.18	\$0.15	0.2%
21	350	\$54.28	\$42.02	\$96.30	\$54.50	\$42.02	\$96.52	\$0.22	0.2%
22	500	\$74.11	\$60.04	\$134.15	\$74.44	\$60.04	\$134.48	\$0.33	0.2%
23	750	\$107.17	\$90.05	\$197.22	\$107.65	\$90.05	\$197.70	\$0.48	0.2%
24	1,300	\$179.89	\$156.09	\$335.98	\$180.73	\$156.09	\$336.82	\$0.84	0.3%
25	2,000	\$272.44	\$240.14	\$512.58	\$273.74	\$240.14	\$513.88	\$1.30	0.3%
26	Avg 464	\$69.35	\$55.71	\$125.06	\$69.65	\$55.71	\$125.36	\$0.30	0.2%

		<u>Current Rates</u>	<u>Proposed Rates</u>	<u>Change</u>
27				
28				
29	Customer Charge	\$8.00	\$8.00	\$ -
30	Distribution Energy - Winter	\$0.04733	\$0.04733	\$ -
31	Distribution Energy - Summer	\$0.07622	\$0.07622	\$ -
32	Revenue Decoupling	\$0.00102	\$0.00102	\$ -
33	Solar Massachusetts Renewable Target	\$0.00221	\$0.00221	\$ -
34	Residential Assistance Adjustment Factor	\$0.00554	\$0.00554	\$ -
35	Pension Adjustment Factor	\$0.00081	\$0.00081	\$ -
36	Net Metering Recovery Surcharge	\$0.00720	\$0.00720	\$ -
37	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
38	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
39	Storm Cost Recovery Adjustment Factor	\$0.00414	\$0.00414	\$ -
40	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
41	Basic Service Cost True Up Factor	\$0.00033	\$0.00033	\$ -
42	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
43	Solar Expansion Cost Recovery Factor	\$0.00122	\$0.00122	\$ -
44	Vegetation Management	\$0.00156	\$0.00156	\$ -
45	Tax Act Credit Factor	(\$0.00236)	(\$0.00236)	\$ -
46	Grid Modernization	\$0.00007	\$0.00072	\$0.00065
47	Transition	\$0.00002	\$0.00002	\$ -
48	Transmission Energy	\$0.02356	\$0.02356	\$ -
49	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
50	System Benefits Charge	\$0.00250	\$0.00250	\$ -
51	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
52	Basic Service Charge	\$0.12007	\$0.12007	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-1 Small General Service (Demand)**

1	Hours Use: 100										
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	1	100	\$20.42	\$12.01	\$32.43	\$20.49	\$12.01	\$32.50	\$0.07	0.2%	
5	2	200	\$29.84	\$24.01	\$53.85	\$29.97	\$24.01	\$53.98	\$0.13	0.2%	
6	3	300	\$39.26	\$36.02	\$75.28	\$39.46	\$36.02	\$75.48	\$0.20	0.3%	
7	4	400	\$48.68	\$48.03	\$96.71	\$48.94	\$48.03	\$96.97	\$0.26	0.3%	
8	5	500	\$58.10	\$60.04	\$118.14	\$58.43	\$60.04	\$118.47	\$0.33	0.3%	
9	6	600	\$67.52	\$72.04	\$139.56	\$67.91	\$72.04	\$139.95	\$0.39	0.3%	
10	7	700	\$76.94	\$84.05	\$160.99	\$77.39	\$84.05	\$161.44	\$0.45	0.3%	
11	8	800	\$86.36	\$96.06	\$182.42	\$86.88	\$96.06	\$182.94	\$0.52	0.3%	
12	10	1,000	\$105.20	\$120.07	\$225.27	\$105.85	\$120.07	\$225.92	\$0.65	0.3%	
13	12	1,200	\$164.56	\$144.08	\$308.64	\$165.34	\$144.08	\$309.42	\$0.78	0.3%	
14	Avg	3	300	\$39.26	\$36.02	\$75.28	\$39.46	\$36.02	\$75.48	\$0.20	0.3%

15	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
16	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
17	1	100	\$23.10	\$12.01	\$35.11	\$23.17	\$12.01	\$35.18	\$0.07	0.2%
18	2	200	\$35.21	\$24.01	\$59.22	\$35.34	\$24.01	\$59.35	\$0.13	0.2%
19	3	300	\$47.31	\$36.02	\$83.33	\$47.51	\$36.02	\$83.53	\$0.20	0.2%
20	4	400	\$59.42	\$48.03	\$107.45	\$59.68	\$48.03	\$107.71	\$0.26	0.2%
21	5	500	\$71.52	\$60.04	\$131.56	\$71.85	\$60.04	\$131.89	\$0.33	0.3%
22	6	600	\$83.62	\$72.04	\$155.66	\$84.01	\$72.04	\$156.05	\$0.39	0.3%
23	7	700	\$95.73	\$84.05	\$179.78	\$96.18	\$84.05	\$180.23	\$0.45	0.3%
24	8	800	\$107.83	\$96.06	\$203.89	\$108.35	\$96.06	\$204.41	\$0.52	0.3%
25	10	1,000	\$132.04	\$120.07	\$252.11	\$132.69	\$120.07	\$252.76	\$0.65	0.3%
26	12	1,200	\$285.39	\$144.08	\$429.47	\$286.17	\$144.08	\$430.25	\$0.78	0.2%
27	Avg	300	\$47.31	\$36.02	\$83.33	\$47.51	\$36.02	\$83.53	\$0.20	0.2%

28		Current	Proposed	
29		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
30	Customer Charge	\$11.00	\$11.00	\$ -
31	Distribution Demand <=10 kW - Winter	\$0.00	\$0.00	\$ -
32	Distribution Demand >10 kW - Winter	\$0.29	\$0.29	\$ -
33	Transmission Demand >10 kW - Winter	\$19.97	\$19.97	\$ -
34	Distribution Demand <=10 kW - Summer	\$0.00	\$0.00	\$ -
35	Distribution Demand >10 kW - Summer	\$0.90	\$0.90	\$ -
36	Transmission Demand >10 kW - Summer	\$63.67	\$63.67	\$ -
37	Distribution Energy - 1st 2000 kWh - Winter	\$0.04418	\$0.04418	\$ -
38	Distribution Energy - next 150 hrs*kW - Winter	\$0.03842	\$0.03842	\$ -
39	Distribution Energy - remainder kWh - Winter	\$0.02550	\$0.02550	\$ -
40	Distribution Energy - 1st 2000 kWh - Summer	\$0.07102	\$0.07102	\$ -
41	Distribution Energy - next 150 hrs*kW - Summer	\$0.04310	\$0.04310	\$ -
42	Distribution Energy - remainder kWh - Summer	\$0.02681	\$0.02681	\$ -
43	Revenue Decoupling	\$0.00102	\$0.00102	\$ -
44	Solar Massachusetts Renewable Target	\$0.00221	\$0.00221	\$ -
45	Residential Assistance Adjustment Factor	\$0.00554	\$0.00554	\$ -
46	Pension Adjustment Factor	\$0.00081	\$0.00081	\$ -
47	Net Metering Recovery Surcharge	\$0.00720	\$0.00720	\$ -
48	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
49	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
50	Storm Cost Recovery Adjustment Factor	\$0.00414	\$0.00414	\$ -
51	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
52	Basic Service Cost True Up Factor	\$0.00033	\$0.00033	\$ -
53	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
54	Solar Expansion Cost Recovery Factor	\$0.00122	\$0.00122	\$ -
55	Vegetation Management	\$0.00156	\$0.00156	\$ -
56	Tax Act Credit Factor	(\$0.00236)	(\$0.00236)	\$ -
57	Grid Modernization	\$0.00007	\$0.00072	\$0.00065
58	Transition	\$0.00002	\$0.00002	\$ -
59	Transmission Energy - 1st 2000 kWh	\$0.01758	\$0.01758	\$ -
60	Transmission Energy - next 150 hrs*kW	\$0.01758	\$0.01758	\$ -
61	Transmission Energy - remainder kWh	\$0.00000	\$0.00000	\$ -
62	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
63	System Benefits Charge	\$0.00250	\$0.00250	\$ -
64	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
65	Basic Service Charge	\$0.12007	\$0.12007	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-1 Small General Service (Demand)**

1 Hours Use: 250

2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	1	250	\$34.55	\$30.02	\$64.57	\$34.71	\$30.02	\$64.73	\$0.16	0.2%	
5	2	500	\$58.10	\$60.04	\$118.14	\$58.43	\$60.04	\$118.47	\$0.33	0.3%	
6	3	750	\$81.65	\$90.05	\$171.70	\$82.14	\$90.05	\$172.19	\$0.49	0.3%	
7	4	1,000	\$105.20	\$120.07	\$225.27	\$105.85	\$120.07	\$225.92	\$0.65	0.3%	
8	5	1,250	\$128.75	\$150.09	\$278.84	\$129.56	\$150.09	\$279.65	\$0.81	0.3%	
9	6	1,500	\$152.30	\$180.11	\$332.41	\$153.28	\$180.11	\$333.39	\$0.98	0.3%	
10	7	1,750	\$175.85	\$210.12	\$385.97	\$176.99	\$210.12	\$387.11	\$1.14	0.3%	
11	8	2,000	\$199.40	\$240.14	\$439.54	\$200.70	\$240.14	\$440.84	\$1.30	0.3%	
12	10	2,500	\$243.62	\$300.18	\$543.80	\$245.25	\$300.18	\$545.43	\$1.63	0.3%	
13	12	3,000	\$328.36	\$360.21	\$688.57	\$330.31	\$360.21	\$690.52	\$1.95	0.3%	
14	Avg	5	1,250	\$128.75	\$150.09	\$278.84	\$129.56	\$150.09	\$279.65	\$0.81	0.3%

15	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
16	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
17	1	250	\$41.26	\$30.02	\$71.28	\$41.42	\$30.02	\$71.44	\$0.16	0.2%	
18	2	500	\$71.52	\$60.04	\$131.56	\$71.85	\$60.04	\$131.89	\$0.33	0.3%	
19	3	750	\$101.78	\$90.05	\$191.83	\$102.27	\$90.05	\$192.32	\$0.49	0.3%	
20	4	1,000	\$132.04	\$120.07	\$252.11	\$132.69	\$120.07	\$252.76	\$0.65	0.3%	
21	5	1,250	\$162.30	\$150.09	\$312.39	\$163.11	\$150.09	\$313.20	\$0.81	0.3%	
22	6	1,500	\$192.56	\$180.11	\$372.67	\$193.54	\$180.11	\$373.65	\$0.98	0.3%	
23	7	1,750	\$222.82	\$210.12	\$432.94	\$223.96	\$210.12	\$434.08	\$1.14	0.3%	
24	8	2,000	\$253.08	\$240.14	\$493.22	\$254.38	\$240.14	\$494.52	\$1.30	0.3%	
25	10	2,500	\$299.64	\$300.18	\$599.82	\$301.27	\$300.18	\$601.45	\$1.63	0.3%	
26	12	3,000	\$475.34	\$360.21	\$835.55	\$477.29	\$360.21	\$837.50	\$1.95	0.2%	
27	Avg	5	1,250	\$162.30	\$150.09	\$312.39	\$163.11	\$150.09	\$313.20	\$0.81	0.3%

28		Current	Proposed	
29		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
30	Customer Charge	\$11.00	\$11.00	\$ -
31	Distribution Demand <=10 kW - Winter	\$0.00	\$0.00	\$ -
32	Distribution Demand >10 kW - Winter	\$0.29	\$0.29	\$ -
33	Transmission Demand >10 kW - Winter	\$19.97	\$19.97	\$ -
34	Distribution Demand <=10 kW - Summer	\$0.00	\$0.00	\$ -
35	Distribution Demand >10 kW - Summer	\$0.90	\$0.90	\$ -
36	Transmission Demand >10 kW - Summer	\$63.67	\$63.67	\$ -
37	Distribution Energy - 1st 2000 kWh - Winter	\$0.04418	\$0.04418	\$ -
38	Distribution Energy - next 150 hrs*kW - Winter	\$0.03842	\$0.03842	\$ -
39	Distribution Energy - remainder kWh - Winter	\$0.02550	\$0.02550	\$ -
40	Distribution Energy - 1st 2000 kWh - Summer	\$0.07102	\$0.07102	\$ -
41	Distribution Energy - next 150 hrs*kW - Summer	\$0.04310	\$0.04310	\$ -
42	Distribution Energy - remainder kWh - Summer	\$0.02681	\$0.02681	\$ -
43	Revenue Decoupling	\$0.00102	\$0.00102	\$ -
44	Solar Massachusetts Renewable Target	\$0.00221	\$0.00221	\$ -
45	Residential Assistance Adjustment Factor	\$0.00554	\$0.00554	\$ -
46	Pension Adjustment Factor	\$0.00081	\$0.00081	\$ -
47	Net Metering Recovery Surcharge	\$0.00720	\$0.00720	\$ -
48	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
49	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
50	Storm Cost Recovery Adjustment Factor	\$0.00414	\$0.00414	\$ -
51	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
52	Basic Service Cost True Up Factor	\$0.00033	\$0.00033	\$ -
53	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
54	Solar Expansion Cost Recovery Factor	\$0.00122	\$0.00122	\$ -
55	Vegetation Management	\$0.00156	\$0.00156	\$ -
56	Tax Act Credit Factor	(\$0.00236)	(\$0.00236)	\$ -
57	Grid Modernization	\$0.00007	\$0.00072	\$0.00065
58	Transition	\$0.00002	\$0.00002	\$ -
59	Transmission Energy - 1st 2000 kWh	\$0.01758	\$0.01758	\$ -
60	Transmission Energy - next 150 hrs*kW	\$0.01758	\$0.01758	\$ -
61	Transmission Energy - remainder kWh	\$0.00000	\$0.00000	\$ -
62	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
63	System Benefits Charge	\$0.00250	\$0.00250	\$ -
64	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
65	Basic Service Charge	\$0.12007	\$0.12007	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-1 Small General Service (Demand)**

1	Hours Use: 400										
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	1	400	\$48.68	\$48.03	\$96.71	\$48.94	\$48.03	\$96.97	\$0.26	0.3%	
5	2	800	\$86.36	\$96.06	\$182.42	\$86.88	\$96.06	\$182.94	\$0.52	0.3%	
6	3	1,200	\$124.04	\$144.08	\$268.12	\$124.82	\$144.08	\$268.90	\$0.78	0.3%	
7	4	1,600	\$161.72	\$192.11	\$353.83	\$162.76	\$192.11	\$354.87	\$1.04	0.3%	
8	5	2,000	\$199.40	\$240.14	\$439.54	\$200.70	\$240.14	\$440.84	\$1.30	0.3%	
9	6	2,400	\$234.78	\$288.17	\$522.95	\$236.34	\$288.17	\$524.51	\$1.56	0.3%	
10	7	2,800	\$270.15	\$336.20	\$606.35	\$271.97	\$336.20	\$608.17	\$1.82	0.3%	
11	8	3,200	\$305.53	\$384.22	\$689.75	\$307.61	\$384.22	\$691.83	\$2.08	0.3%	
12	10	4,000	\$361.03	\$480.28	\$841.31	\$363.63	\$480.28	\$843.91	\$2.60	0.3%	
13	12	4,800	\$457.05	\$576.34	\$1,033.39	\$460.17	\$576.34	\$1,036.51	\$3.12	0.3%	
14	Avg	5	2,000	\$199.40	\$240.14	\$439.54	\$200.70	\$240.14	\$440.84	\$1.30	0.3%

15	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
16	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
17	1	400	\$59.42	\$48.03	\$107.45	\$59.68	\$48.03	\$107.71	\$0.26	0.2%	
18	2	800	\$107.83	\$96.06	\$203.89	\$108.35	\$96.06	\$204.41	\$0.52	0.3%	
19	3	1,200	\$156.25	\$144.08	\$300.33	\$157.03	\$144.08	\$301.11	\$0.78	0.3%	
20	4	1,600	\$204.66	\$192.11	\$396.77	\$205.70	\$192.11	\$397.81	\$1.04	0.3%	
21	5	2,000	\$253.08	\$240.14	\$493.22	\$254.38	\$240.14	\$494.52	\$1.30	0.3%	
22	6	2,400	\$290.33	\$288.17	\$578.50	\$291.89	\$288.17	\$580.06	\$1.56	0.3%	
23	7	2,800	\$327.57	\$336.20	\$663.77	\$329.39	\$336.20	\$665.59	\$1.82	0.3%	
24	8	3,200	\$364.83	\$384.22	\$749.05	\$366.91	\$384.22	\$751.13	\$2.08	0.3%	
25	10	4,000	\$422.39	\$480.28	\$902.67	\$424.99	\$480.28	\$905.27	\$2.60	0.3%	
26	12	4,800	\$609.08	\$576.34	\$1,185.42	\$612.20	\$576.34	\$1,188.54	\$3.12	0.3%	
27	Avg	5	2,000	\$253.08	\$240.14	\$493.22	\$254.38	\$240.14	\$494.52	\$1.30	0.3%

28		Current	Proposed	
29		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
30	Customer Charge	\$11.00	\$11.00	\$ -
31	Distribution Demand <=10 kW - Winter	\$0.00	\$0.00	\$ -
32	Distribution Demand >10 kW - Winter	\$0.29	\$0.29	\$ -
33	Transmission Demand >10 kW - Winter	\$19.97	\$19.97	\$ -
34	Distribution Demand <=10 kW - Summer	\$0.00	\$0.00	\$ -
35	Distribution Demand >10 kW - Summer	\$0.90	\$0.90	\$ -
36	Transmission Demand >10 kW - Summer	\$63.67	\$63.67	\$ -
37	Distribution Energy - 1st 2000 kWh - Winter	\$0.04418	\$0.04418	\$ -
38	Distribution Energy - next 150 hrs*kW - Winter	\$0.03842	\$0.03842	\$ -
39	Distribution Energy - remainder kWh - Winter	\$0.02550	\$0.02550	\$ -
40	Distribution Energy - 1st 2000 kWh - Summer	\$0.07102	\$0.07102	\$ -
41	Distribution Energy - next 150 hrs*kW - Summer	\$0.04310	\$0.04310	\$ -
42	Distribution Energy - remainder kWh - Summer	\$0.02681	\$0.02681	\$ -
43	Revenue Decoupling	\$0.00102	\$0.00102	\$ -
44	Solar Massachusetts Renewable Target	\$0.00221	\$0.00221	\$ -
45	Residential Assistance Adjustment Factor	\$0.00554	\$0.00554	\$ -
46	Pension Adjustment Factor	\$0.00081	\$0.00081	\$ -
47	Net Metering Recovery Surcharge	\$0.00720	\$0.00720	\$ -
48	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
49	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
50	Storm Cost Recovery Adjustment Factor	\$0.00414	\$0.00414	\$ -
51	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
52	Basic Service Cost True Up Factor	\$0.00033	\$0.00033	\$ -
53	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
54	Solar Expansion Cost Recovery Factor	\$0.00122	\$0.00122	\$ -
55	Vegetation Management	\$0.00156	\$0.00156	\$ -
56	Tax Act Credit Factor	(\$0.00236)	(\$0.00236)	\$ -
57	Grid Modernization	\$0.00007	\$0.00072	\$0.00065
58	Transition	\$0.00002	\$0.00002	\$ -
59	Transmission Energy - 1st 2000 kWh	\$0.01758	\$0.01758	\$ -
60	Transmission Energy - next 150 hrs*kW	\$0.01758	\$0.01758	\$ -
61	Transmission Energy - remainder kWh	\$0.00000	\$0.00000	\$ -
62	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
63	System Benefits Charge	\$0.00250	\$0.00250	\$ -
64	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
65	Basic Service Charge	\$0.12007	\$0.12007	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-2 Medium General Service**

1	Hours Use: 200									
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
3			<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
4	8	1,600	\$86.59	\$192.11	\$278.70	\$87.25	\$192.11	\$279.36	\$0.66	0.2%
5	10	2,000	\$103.74	\$240.14	\$343.88	\$104.56	\$240.14	\$344.70	\$0.82	0.2%
6	12	2,400	\$154.71	\$288.17	\$442.88	\$155.69	\$288.17	\$443.86	\$0.98	0.2%
7	14	2,800	\$205.68	\$336.20	\$541.88	\$206.83	\$336.20	\$543.03	\$1.15	0.2%
8	16	3,200	\$256.64	\$384.22	\$640.86	\$257.95	\$384.22	\$642.17	\$1.31	0.2%
9	20	4,000	\$358.58	\$480.28	\$838.86	\$360.22	\$480.28	\$840.50	\$1.64	0.2%
10	24	4,800	\$460.52	\$576.34	\$1,036.86	\$462.49	\$576.34	\$1,038.83	\$1.97	0.2%
11	30	6,000	\$613.42	\$720.42	\$1,333.84	\$615.88	\$720.42	\$1,336.30	\$2.46	0.2%
12	40	8,000	\$868.26	\$960.56	\$1,828.82	\$871.54	\$960.56	\$1,832.10	\$3.28	0.2%
13	70	14,000	\$1,629.81	\$1,680.98	\$3,310.79	\$1,635.55	\$1,680.98	\$3,316.53	\$5.74	0.2%
14	Avg	17	\$282.13	\$408.24	\$690.37	\$283.52	\$408.24	\$691.76	\$1.39	0.2%
15	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
16			<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
17	8	1,600	\$103.41	\$192.11	\$295.52	\$104.07	\$192.11	\$296.18	\$0.66	0.2%
18	10	2,000	\$124.76	\$240.14	\$364.90	\$125.58	\$240.14	\$365.72	\$0.82	0.2%
19	12	2,400	\$225.64	\$288.17	\$513.81	\$226.62	\$288.17	\$514.79	\$0.98	0.2%
20	14	2,800	\$326.52	\$336.20	\$662.72	\$327.67	\$336.20	\$663.87	\$1.15	0.2%
21	16	3,200	\$427.40	\$384.22	\$811.62	\$428.71	\$384.22	\$812.93	\$1.31	0.2%
22	20	4,000	\$629.16	\$480.28	\$1,109.44	\$630.80	\$480.28	\$1,111.08	\$1.64	0.1%
23	24	4,800	\$830.92	\$576.34	\$1,407.26	\$832.89	\$576.34	\$1,409.23	\$1.97	0.1%
24	30	6,000	\$1,133.56	\$720.42	\$1,853.98	\$1,136.02	\$720.42	\$1,856.44	\$2.46	0.1%
25	40	8,000	\$1,637.96	\$960.56	\$2,598.52	\$1,641.24	\$960.56	\$2,601.80	\$3.28	0.1%
26	70	14,000	\$3,146.23	\$1,680.98	\$4,827.21	\$3,151.97	\$1,680.98	\$4,832.95	\$5.74	0.1%
27	Avg	18	\$528.28	\$432.25	\$960.53	\$529.76	\$432.25	\$962.01	\$1.48	0.2%
28			Current	Proposed						
29			Rates	Rates	Change					
30	Customer Charge		\$18.00	\$18.00	\$ -					
31	Distribution Demand <=10 kW - Winter		\$0.00	\$0.00	\$ -					
32	Distribution Demand >10 kW - Winter		\$10.00	\$10.00	\$ -					
33	Transmission Demand >10 kW - Winter		\$7.98	\$7.98	\$ -					
34	Distribution Demand <=10 kW - Summer		\$0.00	\$0.00	\$ -					
35	Distribution Demand >10 kW - Summer		\$21.42	\$21.42	\$ -					
36	Transmission Demand >10 kW - Summer		\$21.15	\$21.15	\$ -					
37	Distribution Energy - 1st 2000 kWh - Winter		\$0.01892	\$0.01892	\$ -					
38	Distribution Energy - next 150 hrs*kW - Winter		\$0.01357	\$0.01357	\$ -					
39	Distribution Energy - remainder kWh - Winter		\$0.01159	\$0.01159	\$ -					
40	Distribution Energy - 1st 2000 kWh - Summer		\$0.02943	\$0.02943	\$ -					
41	Distribution Energy - next 150 hrs*kW - Summer		\$0.01540	\$0.01540	\$ -					
42	Distribution Energy - remainder kWh - Summer		\$0.01211	\$0.01211	\$ -					
43	Revenue Decoupling		\$0.00064	\$0.00064	\$ -					
44	Solar Massachusetts Renewable Target		\$0.00138	\$0.00138	\$ -					
45	Residential Assistance Adjustment Factor		\$0.00346	\$0.00346	\$ -					
46	Pension Adjustment Factor		\$0.00039	\$0.00039	\$ -					
47	Net Metering Recovery Surcharge		\$0.00450	\$0.00450	\$ -					
48	Long Term Renewable Contract Adjustment		\$0.00049	\$0.00049	\$ -					
49	AG Consulting Expense		\$0.00000	\$0.00000	\$ -					
50	Storm Cost Recovery Adjustment Factor		\$0.00259	\$0.00259	\$ -					
51	Storm Reserve Adjustment		\$0.00000	\$0.00000	\$ -					
52	Basic Service Cost True Up Factor		\$0.00021	\$0.00021	\$ -					
53	Solar Program Cost Adjustment Factor		\$0.00000	\$0.00000	\$ -					
54	Solar Expansion Cost Recovery Factor		\$0.00076	\$0.00076	\$ -					
55	Vegetation Management		\$0.00075	\$0.00075	\$ -					
56	Tax Act Credit Factor		(\$0.00148)	(\$0.00148)	\$ -					
57	Grid Modernization		\$0.00005	\$0.00046	\$0.00041					
58	Transition		\$0.00002	\$0.00002	\$ -					
59	Energy Efficiency Reconciliation Factor		\$0.00719	\$0.00719	\$ -					
60	System Benefits Charge		\$0.00250	\$0.00250	\$ -					
61	Renewable Energy Charge		\$0.00050	\$0.00050	\$ -					
62	Basic Service Charge		\$0.12007	\$0.12007	\$ -					

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-2 Medium General Service**

1	Hours Use: 300									
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
3			<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
4		<u>kW</u>								
5		8	\$118.75	\$288.17	\$406.92	\$119.73	\$288.17	\$407.90	\$0.98	0.2%
6		10	\$141.26	\$360.21	\$501.47	\$142.49	\$360.21	\$502.70	\$1.23	0.2%
7		12	\$199.73	\$432.25	\$631.98	\$201.21	\$432.25	\$633.46	\$1.48	0.2%
8		14	\$258.01	\$504.29	\$762.30	\$259.73	\$504.29	\$764.02	\$1.72	0.2%
9		16	\$315.88	\$576.34	\$892.22	\$317.85	\$576.34	\$894.19	\$1.97	0.2%
10		20	\$431.64	\$720.42	\$1,152.06	\$434.10	\$720.42	\$1,154.52	\$2.46	0.2%
11		24	\$547.40	\$864.50	\$1,411.90	\$550.35	\$864.50	\$1,414.85	\$2.95	0.2%
12		30	\$721.03	\$1,080.63	\$1,801.66	\$724.72	\$1,080.63	\$1,805.35	\$3.69	0.2%
13		40	\$1,010.42	\$1,440.84	\$2,451.26	\$1,015.34	\$1,440.84	\$2,456.18	\$4.92	0.2%
14		70	\$1,878.59	\$2,521.47	\$4,400.06	\$1,887.20	\$2,521.47	\$4,408.67	\$8.61	0.2%
15	Avg	24	\$547.40	\$864.50	\$1,411.90	\$550.35	\$864.50	\$1,414.85	\$2.95	0.2%
16	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
17			<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
18		<u>kW</u>								
19		8	\$140.50	\$288.17	\$428.67	\$141.48	\$288.17	\$429.65	\$0.98	0.2%
20		10	\$164.11	\$360.21	\$524.32	\$165.34	\$360.21	\$525.55	\$1.23	0.2%
21		12	\$272.86	\$432.25	\$705.11	\$274.34	\$432.25	\$706.59	\$1.48	0.2%
22		14	\$381.28	\$504.29	\$885.57	\$383.00	\$504.29	\$887.29	\$1.72	0.2%
23		16	\$489.04	\$576.34	\$1,065.38	\$491.01	\$576.34	\$1,067.35	\$1.97	0.2%
24		20	\$704.57	\$720.42	\$1,424.99	\$707.03	\$720.42	\$1,427.45	\$2.46	0.2%
25		24	\$920.10	\$864.50	\$1,784.60	\$923.05	\$864.50	\$1,787.55	\$2.95	0.2%
26		30	\$1,243.39	\$1,080.63	\$2,324.02	\$1,247.08	\$1,080.63	\$2,327.71	\$3.69	0.2%
27		40	\$1,782.20	\$1,440.84	\$3,223.04	\$1,787.12	\$1,440.84	\$3,227.96	\$4.92	0.2%
28		70	\$3,398.65	\$2,521.47	\$5,920.12	\$3,407.26	\$2,521.47	\$5,928.73	\$8.61	0.1%
29	Avg	26	\$1,027.86	\$936.55	\$1,964.41	\$1,031.06	\$936.55	\$1,967.61	\$3.20	0.2%
30			Current Rates			Proposed Rates			Change	
31	Customer Charge				\$18.00			\$18.00	\$ -	
32	Distribution Demand <=10 kW - Winter				\$0.00			\$0.00	\$ -	
33	Distribution Demand >10 kW - Winter				\$10.00			\$10.00	\$ -	
34	Transmission Demand >10 kW - Winter				\$7.98			\$7.98	\$ -	
35	Distribution Demand <=10 kW - Summer				\$0.00			\$0.00	\$ -	
36	Distribution Demand >10 kW - Summer				\$21.42			\$21.42	\$ -	
37	Transmission Demand >10 kW - Summer				\$21.15			\$21.15	\$ -	
38	Distribution Energy - 1st 2000 kWh - Winter				\$0.01892			\$0.01892	\$ -	
39	Distribution Energy - next 150 hrs*kW - Winter				\$0.01357			\$0.01357	\$ -	
40	Distribution Energy - remainder kWh - Winter				\$0.01159			\$0.01159	\$ -	
41	Distribution Energy - 1st 2000 kWh - Summer				\$0.02943			\$0.02943	\$ -	
42	Distribution Energy - next 150 hrs*kW - Summer				\$0.01540			\$0.01540	\$ -	
43	Distribution Energy - remainder kWh - Summer				\$0.01211			\$0.01211	\$ -	
44	Revenue Decoupling				\$0.00064			\$0.00064	\$ -	
45	Solar Massachusetts Renewable Target				\$0.00138			\$0.00138	\$ -	
46	Residential Assistance Adjustment Factor				\$0.00346			\$0.00346	\$ -	
47	Pension Adjustment Factor				\$0.00039			\$0.00039	\$ -	
48	Net Metering Recovery Surcharge				\$0.00450			\$0.00450	\$ -	
49	Long Term Renewable Contract Adjustment				\$0.00049			\$0.00049	\$ -	
50	AG Consulting Expense				\$0.00000			\$0.00000	\$ -	
51	Storm Cost Recovery Adjustment Factor				\$0.00259			\$0.00259	\$ -	
52	Storm Reserve Adjustment				\$0.00000			\$0.00000	\$ -	
53	Basic Service Cost True Up Factor				\$0.00021			\$0.00021	\$ -	
54	Solar Program Cost Adjustment Factor				\$0.00000			\$0.00000	\$ -	
55	Solar Expansion Cost Recovery Factor				\$0.00076			\$0.00076	\$ -	
56	Vegetation Management				\$0.00075			\$0.00075	\$ -	
57	Tax Act Credit Factor				(\$0.00148)			(\$0.00148)	\$ -	
58	Grid Modernization				\$0.00005			\$0.00046	\$0.00041	
59	Transition				\$0.00002			\$0.00002	\$ -	
60	Energy Efficiency Reconciliation Factor				\$0.00719			\$0.00719	\$ -	
61	System Benefits Charge				\$0.00250			\$0.00250	\$ -	
62	Renewable Energy Charge				\$0.00050			\$0.00050	\$ -	
63	Basic Service Charge				\$0.12007			\$0.12007	\$ -	

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-2 Medium General Service**

1	Hours Use: 450										
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3			<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	kW	kWh									
5	8	3,600	\$162.98	\$432.25	\$595.23	\$164.46	\$432.25	\$596.71	\$1.48	0.2%	
6	10	4,500	\$195.57	\$540.32	\$735.89	\$197.41	\$540.32	\$737.73	\$1.84	0.3%	
7	12	5,400	\$264.10	\$648.38	\$912.48	\$266.31	\$648.38	\$914.69	\$2.21	0.2%	
8	14	6,300	\$332.65	\$756.44	\$1,089.09	\$335.23	\$756.44	\$1,091.67	\$2.58	0.2%	
9	16	7,200	\$401.18	\$864.50	\$1,265.68	\$404.13	\$864.50	\$1,268.63	\$2.95	0.2%	
10	20	9,000	\$538.26	\$1,080.63	\$1,618.89	\$541.95	\$1,080.63	\$1,622.58	\$3.69	0.2%	
11	24	10,800	\$675.34	\$1,296.76	\$1,972.10	\$679.77	\$1,296.76	\$1,976.53	\$4.43	0.2%	
12	30	13,500	\$880.97	\$1,620.95	\$2,501.92	\$886.50	\$1,620.95	\$2,507.45	\$5.53	0.2%	
13	40	18,000	\$1,223.66	\$2,161.26	\$3,384.92	\$1,231.04	\$2,161.26	\$3,392.30	\$7.38	0.2%	
14	70	31,500	\$2,251.77	\$3,782.21	\$6,033.98	\$2,264.68	\$3,782.21	\$6,046.89	\$12.91	0.2%	
14	Avg	31	13,950	\$915.23	\$1,674.98	\$2,590.21	\$920.95	\$1,674.98	\$2,595.93	\$5.72	0.2%
15	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
16			<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
17	kW	kWh									
18	8	3,600	\$186.40	\$432.25	\$618.65	\$187.88	\$432.25	\$620.13	\$1.48	0.2%	
19	10	4,500	\$219.85	\$540.32	\$760.17	\$221.69	\$540.32	\$762.01	\$1.84	0.2%	
20	12	5,400	\$338.43	\$648.38	\$986.81	\$340.64	\$648.38	\$989.02	\$2.21	0.2%	
21	14	6,300	\$457.01	\$756.44	\$1,213.45	\$459.59	\$756.44	\$1,216.03	\$2.58	0.2%	
22	16	7,200	\$575.59	\$864.50	\$1,440.09	\$578.54	\$864.50	\$1,443.04	\$2.95	0.2%	
23	20	9,000	\$812.75	\$1,080.63	\$1,893.38	\$816.44	\$1,080.63	\$1,897.07	\$3.69	0.2%	
24	24	10,800	\$1,049.91	\$1,296.76	\$2,346.67	\$1,054.34	\$1,296.76	\$2,351.10	\$4.43	0.2%	
25	30	13,500	\$1,405.66	\$1,620.95	\$3,026.61	\$1,411.19	\$1,620.95	\$3,032.14	\$5.53	0.2%	
26	40	18,000	\$1,998.56	\$2,161.26	\$4,159.82	\$2,005.94	\$2,161.26	\$4,167.20	\$7.38	0.2%	
27	70	31,500	\$3,777.28	\$3,782.21	\$7,559.49	\$3,790.19	\$3,782.21	\$7,572.40	\$12.91	0.2%	
27	Avg	33	14,850	\$1,583.53	\$1,783.04	\$3,366.57	\$1,589.62	\$1,783.04	\$3,372.66	\$6.09	0.2%
28						Current	Proposed				
29						<u>Rates</u>	<u>Rates</u>	<u>Change</u>			
30	Customer Charge					\$18.00	\$18.00	\$ -			
31	Distribution Demand <=10 kW - Winter					\$0.00	\$0.00	\$ -			
32	Distribution Demand >10 kW - Winter					\$10.00	\$10.00	\$ -			
33	Transmission Demand >10 kW - Winter					\$7.98	\$7.98	\$ -			
34	Distribution Demand <=10 kW - Summer					\$0.00	\$0.00	\$ -			
35	Distribution Demand >10 kW - Summer					\$21.42	\$21.42	\$ -			
36	Transmission Demand >10 kW - Summer					\$21.15	\$21.15	\$ -			
37	Distribution Energy - 1st 2000 kWh - Winter					\$0.01892	\$0.01892	\$ -			
38	Distribution Energy - next 150 hrs*kW - Winter					\$0.01357	\$0.01357	\$ -			
39	Distribution Energy - remainder kWh - Winter					\$0.01159	\$0.01159	\$ -			
40	Distribution Energy - 1st 2000 kWh - Summer					\$0.02943	\$0.02943	\$ -			
41	Distribution Energy - next 150 hrs*kW - Summer					\$0.01540	\$0.01540	\$ -			
42	Distribution Energy - remainder kWh - Summer					\$0.01211	\$0.01211	\$ -			
43	Revenue Decoupling					\$0.00064	\$0.00064	\$ -			
44	Solar Massachusetts Renewable Target					\$0.00138	\$0.00138	\$ -			
45	Residential Assistance Adjustment Factor					\$0.00346	\$0.00346	\$ -			
46	Pension Adjustment Factor					\$0.00039	\$0.00039	\$ -			
47	Net Metering Recovery Surcharge					\$0.00450	\$0.00450	\$ -			
48	Long Term Renewable Contract Adjustment					\$0.00049	\$0.00049	\$ -			
49	AG Consulting Expense					\$0.00000	\$0.00000	\$ -			
50	Storm Cost Recovery Adjustment Factor					\$0.00259	\$0.00259	\$ -			
51	Storm Reserve Adjustment					\$0.00000	\$0.00000	\$ -			
52	Basic Service Cost True Up Factor					\$0.00021	\$0.00021	\$ -			
53	Solar Program Cost Adjustment Factor					\$0.00000	\$0.00000	\$ -			
54	Solar Expansion Cost Recovery Factor					\$0.00076	\$0.00076	\$ -			
55	Vegetation Management					\$0.00075	\$0.00075	\$ -			
56	Tax Act Credit Factor					(\$0.00148)	(\$0.00148)	\$ -			
57	Grid Modernization					\$0.00005	\$0.00046	\$0.00041			
58	Transition					\$0.00002	\$0.00002	\$ -			
59	Energy Efficiency Reconciliation Factor					\$0.00719	\$0.00719	\$ -			
60	System Benefits Charge					\$0.00250	\$0.00250	\$ -			
61	Renewable Energy Charge					\$0.00050	\$0.00050	\$ -			
62	Basic Service Charge					\$0.12007	\$0.12007	\$ -			

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-3 Large General Service - NEMA**

1	Hours Use: 350										
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
4	100	35,000	\$2,723.25	\$3,181.85	\$5,905.10	\$2,732.35	\$3,181.85	\$5,914.20	\$9.10	0.2%	
5	250	87,500	\$6,433.13	\$7,954.63	\$14,387.76	\$6,455.88	\$7,954.63	\$14,410.51	\$22.75	0.2%	
6	400	140,000	\$10,143.00	\$12,727.40	\$22,870.40	\$10,179.40	\$12,727.40	\$22,906.80	\$36.40	0.2%	
7	550	192,500	\$13,852.88	\$17,500.18	\$31,353.06	\$13,902.93	\$17,500.18	\$31,403.11	\$50.05	0.2%	
8	700	245,000	\$17,562.75	\$22,272.95	\$39,835.70	\$17,626.45	\$22,272.95	\$39,899.40	\$63.70	0.2%	
9	1,000	350,000	\$24,982.50	\$31,818.50	\$56,801.00	\$25,073.50	\$31,818.50	\$56,892.00	\$91.00	0.2%	
10	1,500	525,000	\$37,348.75	\$47,727.75	\$85,076.50	\$37,485.25	\$47,727.75	\$85,213.00	\$136.50	0.2%	
11	2,500	875,000	\$62,081.25	\$79,546.25	\$141,627.50	\$62,308.75	\$79,546.25	\$141,855.00	\$227.50	0.2%	
12	5,000	1,750,000	\$123,912.50	\$159,092.50	\$283,005.00	\$124,367.50	\$159,092.50	\$283,460.00	\$455.00	0.2%	
13	Avg	430	150,500	\$10,884.98	\$13,681.96	\$24,566.94	\$10,924.11	\$13,681.96	\$24,606.07	\$39.13	0.2%

14			Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
15	Monthly	Monthly	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
16	100	35,000	\$3,363.25	\$3,181.85	\$6,545.10	\$3,372.35	\$3,181.85	\$6,554.20	\$9.10	0.1%
17	250	87,500	\$8,033.13	\$7,954.63	\$15,987.76	\$8,055.88	\$7,954.63	\$16,010.51	\$22.75	0.1%
18	400	140,000	\$12,703.00	\$12,727.40	\$25,430.40	\$12,739.40	\$12,727.40	\$25,466.80	\$36.40	0.1%
19	550	192,500	\$17,372.88	\$17,500.18	\$34,873.06	\$17,422.93	\$17,500.18	\$34,923.11	\$50.05	0.1%
20	700	245,000	\$22,042.75	\$22,272.95	\$44,315.70	\$22,106.45	\$22,272.95	\$44,379.40	\$63.70	0.1%
21	1,000	350,000	\$31,382.50	\$31,818.50	\$63,201.00	\$31,473.50	\$31,818.50	\$63,292.00	\$91.00	0.1%
22	1,500	525,000	\$46,948.75	\$47,727.75	\$94,676.50	\$47,085.25	\$47,727.75	\$94,813.00	\$136.50	0.1%
23	2,500	875,000	\$78,081.25	\$79,546.25	\$157,627.50	\$78,308.75	\$79,546.25	\$157,855.00	\$227.50	0.1%
24	5,000	1,750,000	\$155,912.50	\$159,092.50	\$315,005.00	\$156,367.50	\$159,092.50	\$315,460.00	\$455.00	0.1%
25	Avg 506	177,100	\$16,003.05	\$16,100.16	\$32,103.21	\$16,049.09	\$16,100.16	\$32,149.25	\$46.04	0.1%

26			Current	Proposed	
27			Rates	Rates	Change
28	Customer Charge		\$250.00	\$250.00	\$ -
29	Distribution Demand - Winter		\$9.17	\$9.17	\$ -
30	Distribution Demand - Summer		\$15.57	\$15.57	\$ -
31	Transmission Demand		\$9.00	\$9.00	\$ -
32	Distribution Energy		\$0.00000	\$0.00000	\$ -
33	Revenue Decoupling		\$0.00039	\$0.00039	\$ -
34	Solar Massachusetts Renewable Target		\$0.00083	\$0.00083	\$ -
35	Residential Assistance Adjustment Factor		\$0.00209	\$0.00209	\$ -
36	Pension Adjustment Factor		\$0.00025	\$0.00025	\$ -
37	Net Metering Recovery Surcharge		\$0.00271	\$0.00271	\$ -
38	Long Term Renewable Contract Adjustment		\$0.00049	\$0.00049	\$ -
39	AG Consulting Expense		\$0.00000	\$0.00000	\$ -
40	Storm Cost Recovery Adjustment Factor		\$0.00156	\$0.00156	\$ -
41	Storm Reserve Adjustment		\$0.00000	\$0.00000	\$ -
42	Basic Service Cost True Up Factor		\$0.00013	\$0.00013	\$ -
43	Solar Program Cost Adjustment Factor		\$0.00000	\$0.00000	\$ -
44	Solar Expansion Cost Recovery Factor		\$0.00046	\$0.00046	\$ -
45	Vegetation Management		\$0.00049	\$0.00049	\$ -
46	Tax Act Credit Factor		(\$0.00089)	(\$0.00089)	\$ -
47	Grid Modernization		\$0.00003	\$0.00029	\$0.00026
48	Transition		\$0.00002	\$0.00002	\$ -
49	Energy Efficiency Reconciliation Factor		\$0.00719	\$0.00719	\$ -
50	System Benefits Charge		\$0.00250	\$0.00250	\$ -
51	Renewable Energy Charge		\$0.00050	\$0.00050	\$ -
52	Basic Service Charge		\$0.09091	\$0.09091	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-3 Large General Service - NEMA**

1	Hours Use: 450									
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
3	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
4	100	45,000	\$2,910.75	\$4,090.95	\$7,001.70	\$2,922.45	\$4,090.95	\$7,013.40	\$11.70	0.2%
5	250	112,500	\$6,901.88	\$10,227.38	\$17,129.26	\$6,931.13	\$10,227.38	\$17,158.51	\$29.25	0.2%
6	400	180,000	\$10,893.00	\$16,363.80	\$27,256.80	\$10,939.80	\$16,363.80	\$27,303.60	\$46.80	0.2%
7	550	247,500	\$14,884.13	\$22,500.23	\$37,384.36	\$14,948.48	\$22,500.23	\$37,448.71	\$64.35	0.2%
8	700	315,000	\$18,875.25	\$28,636.65	\$47,511.90	\$18,957.15	\$28,636.65	\$47,593.80	\$81.90	0.2%
9	1,000	450,000	\$26,857.50	\$40,909.50	\$67,767.00	\$26,974.50	\$40,909.50	\$67,884.00	\$117.00	0.2%
10	1,500	675,000	\$40,161.25	\$61,364.25	\$101,525.50	\$40,336.75	\$61,364.25	\$101,701.00	\$175.50	0.2%
11	2,500	1,125,000	\$66,768.75	\$102,273.75	\$169,042.50	\$67,061.25	\$102,273.75	\$169,335.00	\$292.50	0.2%
12	5,000	2,250,000	\$133,287.50	\$204,547.50	\$337,835.00	\$133,872.50	\$204,547.50	\$338,420.00	\$585.00	0.2%
13	Avg	800	\$21,536.00	\$32,727.60	\$54,263.60	\$21,629.60	\$32,727.60	\$54,357.20	\$93.60	0.2%

14	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
15	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
16	100	45,000	\$3,550.75	\$4,090.95	\$7,641.70	\$3,562.45	\$4,090.95	\$7,653.40	\$11.70	0.2%
17	250	112,500	\$8,501.88	\$10,227.38	\$18,729.26	\$8,531.13	\$10,227.38	\$18,758.51	\$29.25	0.2%
18	400	180,000	\$13,453.00	\$16,363.80	\$29,816.80	\$13,499.80	\$16,363.80	\$29,863.60	\$46.80	0.2%
19	550	247,500	\$18,404.13	\$22,500.23	\$40,904.36	\$18,468.48	\$22,500.23	\$40,968.71	\$64.35	0.2%
20	700	315,000	\$23,355.25	\$28,636.65	\$51,991.90	\$23,437.15	\$28,636.65	\$52,073.80	\$81.90	0.2%
21	1,000	450,000	\$33,257.50	\$40,909.50	\$74,167.00	\$33,374.50	\$40,909.50	\$74,284.00	\$117.00	0.2%
22	1,500	675,000	\$49,761.25	\$61,364.25	\$111,125.50	\$49,936.75	\$61,364.25	\$111,301.00	\$175.50	0.2%
23	2,500	1,125,000	\$82,768.75	\$102,273.75	\$185,042.50	\$83,061.25	\$102,273.75	\$185,335.00	\$292.50	0.2%
24	5,000	2,250,000	\$165,287.50	\$204,547.50	\$369,835.00	\$165,872.50	\$204,547.50	\$370,420.00	\$585.00	0.2%
25	Avg	1,060	\$35,237.95	\$43,364.07	\$78,602.02	\$35,361.97	\$43,364.07	\$78,726.04	\$124.02	0.2%

26		Current	Proposed	
27		Rates	Rates	Change
28	Customer Charge	\$250.00	\$250.00	\$ -
29	Distribution Demand - Winter	\$9.17	\$9.17	\$ -
30	Distribution Demand - Summer	\$15.57	\$15.57	\$ -
31	Transmission Demand	\$9.00	\$9.00	\$ -
32	Distribution Energy	\$0.00000	\$0.00000	\$ -
33	Revenue Decoupling	\$0.00039	\$0.00039	\$ -
34	Solar Massachusetts Renewable Target	\$0.00083	\$0.00083	\$ -
35	Residential Assistance Adjustment Factor	\$0.00209	\$0.00209	\$ -
36	Pension Adjustment Factor	\$0.00025	\$0.00025	\$ -
37	Net Metering Recovery Surcharge	\$0.00271	\$0.00271	\$ -
38	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
39	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
40	Storm Cost Recovery Adjustment Factor	\$0.00156	\$0.00156	\$ -
41	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
42	Basic Service Cost True Up Factor	\$0.00013	\$0.00013	\$ -
43	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
44	Solar Expansion Cost Recovery Factor	\$0.00046	\$0.00046	\$ -
45	Vegetation Management	\$0.00049	\$0.00049	\$ -
46	Tax Act Credit Factor	(\$0.00089)	(\$0.00089)	\$ -
47	Grid Modernization	\$0.00003	\$0.00029	\$0.00026
48	Transition	\$0.00002	\$0.00002	\$ -
49	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
50	System Benefits Charge	\$0.00250	\$0.00250	\$ -
51	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
52	Basic Service Charge	\$0.09091	\$0.09091	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-3 Large General Service - NEMA**

Hours Use: 550											
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	100	55,000	\$3,098.25	\$5,000.05	\$8,098.30	\$3,112.55	\$5,000.05	\$8,112.60	\$14.30	0.2%	
5	250	137,500	\$7,370.63	\$12,500.13	\$19,870.76	\$7,406.38	\$12,500.13	\$19,906.51	\$35.75	0.2%	
6	400	220,000	\$11,643.00	\$20,000.20	\$31,643.20	\$11,700.20	\$20,000.20	\$31,700.40	\$57.20	0.2%	
7	550	302,500	\$15,915.38	\$27,500.28	\$43,415.66	\$15,994.03	\$27,500.28	\$43,494.31	\$78.65	0.2%	
8	700	385,000	\$20,187.75	\$35,000.35	\$55,188.10	\$20,287.85	\$35,000.35	\$55,288.20	\$100.10	0.2%	
9	1,000	550,000	\$28,732.50	\$50,000.50	\$78,733.00	\$28,875.50	\$50,000.50	\$78,876.00	\$143.00	0.2%	
10	1,500	825,000	\$42,973.75	\$75,000.75	\$117,974.50	\$43,188.25	\$75,000.75	\$118,189.00	\$214.50	0.2%	
11	2,500	1,375,000	\$71,456.25	\$125,001.25	\$196,457.50	\$71,813.75	\$125,001.25	\$196,815.00	\$357.50	0.2%	
12	5,000	2,750,000	\$142,662.50	\$250,002.50	\$392,665.00	\$143,377.50	\$250,002.50	\$393,380.00	\$715.00	0.2%	
13	Avg	1,459	802,450	\$41,805.97	\$72,950.73	\$114,756.70	\$42,014.60	\$72,950.73	\$114,965.33	\$208.63	0.2%
14	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
15	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
16	100	55,000	\$3,738.25	\$5,000.05	\$8,738.30	\$3,752.55	\$5,000.05	\$8,752.60	\$14.30	0.2%	
17	250	137,500	\$8,970.63	\$12,500.13	\$21,470.76	\$9,006.38	\$12,500.13	\$21,506.51	\$35.75	0.2%	
18	400	220,000	\$14,203.00	\$20,000.20	\$34,203.20	\$14,260.20	\$20,000.20	\$34,260.40	\$57.20	0.2%	
19	550	302,500	\$19,435.38	\$27,500.28	\$46,935.66	\$19,514.03	\$27,500.28	\$47,014.31	\$78.65	0.2%	
20	700	385,000	\$24,667.75	\$35,000.35	\$59,668.10	\$24,767.85	\$35,000.35	\$59,768.20	\$100.10	0.2%	
21	1,000	550,000	\$35,132.50	\$50,000.50	\$85,133.00	\$35,275.50	\$50,000.50	\$85,276.00	\$143.00	0.2%	
22	1,500	825,000	\$52,573.75	\$75,000.75	\$127,574.50	\$52,788.25	\$75,000.75	\$127,789.00	\$214.50	0.2%	
23	2,500	1,375,000	\$87,456.25	\$125,001.25	\$212,457.50	\$87,813.75	\$125,001.25	\$212,815.00	\$357.50	0.2%	
24	5,000	2,750,000	\$174,662.50	\$250,002.50	\$424,665.00	\$175,377.50	\$250,002.50	\$425,380.00	\$715.00	0.2%	
25	Avg	2,101	1,155,550	\$73,538.13	\$105,051.05	\$178,589.18	\$73,838.58	\$105,051.05	\$178,889.63	\$300.45	0.2%
26					Current	Proposed					
27					<u>Rates</u>	<u>Rates</u>	<u>Change</u>				
28	Customer Charge				\$250.00	\$250.00	\$ -				
29	Distribution Demand - Winter				\$9.17	\$9.17	\$ -				
30	Distribution Demand - Summer				\$15.57	\$15.57	\$ -				
31	Transmission Demand				\$9.00	\$9.00	\$ -				
32	Distribution Energy				\$0.00000	\$0.00000	\$ -				
33	Revenue Decoupling				\$0.00039	\$0.00039	\$ -				
34	Solar Massachusetts Renewable Target				\$0.00083	\$0.00083	\$ -				
35	Residential Assistance Adjustment Factor				\$0.00209	\$0.00209	\$ -				
36	Pension Adjustment Factor				\$0.00025	\$0.00025	\$ -				
37	Net Metering Recovery Surcharge				\$0.00271	\$0.00271	\$ -				
38	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
39	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
40	Storm Cost Recovery Adjustment Factor				\$0.00156	\$0.00156	\$ -				
41	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
42	Basic Service Cost True Up Factor				\$0.00013	\$0.00013	\$ -				
43	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
44	Solar Expansion Cost Recovery Factor				\$0.00046	\$0.00046	\$ -				
45	Vegetation Management				\$0.00049	\$0.00049	\$ -				
46	Tax Act Credit Factor				(\$0.00089)	(\$0.00089)	\$ -				
47	Grid Modernization				\$0.00003	\$0.00029	\$0.00026				
48	Transition				\$0.00002	\$0.00002	\$ -				
49	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -				
50	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
51	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -				
52	Basic Service Charge				\$0.09091	\$0.09091	\$ -				

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-3 Large General Service - SEMA**

1	Hours Use: 350									
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
3	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
4	100	35,000	\$2,723.25	\$2,847.60	\$5,570.85	\$2,732.35	\$2,847.60	\$5,579.95	\$9.10	0.2%
5	250	87,500	\$6,433.13	\$7,119.00	\$13,552.13	\$6,455.88	\$7,119.00	\$13,574.88	\$22.75	0.2%
6	400	140,000	\$10,143.00	\$11,390.40	\$21,533.40	\$10,179.40	\$11,390.40	\$21,569.80	\$36.40	0.2%
7	550	192,500	\$13,852.88	\$15,661.80	\$29,514.68	\$13,902.93	\$15,661.80	\$29,564.73	\$50.05	0.2%
8	700	245,000	\$17,562.75	\$19,933.20	\$37,495.95	\$17,626.45	\$19,933.20	\$37,559.65	\$63.70	0.2%
9	1,000	350,000	\$24,982.50	\$28,476.00	\$53,458.50	\$25,073.50	\$28,476.00	\$53,549.50	\$91.00	0.2%
10	1,500	525,000	\$37,348.75	\$42,714.00	\$80,062.75	\$37,485.25	\$42,714.00	\$80,199.25	\$136.50	0.2%
11	2,500	875,000	\$62,081.25	\$71,190.00	\$133,271.25	\$62,308.75	\$71,190.00	\$133,498.75	\$227.50	0.2%
12	5,000	1,750,000	\$123,912.50	\$142,380.00	\$266,292.50	\$124,367.50	\$142,380.00	\$266,747.50	\$455.00	0.2%
13	Avg	430	150,500	\$12,884.98	\$23,129.66	\$10,924.11	\$12,244.68	\$23,168.79	\$39.13	0.2%

14	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
15	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
16	100	35,000	\$3,363.25	\$2,847.60	\$6,210.85	\$3,372.35	\$2,847.60	\$6,219.95	\$9.10	0.1%
17	250	87,500	\$8,033.13	\$7,119.00	\$15,152.13	\$8,055.88	\$7,119.00	\$15,174.88	\$22.75	0.2%
18	400	140,000	\$12,703.00	\$11,390.40	\$24,093.40	\$12,739.40	\$11,390.40	\$24,129.80	\$36.40	0.2%
19	550	192,500	\$17,372.88	\$15,661.80	\$33,034.68	\$17,422.93	\$15,661.80	\$33,084.73	\$50.05	0.2%
20	700	245,000	\$22,042.75	\$19,933.20	\$41,975.95	\$22,106.45	\$19,933.20	\$42,039.65	\$63.70	0.2%
21	1,000	350,000	\$31,382.50	\$28,476.00	\$59,858.50	\$31,473.50	\$28,476.00	\$59,949.50	\$91.00	0.2%
22	1,500	525,000	\$46,948.75	\$42,714.00	\$89,662.75	\$47,085.25	\$42,714.00	\$89,799.25	\$136.50	0.2%
23	2,500	875,000	\$78,081.25	\$71,190.00	\$149,271.25	\$78,308.75	\$71,190.00	\$149,498.75	\$227.50	0.2%
24	5,000	1,750,000	\$155,912.50	\$142,380.00	\$298,292.50	\$156,367.50	\$142,380.00	\$298,747.50	\$455.00	0.2%
25	Avg	506	177,100	\$16,003.05	\$30,411.91	\$16,049.09	\$14,408.86	\$30,457.95	\$46.04	0.2%

26			Current	Proposed		
27			Rates	Rates	Change	
28	Customer Charge		\$250.00	\$250.00	\$ -	
29	Distribution Demand - Winter		\$9.17	\$9.17	\$ -	
30	Distribution Demand - Summer		\$15.57	\$15.57	\$ -	
31	Transmission Demand		\$9.00	\$9.00	\$ -	
32	Distribution Energy		\$0.00000	\$0.00000	\$ -	
33	Revenue Decoupling		\$0.00039	\$0.00039	\$ -	
34	Solar Massachusetts Renewable Target		\$0.00083	\$0.00083	\$ -	
35	Residential Assistance Adjustment Factor		\$0.00209	\$0.00209	\$ -	
36	Pension Adjustment Factor		\$0.00025	\$0.00025	\$ -	
37	Net Metering Recovery Surcharge		\$0.00271	\$0.00271	\$ -	
38	Long Term Renewable Contract Adjustment		\$0.00049	\$0.00049	\$ -	
39	AG Consulting Expense		\$0.00000	\$0.00000	\$ -	
40	Storm Cost Recovery Adjustment Factor		\$0.00156	\$0.00156	\$ -	
41	Storm Reserve Adjustment		\$0.00000	\$0.00000	\$ -	
42	Basic Service Cost True Up Factor		\$0.00013	\$0.00013	\$ -	
43	Solar Program Cost Adjustment Factor		\$0.00000	\$0.00000	\$ -	
44	Solar Expansion Cost Recovery Factor		\$0.00046	\$0.00046	\$ -	
45	Vegetation Management		\$0.00049	\$0.00049	\$ -	
46	Tax Act Credit Factor		(\$0.00089)	(\$0.00089)	\$ -	
47	Grid Modernization		\$0.00003	\$0.00029	\$0.00026	
48	Transition		\$0.00002	\$0.00002	\$ -	
49	Energy Efficiency Reconciliation Factor		\$0.00719	\$0.00719	\$ -	
50	System Benefits Charge		\$0.00250	\$0.00250	\$ -	
51	Renewable Energy Charge		\$0.00050	\$0.00050	\$ -	
52	Basic Service Charge		\$0.08136	\$0.08136	\$ -	

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-3 Large General Service - SEMA**

1	Hours Use: 450									
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
3	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
4	100	45,000	\$2,910.75	\$3,661.20	\$6,571.95	\$2,922.45	\$3,661.20	\$6,583.65	\$11.70	0.2%
5	250	112,500	\$6,901.88	\$9,153.00	\$16,054.88	\$6,931.13	\$9,153.00	\$16,084.13	\$29.25	0.2%
6	400	180,000	\$10,893.00	\$14,644.80	\$25,537.80	\$10,939.80	\$14,644.80	\$25,584.60	\$46.80	0.2%
7	550	247,500	\$14,884.13	\$20,136.60	\$35,020.73	\$14,948.48	\$20,136.60	\$35,085.08	\$64.35	0.2%
8	700	315,000	\$18,875.25	\$25,628.40	\$44,503.65	\$18,957.15	\$25,628.40	\$44,585.55	\$81.90	0.2%
9	1,000	450,000	\$26,857.50	\$36,612.00	\$63,469.50	\$26,974.50	\$36,612.00	\$63,586.50	\$117.00	0.2%
10	1,500	675,000	\$40,161.25	\$54,918.00	\$95,079.25	\$40,336.75	\$54,918.00	\$95,254.75	\$175.50	0.2%
11	2,500	1,125,000	\$66,768.75	\$91,530.00	\$158,298.75	\$67,061.25	\$91,530.00	\$158,591.25	\$292.50	0.2%
12	5,000	2,250,000	\$133,287.50	\$183,060.00	\$316,347.50	\$133,872.50	\$183,060.00	\$316,932.50	\$585.00	0.2%
13	Avg	800	\$21,536.00	\$29,289.60	\$50,825.60	\$21,629.60	\$29,289.60	\$50,919.20	\$93.60	0.2%

14	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
15	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
16	100	45,000	\$3,550.75	\$3,661.20	\$7,211.95	\$3,562.45	\$3,661.20	\$7,223.65	\$11.70	0.2%
17	250	112,500	\$8,501.88	\$9,153.00	\$17,654.88	\$8,531.13	\$9,153.00	\$17,684.13	\$29.25	0.2%
18	400	180,000	\$13,453.00	\$14,644.80	\$28,097.80	\$13,499.80	\$14,644.80	\$28,144.60	\$46.80	0.2%
19	550	247,500	\$18,404.13	\$20,136.60	\$38,540.73	\$18,468.48	\$20,136.60	\$38,605.08	\$64.35	0.2%
20	700	315,000	\$23,355.25	\$25,628.40	\$48,983.65	\$23,437.15	\$25,628.40	\$49,065.55	\$81.90	0.2%
21	1,000	450,000	\$33,257.50	\$36,612.00	\$69,869.50	\$33,374.50	\$36,612.00	\$69,986.50	\$117.00	0.2%
22	1,500	675,000	\$49,761.25	\$54,918.00	\$104,679.25	\$49,936.75	\$54,918.00	\$104,854.75	\$175.50	0.2%
23	2,500	1,125,000	\$82,768.75	\$91,530.00	\$174,298.75	\$83,061.25	\$91,530.00	\$174,591.25	\$292.50	0.2%
24	5,000	2,250,000	\$165,287.50	\$183,060.00	\$348,347.50	\$165,872.50	\$183,060.00	\$348,932.50	\$585.00	0.2%
25	Avg	1,060	\$35,237.95	\$38,808.72	\$74,046.67	\$35,361.97	\$38,808.72	\$74,170.69	\$124.02	0.2%

26		Current	Proposed	
27		Rates	Rates	Change
28	Customer Charge	\$250.00	\$250.00	\$ -
29	Distribution Demand - Winter	\$9.17	\$9.17	\$ -
30	Distribution Demand - Summer	\$15.57	\$15.57	\$ -
31	Transmission Demand	\$9.00	\$9.00	\$ -
32	Distribution Energy	\$0.00000	\$0.00000	\$ -
33	Revenue Decoupling	\$0.00039	\$0.00039	\$ -
34	Solar Massachusetts Renewable Target	\$0.00083	\$0.00083	\$ -
35	Residential Assistance Adjustment Factor	\$0.00209	\$0.00209	\$ -
36	Pension Adjustment Factor	\$0.00025	\$0.00025	\$ -
37	Net Metering Recovery Surcharge	\$0.00271	\$0.00271	\$ -
38	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
39	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
40	Storm Cost Recovery Adjustment Factor	\$0.00156	\$0.00156	\$ -
41	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
42	Basic Service Cost True Up Factor	\$0.00013	\$0.00013	\$ -
43	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
44	Solar Expansion Cost Recovery Factor	\$0.00046	\$0.00046	\$ -
45	Vegetation Management	\$0.00049	\$0.00049	\$ -
46	Tax Act Credit Factor	(\$0.00089)	(\$0.00089)	\$ -
47	Grid Modernization	\$0.00003	\$0.00029	\$0.00026
48	Transition	\$0.00002	\$0.00002	\$ -
49	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
50	System Benefits Charge	\$0.00250	\$0.00250	\$ -
51	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
52	Basic Service Charge	\$0.08136	\$0.08136	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate G-3 Large General Service - SEMA**

1 Hours Use: 550

2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
3	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
4	100	55,000	\$3,098.25	\$4,474.80	\$7,573.05	\$3,112.55	\$4,474.80	\$7,587.35	\$14.30	0.2%
5	250	137,500	\$7,370.63	\$11,187.00	\$18,557.63	\$7,406.38	\$11,187.00	\$18,593.38	\$35.75	0.2%
6	400	220,000	\$11,643.00	\$17,899.20	\$29,542.20	\$11,700.20	\$17,899.20	\$29,599.40	\$57.20	0.2%
7	550	302,500	\$15,915.38	\$24,611.40	\$40,526.78	\$15,994.03	\$24,611.40	\$40,605.43	\$78.65	0.2%
8	700	385,000	\$20,187.75	\$31,323.60	\$51,511.35	\$20,287.85	\$31,323.60	\$51,611.45	\$100.10	0.2%
9	1,000	550,000	\$28,732.50	\$44,748.00	\$73,480.50	\$28,875.50	\$44,748.00	\$73,623.50	\$143.00	0.2%
10	1,500	825,000	\$42,973.75	\$67,122.00	\$110,095.75	\$43,188.25	\$67,122.00	\$110,310.25	\$214.50	0.2%
11	2,500	1,375,000	\$71,456.25	\$111,870.00	\$183,326.25	\$71,813.75	\$111,870.00	\$183,683.75	\$357.50	0.2%
12	5,000	2,750,000	\$142,662.50	\$223,740.00	\$366,402.50	\$143,377.50	\$223,740.00	\$367,117.50	\$715.00	0.2%
13 Avg	1,459	802,450	\$41,805.97	\$65,287.33	\$107,093.30	\$42,014.60	\$65,287.33	\$107,301.93	\$208.63	0.2%

14	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
15	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
16	100	55,000	\$3,738.25	\$4,474.80	\$8,213.05	\$3,752.55	\$4,474.80	\$8,227.35	\$14.30	0.2%
17	250	137,500	\$8,970.63	\$11,187.00	\$20,157.63	\$9,006.38	\$11,187.00	\$20,193.38	\$35.75	0.2%
18	400	220,000	\$14,203.00	\$17,899.20	\$32,102.20	\$14,260.20	\$17,899.20	\$32,159.40	\$57.20	0.2%
19	550	302,500	\$19,435.38	\$24,611.40	\$44,046.78	\$19,514.03	\$24,611.40	\$44,125.43	\$78.65	0.2%
20	700	385,000	\$24,667.75	\$31,323.60	\$55,991.35	\$24,767.85	\$31,323.60	\$56,091.45	\$100.10	0.2%
21	1,000	550,000	\$35,132.50	\$44,748.00	\$79,880.50	\$35,275.50	\$44,748.00	\$80,023.50	\$143.00	0.2%
22	1,500	825,000	\$52,573.75	\$67,122.00	\$119,695.75	\$52,788.25	\$67,122.00	\$119,910.25	\$214.50	0.2%
23	2,500	1,375,000	\$87,456.25	\$111,870.00	\$199,326.25	\$87,813.75	\$111,870.00	\$199,683.75	\$357.50	0.2%
24	5,000	2,750,000	\$174,662.50	\$223,740.00	\$398,402.50	\$175,377.50	\$223,740.00	\$399,117.50	\$715.00	0.2%
25 Avg	2,101	1,155,550	\$73,538.13	\$94,015.55	\$167,553.68	\$73,838.58	\$94,015.55	\$167,854.13	\$300.45	0.2%

26		Current	Proposed	
27		Rates	Rates	Change
28	Customer Charge	\$250.00	\$250.00	\$ -
29	Distribution Demand - Winter	\$9.17	\$9.17	\$ -
30	Distribution Demand - Summer	\$15.57	\$15.57	\$ -
31	Transmission Demand	\$9.00	\$9.00	\$ -
32	Distribution Energy	\$0.00000	\$0.00000	\$ -
33	Revenue Decoupling	\$0.00039	\$0.00039	\$ -
34	Solar Massachusetts Renewable Target	\$0.00083	\$0.00083	\$ -
35	Residential Assistance Adjustment Factor	\$0.00209	\$0.00209	\$ -
36	Pension Adjustment Factor	\$0.00025	\$0.00025	\$ -
37	Net Metering Recovery Surcharge	\$0.00271	\$0.00271	\$ -
38	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
39	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
40	Storm Cost Recovery Adjustment Factor	\$0.00156	\$0.00156	\$ -
41	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
42	Basic Service Cost True Up Factor	\$0.00013	\$0.00013	\$ -
43	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
44	Solar Expansion Cost Recovery Factor	\$0.00046	\$0.00046	\$ -
45	Vegetation Management	\$0.00049	\$0.00049	\$ -
46	Tax Act Credit Factor	(\$0.00089)	(\$0.00089)	\$ -
47	Grid Modernization	\$0.00003	\$0.00029	\$0.00026
48	Transition	\$0.00002	\$0.00002	\$ -
49	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
50	System Benefits Charge	\$0.00250	\$0.00250	\$ -
51	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
52	Basic Service Charge	\$0.08136	\$0.08136	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate T-1 Optional Time-of-Use**

1	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
2	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
3	1	\$10.10	\$0.12	\$10.22	\$10.10	\$0.12	\$10.22	\$0.00	0.0%
4	75	\$17.19	\$9.01	\$26.20	\$17.24	\$9.01	\$26.25	\$0.05	0.2%
5	100	\$19.59	\$12.01	\$31.60	\$19.65	\$12.01	\$31.66	\$0.06	0.2%
6	200	\$29.17	\$24.01	\$53.18	\$29.30	\$24.01	\$53.31	\$0.13	0.2%
7	500	\$57.94	\$60.04	\$117.98	\$58.26	\$60.04	\$118.30	\$0.32	0.3%
8	1,000	\$105.87	\$120.07	\$225.94	\$106.52	\$120.07	\$226.59	\$0.65	0.3%
9	Avg 509	\$58.80	\$61.12	\$119.92	\$59.13	\$61.12	\$120.25	\$0.33	0.3%

10	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
11	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
12	1	\$10.12	\$0.12	\$10.24	\$10.12	\$0.12	\$10.24	\$0.00	0.0%
13	75	\$18.70	\$9.01	\$27.71	\$18.74	\$9.01	\$27.75	\$0.04	0.1%
14	100	\$21.59	\$12.01	\$33.60	\$21.66	\$12.01	\$33.67	\$0.07	0.2%
15	200	\$33.19	\$24.01	\$57.20	\$33.32	\$24.01	\$57.33	\$0.13	0.2%
16	500	\$67.97	\$60.04	\$128.01	\$68.29	\$60.04	\$128.33	\$0.32	0.2%
17	1,000	\$125.94	\$120.07	\$246.01	\$126.59	\$120.07	\$246.66	\$0.65	0.3%
18	Avg 287	\$43.27	\$34.46	\$77.73	\$43.46	\$34.46	\$77.92	\$0.19	0.2%

19		Current Rates	Proposed Rates	Change
20				
21	Customer Charge	\$10.00	\$10.00	\$ -
22	Distribution Energy Peak - Winter	\$0.07638	\$0.07638	\$ -
23	Distribution Energy Off Peak - Winter	\$0.01946	\$0.01946	\$ -
24	Distribution Energy Peak - Summer	\$0.16291	\$0.16291	\$ -
25	Distribution Energy Off Peak - Summer	\$0.02148	\$0.02148	\$ -
26	Revenue Decoupling	\$0.00102	\$0.00102	\$ -
27	Solar Massachusetts Renewable Target	\$0.00221	\$0.00221	\$ -
28	Residential Assistance Adjustment Factor	\$0.00554	\$0.00554	\$ -
29	Pension Adjustment Factor	\$0.00081	\$0.00081	\$ -
30	Net Metering Recovery Surcharge	\$0.00720	\$0.00720	\$ -
31	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
32	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
33	Storm Cost Recovery Adjustment Factor	\$0.00414	\$0.00414	\$ -
34	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
35	Basic Service Cost True Up Factor	\$0.00033	\$0.00033	\$ -
36	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
37	Solar Expansion Cost Recovery Factor	\$0.00122	\$0.00122	\$ -
38	Vegetation Management	\$0.00156	\$0.00156	\$ -
39	Tax Act Credit Factor	(\$0.00236)	(\$0.00236)	\$ -
40	Grid Modernization	\$0.00007	\$0.00072	\$0.00065
41	Transition	\$0.00002	\$0.00002	\$ -
42	Transmission Energy Peak - Winter	\$0.06872	\$0.06872	\$ -
43	Transmission Energy Off Peak - Winter	\$0.00000	\$0.00000	\$ -
44	Transmission Energy Peak - Summer	\$0.07242	\$0.07242	\$ -
45	Transmission Energy Off Peak - Summer	\$0.00000	\$0.00000	\$ -
46	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
47	System Benefits Charge	\$0.00250	\$0.00250	\$ -
48	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
49	Basic Service Charge	\$0.12007	\$0.12007	\$ -

50		Winter	Summer
51	On-Peak Use:	35%	29%
52	Off-Peak Use:	65%	71%

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate T-2 Time-of-Use - NEMA**

Hours Use: 350											
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	50	17,500	\$1,448.13	\$1,590.93	\$3,039.06	\$1,455.30	\$1,590.93	\$3,046.23	\$7.17	0.2%	
5	100	35,000	\$2,869.25	\$3,181.85	\$6,051.10	\$2,883.60	\$3,181.85	\$6,065.45	\$14.35	0.2%	
6	150	52,500	\$4,290.38	\$4,772.78	\$9,063.16	\$4,311.90	\$4,772.78	\$9,084.68	\$21.52	0.2%	
7	200	70,000	\$5,794.50	\$6,363.70	\$12,158.20	\$5,823.20	\$6,363.70	\$12,186.90	\$28.70	0.2%	
8	250	87,500	\$7,215.63	\$7,954.63	\$15,170.26	\$7,251.50	\$7,954.63	\$15,206.13	\$35.87	0.2%	
9	300	105,000	\$8,636.75	\$9,545.55	\$18,182.30	\$8,679.80	\$9,545.55	\$18,225.35	\$43.05	0.2%	
10	500	175,000	\$14,371.25	\$15,909.25	\$30,280.50	\$14,443.00	\$15,909.25	\$30,352.25	\$71.75	0.2%	
11	1,000	350,000	\$28,582.50	\$31,818.50	\$60,401.00	\$28,726.00	\$31,818.50	\$60,544.50	\$143.50	0.2%	
12	Avg	201	70,350	\$5,822.92	\$6,395.52	\$12,218.44	\$5,851.77	\$6,395.52	\$12,247.29	\$28.85	0.2%
13	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
14	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
15	50	17,500	\$1,896.13	\$1,590.93	\$3,487.06	\$1,903.30	\$1,590.93	\$3,494.23	\$7.17	0.2%	
16	100	35,000	\$3,765.25	\$3,181.85	\$6,947.10	\$3,779.60	\$3,181.85	\$6,961.45	\$14.35	0.2%	
17	150	52,500	\$5,634.38	\$4,772.78	\$10,407.16	\$5,655.90	\$4,772.78	\$10,428.68	\$21.52	0.2%	
18	200	70,000	\$7,586.50	\$6,363.70	\$13,950.20	\$7,615.20	\$6,363.70	\$13,978.90	\$28.70	0.2%	
19	250	87,500	\$9,455.63	\$7,954.63	\$17,410.26	\$9,491.50	\$7,954.63	\$17,446.13	\$35.87	0.2%	
20	300	105,000	\$11,324.75	\$9,545.55	\$20,870.30	\$11,367.80	\$9,545.55	\$20,913.35	\$43.05	0.2%	
21	500	175,000	\$18,851.25	\$15,909.25	\$34,760.50	\$18,923.00	\$15,909.25	\$34,832.25	\$71.75	0.2%	
22	1,000	350,000	\$37,542.50	\$31,818.50	\$69,361.00	\$37,686.00	\$31,818.50	\$69,504.50	\$143.50	0.2%	
23	Avg	246	86,100	\$9,306.10	\$7,827.35	\$17,133.45	\$9,341.40	\$7,827.35	\$17,168.75	\$35.30	0.2%
24					Current	Proposed					
25					Rates	Rates	Change				
26	Customer Charge kW <=150				\$27.00	\$27.00	\$ -				
27	Customer Charge 150 < kW <= 300				\$110.00	\$110.00	\$ -				
28	Customer Charge 300 < kW <= 1000				\$160.00	\$160.00	\$ -				
29	Customer Charge kW > 1000				\$360.00	\$360.00	\$ -				
30	Distribution Demand - Winter				\$11.86	\$11.86	\$ -				
31	Distribution Demand - Summer				\$20.82	\$20.82	\$ -				
32	Transmission Demand				\$8.18	\$8.18	\$ -				
33	Distribution Energy				\$0.00000	\$0.00000	\$ -				
34	Revenue Decoupling				\$0.00064	\$0.00064	\$ -				
35	Solar Massachusetts Renewable Target				\$0.00138	\$0.00138	\$ -				
36	Residential Assistance Adjustment Factor				\$0.00346	\$0.00346	\$ -				
37	Pension Adjustment Factor				\$0.00039	\$0.00039	\$ -				
38	Net Metering Recovery Surcharge				\$0.00450	\$0.00450	\$ -				
39	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
40	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
41	Storm Cost Recovery Adjustment Factor				\$0.00259	\$0.00259	\$ -				
42	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
43	Basic Service Cost True Up Factor				\$0.00021	\$0.00021	\$ -				
44	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
45	Solar Expansion Cost Recovery Factor				\$0.00076	\$0.00076	\$ -				
46	Vegetation Management				\$0.00075	\$0.00075	\$ -				
47	Tax Act Credit Factor				(\$0.00148)	(\$0.00148)	\$ -				
48	Grid Modernization				\$0.00005	\$0.00046	\$0.00041				
49	Transition				\$0.00002	\$0.00002	\$ -				
50	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -				
51	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
52	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -				
53	Basic Service Charge				\$0.09091	\$0.09091	\$ -				

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate T-2 Time-of-Use - NEMA**

1	Hours Use: 450										
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3		<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	50	22,500	\$1,567.88	\$2,045.48	\$3,613.36	\$1,577.10	\$2,045.48	\$3,622.58	\$9.22	0.3%	
5	100	45,000	\$3,108.75	\$4,090.95	\$7,199.70	\$3,127.20	\$4,090.95	\$7,218.15	\$18.45	0.3%	
6	150	67,500	\$4,649.63	\$6,136.43	\$10,786.06	\$4,677.30	\$6,136.43	\$10,813.73	\$27.67	0.3%	
7	200	90,000	\$6,273.50	\$8,181.90	\$14,455.40	\$6,310.40	\$8,181.90	\$14,492.30	\$36.90	0.3%	
8	250	112,500	\$7,814.38	\$10,227.38	\$18,041.76	\$7,860.50	\$10,227.38	\$18,087.88	\$46.12	0.3%	
9	300	135,000	\$9,355.25	\$12,272.85	\$21,628.10	\$9,410.60	\$12,272.85	\$21,683.45	\$55.35	0.3%	
10	500	225,000	\$15,568.75	\$20,454.75	\$36,023.50	\$15,661.00	\$20,454.75	\$36,115.75	\$92.25	0.3%	
11	1,000	450,000	\$30,977.50	\$40,909.50	\$71,887.00	\$31,162.00	\$40,909.50	\$72,071.50	\$184.50	0.3%	
12	Avg	281	126,450	\$8,769.72	\$11,495.57	\$20,265.29	\$8,821.56	\$11,495.57	\$20,317.13	\$51.84	0.3%

13	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
14	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
15	50	22,500	\$2,015.88	\$2,045.48	\$4,061.36	\$2,025.10	\$2,045.48	\$4,070.58	\$9.22	0.2%	
16	100	45,000	\$4,004.75	\$4,090.95	\$8,095.70	\$4,023.20	\$4,090.95	\$8,114.15	\$18.45	0.2%	
17	150	67,500	\$5,993.63	\$6,136.43	\$12,130.06	\$6,021.30	\$6,136.43	\$12,157.73	\$27.67	0.2%	
18	200	90,000	\$8,065.50	\$8,181.90	\$16,247.40	\$8,102.40	\$8,181.90	\$16,284.30	\$36.90	0.2%	
19	250	112,500	\$10,054.38	\$10,227.38	\$20,281.76	\$10,100.50	\$10,227.38	\$20,327.88	\$46.12	0.2%	
20	300	135,000	\$12,043.25	\$12,272.85	\$24,316.10	\$12,098.60	\$12,272.85	\$24,371.45	\$55.35	0.2%	
21	500	225,000	\$20,048.75	\$20,454.75	\$40,503.50	\$20,141.00	\$20,454.75	\$40,595.75	\$92.25	0.2%	
22	1,000	450,000	\$39,937.50	\$40,909.50	\$80,847.00	\$40,122.00	\$40,909.50	\$81,031.50	\$184.50	0.2%	
23	Avg	319	143,550	\$12,849.02	\$13,050.13	\$25,899.15	\$12,907.88	\$13,050.13	\$25,958.01	\$58.86	0.2%

24		Current	Proposed	
25		Rates	Rates	Change
26	Customer Charge kW <=150	\$27.00	\$27.00	\$ -
27	Customer Charge 150 < kW <= 300	\$110.00	\$110.00	\$ -
28	Customer Charge 300 < kW <= 1000	\$160.00	\$160.00	\$ -
29	Customer Charge kW > 1000	\$360.00	\$360.00	\$ -
30	Distribution Demand - Winter	\$11.86	\$11.86	\$ -
31	Distribution Demand - Summer	\$20.82	\$20.82	\$ -
32	Transmission Demand	\$8.18	\$8.18	\$ -
33	Distribution Energy	\$0.00000	\$0.00000	\$ -
34	Revenue Decoupling	\$0.00064	\$0.00064	\$ -
35	Solar Massachusetts Renewable Target	\$0.00138	\$0.00138	\$ -
36	Residential Assistance Adjustment Factor	\$0.00346	\$0.00346	\$ -
37	Pension Adjustment Factor	\$0.00039	\$0.00039	\$ -
38	Net Metering Recovery Surcharge	\$0.00450	\$0.00450	\$ -
39	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
40	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
41	Storm Cost Recovery Adjustment Factor	\$0.00259	\$0.00259	\$ -
42	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
43	Basic Service Cost True Up Factor	\$0.00021	\$0.00021	\$ -
44	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
45	Solar Expansion Cost Recovery Factor	\$0.00076	\$0.00076	\$ -
46	Vegetation Management	\$0.00075	\$0.00075	\$ -
47	Tax Act Credit Factor	(\$0.00148)	(\$0.00148)	\$ -
48	Grid Modernization	\$0.00005	\$0.00046	\$0.00041
49	Transition	\$0.00002	\$0.00002	\$ -
50	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
51	System Benefits Charge	\$0.00250	\$0.00250	\$ -
52	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
53	Basic Service Charge	\$0.09091	\$0.09091	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate T-2 Time-of-Use - NEMA**

1	Hours Use: 550										
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	50	27,500	\$1,687.63	\$2,500.03	\$4,187.66	\$1,698.90	\$2,500.03	\$4,198.93	\$11.27	0.3%	
5	100	55,000	\$3,348.25	\$5,000.05	\$8,348.30	\$3,370.80	\$5,000.05	\$8,370.85	\$22.55	0.3%	
6	150	82,500	\$5,008.88	\$7,500.08	\$12,508.96	\$5,042.70	\$7,500.08	\$12,542.78	\$33.82	0.3%	
7	200	110,000	\$6,752.50	\$10,000.10	\$16,752.60	\$6,797.60	\$10,000.10	\$16,797.70	\$45.10	0.3%	
8	250	137,500	\$8,413.13	\$12,500.13	\$20,913.26	\$8,469.50	\$12,500.13	\$20,969.63	\$56.37	0.3%	
9	300	165,000	\$10,073.75	\$15,000.15	\$25,073.90	\$10,141.40	\$15,000.15	\$25,141.55	\$67.65	0.3%	
10	500	275,000	\$16,766.25	\$25,000.25	\$41,766.50	\$16,879.00	\$25,000.25	\$41,879.25	\$112.75	0.3%	
11	1,000	550,000	\$33,372.50	\$50,000.50	\$83,373.00	\$33,598.00	\$50,000.50	\$83,598.50	\$225.50	0.3%	
12	Avg	299	164,450	\$10,040.54	\$14,950.15	\$24,990.69	\$10,107.96	\$14,950.15	\$25,058.11	\$67.42	0.3%

13	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
14	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
15	50	27,500	\$2,135.63	\$2,500.03	\$4,635.66	\$2,146.90	\$2,500.03	\$4,646.93	\$11.27	0.2%	
16	100	55,000	\$4,244.25	\$5,000.05	\$9,244.30	\$4,266.80	\$5,000.05	\$9,266.85	\$22.55	0.2%	
17	150	82,500	\$6,352.88	\$7,500.08	\$13,852.96	\$6,386.70	\$7,500.08	\$13,886.78	\$33.82	0.2%	
18	200	110,000	\$8,544.50	\$10,000.10	\$18,544.60	\$8,589.60	\$10,000.10	\$18,589.70	\$45.10	0.2%	
19	250	137,500	\$10,653.13	\$12,500.13	\$23,153.26	\$10,709.50	\$12,500.13	\$23,209.63	\$56.37	0.2%	
20	300	165,000	\$12,761.75	\$15,000.15	\$27,761.90	\$12,829.40	\$15,000.15	\$27,829.55	\$67.65	0.2%	
21	500	275,000	\$21,246.25	\$25,000.25	\$46,246.50	\$21,359.00	\$25,000.25	\$46,359.25	\$112.75	0.2%	
22	1,000	550,000	\$42,332.50	\$50,000.50	\$92,333.00	\$42,558.00	\$50,000.50	\$92,558.50	\$225.50	0.2%	
23	Avg	352	193,600	\$15,004.72	\$17,600.18	\$32,604.90	\$15,084.10	\$17,600.18	\$32,684.28	\$79.38	0.2%

24		Current	Proposed	
25		Rates	Rates	Change
26	Customer Charge kW <=150	\$27.00	\$27.00	\$ -
27	Customer Charge 150 < kW <= 300	\$110.00	\$110.00	\$ -
28	Customer Charge 300 < kW <= 1000	\$160.00	\$160.00	\$ -
29	Customer Charge kW > 1000	\$360.00	\$360.00	\$ -
30	Distribution Demand - Winter	\$11.86	\$11.86	\$ -
31	Distribution Demand - Summer	\$20.82	\$20.82	\$ -
32	Transmission Demand	\$8.18	\$8.18	\$ -
33	Distribution Energy	\$0.00000	\$0.00000	\$ -
34	Revenue Decoupling	\$0.00064	\$0.00064	\$ -
35	Solar Massachusetts Renewable Target	\$0.00138	\$0.00138	\$ -
36	Residential Assistance Adjustment Factor	\$0.00346	\$0.00346	\$ -
37	Pension Adjustment Factor	\$0.00039	\$0.00039	\$ -
38	Net Metering Recovery Surcharge	\$0.00450	\$0.00450	\$ -
39	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
40	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
41	Storm Cost Recovery Adjustment Factor	\$0.00259	\$0.00259	\$ -
42	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
43	Basic Service Cost True Up Factor	\$0.00021	\$0.00021	\$ -
44	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
45	Solar Expansion Cost Recovery Factor	\$0.00076	\$0.00076	\$ -
46	Vegetation Management	\$0.00075	\$0.00075	\$ -
47	Tax Act Credit Factor	(\$0.00148)	(\$0.00148)	\$ -
48	Grid Modernization	\$0.00005	\$0.00046	\$0.00041
49	Transition	\$0.00002	\$0.00002	\$ -
50	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
51	System Benefits Charge	\$0.00250	\$0.00250	\$ -
52	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
53	Basic Service Charge	\$0.09091	\$0.09091	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate T-2 Time-of-Use - SEMA**

Hours Use: 350											
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	50	17,500	\$1,448.13	\$1,423.80	\$2,871.93	\$1,455.30	\$1,423.80	\$2,879.10	\$7.17	0.2%	
5	100	35,000	\$2,869.25	\$2,847.60	\$5,716.85	\$2,883.60	\$2,847.60	\$5,731.20	\$14.35	0.3%	
6	150	52,500	\$4,290.38	\$4,271.40	\$8,561.78	\$4,311.90	\$4,271.40	\$8,583.30	\$21.52	0.3%	
7	200	70,000	\$5,794.50	\$5,695.20	\$11,489.70	\$5,823.20	\$5,695.20	\$11,518.40	\$28.70	0.2%	
8	250	87,500	\$7,215.63	\$7,119.00	\$14,334.63	\$7,251.50	\$7,119.00	\$14,370.50	\$35.87	0.3%	
9	300	105,000	\$8,636.75	\$8,542.80	\$17,179.55	\$8,679.80	\$8,542.80	\$17,222.60	\$43.05	0.3%	
10	500	175,000	\$14,371.25	\$14,238.00	\$28,609.25	\$14,443.00	\$14,238.00	\$28,681.00	\$71.75	0.3%	
11	1,000	350,000	\$28,582.50	\$28,476.00	\$57,058.50	\$28,726.00	\$28,476.00	\$57,202.00	\$143.50	0.3%	
12	Avg	201	70,350	\$5,822.92	\$5,723.68	\$11,546.60	\$5,851.77	\$5,723.68	\$11,575.45	\$28.85	0.2%
13	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
14	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
15	50	17,500	\$1,896.13	\$1,423.80	\$3,319.93	\$1,903.30	\$1,423.80	\$3,327.10	\$7.17	0.2%	
16	100	35,000	\$3,765.25	\$2,847.60	\$6,612.85	\$3,779.60	\$2,847.60	\$6,627.20	\$14.35	0.2%	
17	150	52,500	\$5,634.38	\$4,271.40	\$9,905.78	\$5,655.90	\$4,271.40	\$9,927.30	\$21.52	0.2%	
18	200	70,000	\$7,586.50	\$5,695.20	\$13,281.70	\$7,615.20	\$5,695.20	\$13,310.40	\$28.70	0.2%	
19	250	87,500	\$9,455.63	\$7,119.00	\$16,574.63	\$9,491.50	\$7,119.00	\$16,610.50	\$35.87	0.2%	
20	300	105,000	\$11,324.75	\$8,542.80	\$19,867.55	\$11,367.80	\$8,542.80	\$19,910.60	\$43.05	0.2%	
21	500	175,000	\$18,851.25	\$14,238.00	\$33,089.25	\$18,923.00	\$14,238.00	\$33,161.00	\$71.75	0.2%	
22	1,000	350,000	\$37,542.50	\$28,476.00	\$66,018.50	\$37,686.00	\$28,476.00	\$66,162.00	\$143.50	0.2%	
23	Avg	246	86,100	\$9,306.10	\$7,005.10	\$16,311.20	\$9,341.40	\$7,005.10	\$16,346.50	\$35.30	0.2%
24					Current	Proposed					
25					Rates	Rates	Change				
26	Customer Charge kW <=150				\$27.00	\$27.00	\$ -				
27	Customer Charge 150 < kW <= 300				\$110.00	\$110.00	\$ -				
28	Customer Charge 300 < kW <= 1000				\$160.00	\$160.00	\$ -				
29	Customer Charge kW > 1000				\$360.00	\$360.00	\$ -				
30	Distribution Demand - Winter				\$11.86	\$11.86	\$ -				
31	Distribution Demand - Summer				\$20.82	\$20.82	\$ -				
32	Transmission Demand				\$8.18	\$8.18	\$ -				
33	Distribution Energy				\$0.00000	\$0.00000	\$ -				
34	Revenue Decoupling				\$0.00064	\$0.00064	\$ -				
35	Solar Massachusetts Renewable Target				\$0.00138	\$0.00138	\$ -				
36	Residential Assistance Adjustment Factor				\$0.00346	\$0.00346	\$ -				
37	Pension Adjustment Factor				\$0.00039	\$0.00039	\$ -				
38	Net Metering Recovery Surcharge				\$0.00450	\$0.00450	\$ -				
39	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
40	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
41	Storm Cost Recovery Adjustment Factor				\$0.00259	\$0.00259	\$ -				
42	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
43	Basic Service Cost True Up Factor				\$0.00021	\$0.00021	\$ -				
44	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
45	Solar Expansion Cost Recovery Factor				\$0.00076	\$0.00076	\$ -				
46	Vegetation Management				\$0.00075	\$0.00075	\$ -				
47	Tax Act Credit Factor				(\$0.00148)	(\$0.00148)	\$ -				
48	Grid Modernization				\$0.00005	\$0.00046	\$0.00041				
49	Transition				\$0.00002	\$0.00002	\$ -				
50	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -				
51	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
52	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -				
53	Basic Service Charge				\$0.08136	\$0.08136	\$ -				

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate T-2 Time-of-Use - SEMA**

1	Hours Use: 450										
2	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
3	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
4	50	22,500	\$1,567.88	\$1,830.60	\$3,398.48	\$1,577.10	\$1,830.60	\$3,407.70	\$9.22	0.3%	
5	100	45,000	\$3,108.75	\$3,661.20	\$6,769.95	\$3,127.20	\$3,661.20	\$6,788.40	\$18.45	0.3%	
6	150	67,500	\$4,649.63	\$5,491.80	\$10,141.43	\$4,677.30	\$5,491.80	\$10,169.10	\$27.67	0.3%	
7	200	90,000	\$6,273.50	\$7,322.40	\$13,595.90	\$6,310.40	\$7,322.40	\$13,632.80	\$36.90	0.3%	
8	250	112,500	\$7,814.38	\$9,153.00	\$16,967.38	\$7,860.50	\$9,153.00	\$17,013.50	\$46.12	0.3%	
9	300	135,000	\$9,355.25	\$10,983.60	\$20,338.85	\$9,410.60	\$10,983.60	\$20,394.20	\$55.35	0.3%	
10	500	225,000	\$15,568.75	\$18,306.00	\$33,874.75	\$15,661.00	\$18,306.00	\$33,967.00	\$92.25	0.3%	
11	1,000	450,000	\$30,977.50	\$36,612.00	\$67,589.50	\$31,162.00	\$36,612.00	\$67,774.00	\$184.50	0.3%	
12	Avg	281	126,450	\$8,769.72	\$10,287.97	\$19,057.69	\$8,821.56	\$10,287.97	\$19,109.53	\$51.84	0.3%

13	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
14	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
15	50	22,500	\$2,015.88	\$1,830.60	\$3,846.48	\$2,025.10	\$1,830.60	\$3,855.70	\$9.22	0.2%	
16	100	45,000	\$4,004.75	\$3,661.20	\$7,665.95	\$4,023.20	\$3,661.20	\$7,684.40	\$18.45	0.2%	
17	150	67,500	\$5,993.63	\$5,491.80	\$11,485.43	\$6,021.30	\$5,491.80	\$11,513.10	\$27.67	0.2%	
18	200	90,000	\$8,065.50	\$7,322.40	\$15,387.90	\$8,102.40	\$7,322.40	\$15,424.80	\$36.90	0.2%	
19	250	112,500	\$10,054.38	\$9,153.00	\$19,207.38	\$10,100.50	\$9,153.00	\$19,253.50	\$46.12	0.2%	
20	300	135,000	\$12,043.25	\$10,983.60	\$23,026.85	\$12,098.60	\$10,983.60	\$23,082.20	\$55.35	0.2%	
21	500	225,000	\$20,048.75	\$18,306.00	\$38,354.75	\$20,141.00	\$18,306.00	\$38,447.00	\$92.25	0.2%	
22	1,000	450,000	\$39,937.50	\$36,612.00	\$76,549.50	\$40,122.00	\$36,612.00	\$76,734.00	\$184.50	0.2%	
23	Avg	319	143,550	\$12,849.02	\$11,679.23	\$24,528.25	\$12,907.88	\$11,679.23	\$24,587.11	\$58.86	0.2%

24		Current	Proposed	
25		Rates	Rates	Change
26	Customer Charge kW <=150	\$27.00	\$27.00	\$ -
27	Customer Charge 150 < kW <= 300	\$110.00	\$110.00	\$ -
28	Customer Charge 300 < kW <= 1000	\$160.00	\$160.00	\$ -
29	Customer Charge kW > 1000	\$360.00	\$360.00	\$ -
30	Distribution Demand - Winter	\$11.86	\$11.86	\$ -
31	Distribution Demand - Summer	\$20.82	\$20.82	\$ -
32	Transmission Demand	\$8.18	\$8.18	\$ -
33	Distribution Energy	\$0.00000	\$0.00000	\$ -
34	Revenue Decoupling	\$0.00064	\$0.00064	\$ -
35	Solar Massachusetts Renewable Target	\$0.00138	\$0.00138	\$ -
36	Residential Assistance Adjustment Factor	\$0.00346	\$0.00346	\$ -
37	Pension Adjustment Factor	\$0.00039	\$0.00039	\$ -
38	Net Metering Recovery Surcharge	\$0.00450	\$0.00450	\$ -
39	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
40	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
41	Storm Cost Recovery Adjustment Factor	\$0.00259	\$0.00259	\$ -
42	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
43	Basic Service Cost True Up Factor	\$0.00021	\$0.00021	\$ -
44	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
45	Solar Expansion Cost Recovery Factor	\$0.00076	\$0.00076	\$ -
46	Vegetation Management	\$0.00075	\$0.00075	\$ -
47	Tax Act Credit Factor	(\$0.00148)	(\$0.00148)	\$ -
48	Grid Modernization	\$0.00005	\$0.00046	\$0.00041
49	Transition	\$0.00002	\$0.00002	\$ -
50	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
51	System Benefits Charge	\$0.00250	\$0.00250	\$ -
52	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
53	Basic Service Charge	\$0.08136	\$0.08136	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Greater Boston Service Area
Rate T-2 Time-of-Use - SEMA**

2	Hours Use: 550										
3	Monthly	Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact		
4	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
5	50	27,500	\$1,687.63	\$2,237.40	\$3,925.03	\$1,698.90	\$2,237.40	\$3,936.30	\$11.27	0.3%	
6	100	55,000	\$3,348.25	\$4,474.80	\$7,823.05	\$3,370.80	\$4,474.80	\$7,845.60	\$22.55	0.3%	
7	150	82,500	\$5,008.88	\$6,712.20	\$11,721.08	\$5,042.70	\$6,712.20	\$11,754.90	\$33.82	0.3%	
8	200	110,000	\$6,752.50	\$8,949.60	\$15,702.10	\$6,797.60	\$8,949.60	\$15,747.20	\$45.10	0.3%	
9	250	137,500	\$8,413.13	\$11,187.00	\$19,600.13	\$8,469.50	\$11,187.00	\$19,656.50	\$56.37	0.3%	
10	300	165,000	\$10,073.75	\$13,424.40	\$23,498.15	\$10,141.40	\$13,424.40	\$23,565.80	\$67.65	0.3%	
11	500	275,000	\$16,766.25	\$22,374.00	\$39,140.25	\$16,879.00	\$22,374.00	\$39,253.00	\$112.75	0.3%	
12	1,000	550,000	\$33,372.50	\$44,748.00	\$78,120.50	\$33,598.00	\$44,748.00	\$78,346.00	\$225.50	0.3%	
12	Avg	299	164,450	\$10,040.54	\$13,379.65	\$23,420.19	\$10,107.96	\$13,379.65	\$23,487.61	\$67.42	0.3%
13	Monthly	Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact		
14	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
15	50	27,500	\$2,135.63	\$2,237.40	\$4,373.03	\$2,146.90	\$2,237.40	\$4,384.30	\$11.27	0.3%	
16	100	55,000	\$4,244.25	\$4,474.80	\$8,719.05	\$4,266.80	\$4,474.80	\$8,741.60	\$22.55	0.3%	
17	150	82,500	\$6,352.88	\$6,712.20	\$13,065.08	\$6,386.70	\$6,712.20	\$13,098.90	\$33.82	0.3%	
18	200	110,000	\$8,544.50	\$8,949.60	\$17,494.10	\$8,589.60	\$8,949.60	\$17,539.20	\$45.10	0.3%	
19	250	137,500	\$10,653.13	\$11,187.00	\$21,840.13	\$10,709.50	\$11,187.00	\$21,896.50	\$56.37	0.3%	
20	300	165,000	\$12,761.75	\$13,424.40	\$26,186.15	\$12,829.40	\$13,424.40	\$26,253.80	\$67.65	0.3%	
21	500	275,000	\$21,246.25	\$22,374.00	\$43,620.25	\$21,359.00	\$22,374.00	\$43,733.00	\$112.75	0.3%	
22	1,000	550,000	\$42,332.50	\$44,748.00	\$87,080.50	\$42,558.00	\$44,748.00	\$87,306.00	\$225.50	0.3%	
23	Avg	352	193,600	\$15,004.72	\$15,751.30	\$30,756.02	\$15,084.10	\$15,751.30	\$30,835.40	\$79.38	0.3%
24											
25					Current	Proposed					
26					Rates	Rates	Change				
26	Customer Charge kW <=150				\$27.00	\$27.00	\$ -				
27	Customer Charge 150 < kW <= 300				\$110.00	\$110.00	\$ -				
28	Customer Charge 300 < kW <= 1000				\$160.00	\$160.00	\$ -				
29	Customer Charge kW > 1000				\$360.00	\$360.00	\$ -				
30	Distribution Demand - Winter				\$11.86	\$11.86	\$ -				
31	Distribution Demand - Summer				\$20.82	\$20.82	\$ -				
32	Transmission Demand				\$8.18	\$8.18	\$ -				
33	Distribution Energy				\$0.00000	\$0.00000	\$ -				
34	Revenue Decoupling				\$0.00064	\$0.00064	\$ -				
35	Solar Massachusetts Renewable Target				\$0.00138	\$0.00138	\$ -				
36	Residential Assistance Adjustment Factor				\$0.00346	\$0.00346	\$ -				
37	Pension Adjustment Factor				\$0.00039	\$0.00039	\$ -				
38	Net Metering Recovery Surcharge				\$0.00450	\$0.00450	\$ -				
39	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
40	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
41	Storm Cost Recovery Adjustment Factor				\$0.00259	\$0.00259	\$ -				
42	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
43	Basic Service Cost True Up Factor				\$0.00021	\$0.00021	\$ -				
44	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
45	Solar Expansion Cost Recovery Factor				\$0.00076	\$0.00076	\$ -				
46	Vegetation Management				\$0.00075	\$0.00075	\$ -				
47	Tax Act Credit Factor				(\$0.00148)	(\$0.00148)	\$ -				
48	Grid Modernization				\$0.00005	\$0.00046	\$0.00041				
49	Transition				\$0.00002	\$0.00002	\$ -				
50	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -				
51	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
52	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -				
53	Basic Service Charge				\$0.08136	\$0.08136	\$ -				

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Cambridge Service Area
Rate G-0 Small General Service (Non-Demand)**

	Monthly kWh	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
1	25	\$7.10	\$3.00	\$10.10	\$7.11	\$3.00	\$10.11	\$0.01	0.1%
2	50	\$9.21	\$6.00	\$15.21	\$9.22	\$6.00	\$15.22	\$0.01	0.1%
3	100	\$13.41	\$12.01	\$25.42	\$13.44	\$12.01	\$25.45	\$0.03	0.1%
4	150	\$17.62	\$18.01	\$35.63	\$17.67	\$18.01	\$35.68	\$0.05	0.1%
5	250	\$26.03	\$30.02	\$56.05	\$26.11	\$30.02	\$56.13	\$0.08	0.1%
6	400	\$38.64	\$48.03	\$86.67	\$38.78	\$48.03	\$86.81	\$0.14	0.2%
7	600	\$55.47	\$72.04	\$127.51	\$55.66	\$72.04	\$127.70	\$0.19	0.1%
8	900	\$80.70	\$108.06	\$188.76	\$81.00	\$108.06	\$189.06	\$0.30	0.2%
9	1,500	\$131.17	\$180.11	\$311.28	\$131.66	\$180.11	\$311.77	\$0.49	0.2%
10	2,500	\$215.28	\$300.18	\$515.46	\$216.10	\$300.18	\$516.28	\$0.82	0.2%
11	Avg	593	\$54.88	\$71.20	\$55.07	\$71.20	\$126.27	\$0.19	0.2%

	Current Rates	Proposed Rates	Change
14			
15			
16	Customer Charge	\$5.00	\$ -
17	Distribution Energy	\$0.03582	\$ -
18	Revenue Decoupling	\$0.00054	\$ -
19	Solar Massachusetts Renewable Target	\$0.00116	\$ -
20	Residential Assistance Adjustment Factor	\$0.00291	\$ -
21	Pension Adjustment Factor	\$0.00048	\$ -
22	Net Metering Recovery Surcharge	\$0.00378	\$ -
23	Long Term Renewable Contract Adjustment	\$0.00049	\$ -
24	AG Consulting Expense	\$0.00000	\$ -
25	Storm Cost Recovery Adjustment Factor	\$0.00217	\$ -
26	Storm Reserve Adjustment	\$0.00000	\$ -
27	Basic Service Cost True Up Factor	\$0.00017	\$ -
28	Solar Program Cost Adjustment Factor	\$0.00000	\$ -
29	Solar Expansion Cost Recovery Factor	\$0.00064	\$ -
30	Vegetation Management	\$0.00093	\$ -
31	Tax Act Credit Factor	(\$0.00124)	\$ -
32	Grid Modernization	\$0.00004	\$0.00037
33	Transition	\$0.00002	\$ -
34	Transmission Energy	\$0.02601	\$ -
35	Energy Efficiency Reconciliation Factor	\$0.00719	\$ -
36	System Benefits Charge	\$0.00250	\$ -
37	Renewable Energy Charge	\$0.00050	\$ -
38	Basic Service Charge	\$0.12007	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Cambridge Service Area
Rate G-1 Small General Service (Demand)**

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 250										
4	5	1,250	\$109.79	\$150.09	\$259.88	\$110.20	\$150.09	\$260.29	\$0.41	0.2%	
5	10	2,500	\$211.58	\$300.18	\$511.76	\$212.40	\$300.18	\$512.58	\$0.82	0.2%	
6	15	3,750	\$330.71	\$450.26	\$780.97	\$331.95	\$450.26	\$782.21	\$1.24	0.2%	
7	20	5,000	\$449.85	\$600.35	\$1,050.20	\$451.50	\$600.35	\$1,051.85	\$1.65	0.2%	
8	30	7,500	\$688.13	\$900.53	\$1,588.66	\$690.60	\$900.53	\$1,591.13	\$2.47	0.2%	
9	50	12,500	\$1,164.68	\$1,500.88	\$2,665.56	\$1,168.80	\$1,500.88	\$2,669.68	\$4.12	0.2%	
10	75	18,750	\$1,760.36	\$2,251.31	\$4,011.67	\$1,766.55	\$2,251.31	\$4,017.86	\$6.19	0.2%	
11	100	25,000	\$2,356.05	\$3,001.75	\$5,357.80	\$2,364.30	\$3,001.75	\$5,366.05	\$8.25	0.2%	
12	Avg	19	4,750	\$426.02	\$570.33	\$996.35	\$427.59	\$570.33	\$997.92	\$1.57	0.2%
13	Hours Use: 350										
14	5	1,750	\$126.96	\$210.12	\$337.08	\$127.54	\$210.12	\$337.66	\$0.58	0.2%	
15	10	3,500	\$245.93	\$420.25	\$666.18	\$247.08	\$420.25	\$667.33	\$1.15	0.2%	
16	15	5,250	\$382.24	\$630.37	\$1,012.61	\$383.97	\$630.37	\$1,014.34	\$1.73	0.2%	
17	20	7,000	\$518.55	\$840.49	\$1,359.04	\$520.86	\$840.49	\$1,361.35	\$2.31	0.2%	
18	30	10,500	\$791.18	\$1,260.74	\$2,051.92	\$794.64	\$1,260.74	\$2,055.38	\$3.46	0.2%	
19	50	17,500	\$1,336.43	\$2,101.23	\$3,437.66	\$1,342.20	\$2,101.23	\$3,443.43	\$5.77	0.2%	
20	75	26,250	\$2,017.99	\$3,151.84	\$5,169.83	\$2,026.65	\$3,151.84	\$5,178.49	\$8.66	0.2%	
21	100	35,000	\$2,699.55	\$4,202.45	\$6,902.00	\$2,711.10	\$4,202.45	\$6,913.55	\$11.55	0.2%	
22	Avg	26	9,100	\$682.13	\$1,092.64	\$1,774.77	\$685.13	\$1,777.77	\$3.00	0.2%	
23	Hours Use: 500										
24	5	2,500	\$152.73	\$300.18	\$452.91	\$153.55	\$300.18	\$453.73	\$0.82	0.2%	
25	10	5,000	\$297.45	\$600.35	\$897.80	\$299.10	\$600.35	\$899.45	\$1.65	0.2%	
26	15	7,500	\$459.53	\$900.53	\$1,360.06	\$462.00	\$900.53	\$1,362.53	\$2.47	0.2%	
27	20	10,000	\$621.60	\$1,200.70	\$1,822.30	\$624.90	\$1,200.70	\$1,825.60	\$3.30	0.2%	
28	30	15,000	\$945.75	\$1,801.05	\$2,746.80	\$950.70	\$1,801.05	\$2,751.75	\$4.95	0.2%	
29	50	25,000	\$1,594.05	\$3,001.75	\$4,595.80	\$1,602.30	\$3,001.75	\$4,604.05	\$8.25	0.2%	
30	75	37,500	\$2,404.43	\$4,502.63	\$6,907.06	\$2,416.80	\$4,502.63	\$6,919.43	\$12.37	0.2%	
31	100	50,000	\$3,214.80	\$6,003.50	\$9,218.30	\$3,231.30	\$6,003.50	\$9,234.80	\$16.50	0.2%	
32	Avg	32	16,000	\$1,010.58	\$1,921.12	\$2,931.70	\$1,015.86	\$1,921.12	\$2,936.98	\$5.28	0.2%
33					Current	Proposed					
34					Rates	Rates	Change				
35	Customer Charge				\$8.00	\$8.00	\$ -				
36	Distribution Demand <=10 kW				\$4.01	\$4.01	\$ -				
37	Distribution Demand >10 kW				\$7.48	\$7.48	\$ -				
38	Transmission Demand				\$7.76	\$7.76	\$ -				
39	Distribution Energy				\$0.01207	\$0.01207	\$ -				
40	Revenue Decoupling				\$0.00054	\$0.00054	\$ -				
41	Solar Massachusetts Renewable Target				\$0.00116	\$0.00116	\$ -				
42	Residential Assistance Adjustment Factor				\$0.00291	\$0.00291	\$ -				
43	Pension Adjustment Factor				\$0.00048	\$0.00048	\$ -				
44	Net Metering Recovery Surcharge				\$0.00378	\$0.00378	\$ -				
45	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
46	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
47	Storm Cost Recovery Adjustment Factor				\$0.00217	\$0.00217	\$ -				
48	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
49	Basic Service Cost True Up Factor				\$0.00017	\$0.00017	\$ -				
50	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
51	Solar Expansion Cost Recovery Factor				\$0.00064	\$0.00064	\$ -				
52	Vegetation Management				\$0.00093	\$0.00093	\$ -				
53	Tax Act Credit Factor				(\$0.00124)	(\$0.00124)	\$ -				
54	Grid Modernization				\$0.00004	\$0.00037	\$0.00033				
55	Transition				\$0.00002	\$0.00002	\$ -				
56	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -				
57	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
58	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -				
59	Basic Service Charge				\$0.12007	\$0.12007	\$ -				

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Cambridge Service Area
Rate G-2 Large General Time-of-Use - Secondary Service**

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kVA	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 350										
4	100	35,000	\$2,028.40	\$3,181.85	\$5,210.25	\$2,036.10	\$3,181.85	\$5,217.95	\$7.70	0.1%	
5	150	52,500	\$3,316.60	\$4,772.78	\$8,089.38	\$3,328.15	\$4,772.78	\$8,100.93	\$11.55	0.1%	
6	200	70,000	\$4,604.80	\$6,363.70	\$10,968.50	\$4,620.20	\$6,363.70	\$10,983.90	\$15.40	0.1%	
7	300	105,000	\$7,181.20	\$9,545.55	\$16,726.75	\$7,204.30	\$9,545.55	\$16,749.85	\$23.10	0.1%	
8	500	175,000	\$12,334.00	\$15,909.25	\$28,243.25	\$12,372.50	\$15,909.25	\$28,281.75	\$38.50	0.1%	
9	750	262,500	\$18,775.00	\$23,863.88	\$42,638.88	\$18,832.75	\$23,863.88	\$42,696.63	\$57.75	0.1%	
10	1,000	350,000	\$25,216.00	\$31,818.50	\$57,034.50	\$25,293.00	\$31,818.50	\$57,111.50	\$77.00	0.1%	
11	Avg	227	79,450	\$5,300.43	\$7,222.80	\$12,523.23	\$5,317.91	\$7,222.80	\$12,540.71	\$17.48	0.1%
12	Hours Use: 450										
13	100	45,000	\$2,316.80	\$4,090.95	\$6,407.75	\$2,326.70	\$4,090.95	\$6,417.65	\$9.90	0.2%	
14	150	67,500	\$3,749.20	\$6,136.43	\$9,885.63	\$3,764.05	\$6,136.43	\$9,900.48	\$14.85	0.2%	
15	200	90,000	\$5,181.60	\$8,181.90	\$13,363.50	\$5,201.40	\$8,181.90	\$13,383.30	\$19.80	0.1%	
16	300	135,000	\$8,046.40	\$12,272.85	\$20,319.25	\$8,076.10	\$12,272.85	\$20,348.95	\$29.70	0.1%	
17	500	225,000	\$13,776.00	\$20,454.75	\$34,230.75	\$13,825.50	\$20,454.75	\$34,280.25	\$49.50	0.1%	
18	750	337,500	\$20,938.00	\$30,682.13	\$51,620.13	\$21,012.25	\$30,682.13	\$51,694.38	\$74.25	0.1%	
19	1,000	450,000	\$28,100.00	\$40,909.50	\$69,009.50	\$28,199.00	\$40,909.50	\$69,108.50	\$99.00	0.1%	
20	Avg	312	140,400	\$8,390.18	\$12,763.76	\$21,153.94	\$8,421.06	\$12,763.76	\$21,184.82	\$30.88	0.1%
21	Hours Use: 550										
22	100	55,000	\$2,605.20	\$5,000.05	\$7,605.25	\$2,617.30	\$5,000.05	\$7,617.35	\$12.10	0.2%	
23	150	82,500	\$4,181.80	\$7,500.08	\$11,681.88	\$4,199.95	\$7,500.08	\$11,700.03	\$18.15	0.2%	
24	200	110,000	\$5,758.40	\$10,000.10	\$15,758.50	\$5,782.60	\$10,000.10	\$15,782.70	\$24.20	0.2%	
25	300	165,000	\$8,911.60	\$15,000.15	\$23,911.75	\$8,947.90	\$15,000.15	\$23,948.05	\$36.30	0.2%	
26	500	275,000	\$15,218.00	\$25,000.25	\$40,218.25	\$15,278.50	\$25,000.25	\$40,278.75	\$60.50	0.2%	
27	750	412,500	\$23,101.00	\$37,500.38	\$60,601.38	\$23,191.75	\$37,500.38	\$60,692.13	\$90.75	0.1%	
28	1,000	550,000	\$30,984.00	\$50,000.50	\$80,984.50	\$31,105.00	\$50,000.50	\$81,105.50	\$121.00	0.1%	
29	Avg	283	155,650	\$8,375.56	\$14,150.14	\$22,525.70	\$8,409.80	\$14,150.14	\$22,559.94	\$34.24	0.2%
30											
31					Current	Proposed					
32					Rates	Rates	Change				
32	Customer Charge				\$97.00	\$97.00	\$ -				
33	Distribution Demand <=100 kVA				\$4.33	\$4.33	\$ -				
34	Distribution Demand >100 kVA				\$5.37	\$5.37	\$ -				
35	Transmission Demand <=100 kVA				\$4.89	\$4.89	\$ -				
36	Transmission Demand >100 kVA				\$10.30	\$10.30	\$ -				
37	Distribution Energy				\$0.01016	\$0.01016	\$ -				
38	Revenue Decoupling				\$0.00037	\$0.00037	\$ -				
39	Solar Massachusetts Renewable Target				\$0.00079	\$0.00079	\$ -				
40	Residential Assistance Adjustment Factor				\$0.00198	\$0.00198	\$ -				
41	Pension Adjustment Factor				\$0.00036	\$0.00036	\$ -				
42	Net Metering Recovery Surcharge				\$0.00257	\$0.00257	\$ -				
43	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
44	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
45	Storm Cost Recovery Adjustment Factor				\$0.00147	\$0.00147	\$ -				
46	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
47	Basic Service Cost True Up Factor				\$0.00012	\$0.00012	\$ -				
48	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
49	Solar Expansion Cost Recovery Factor				\$0.00043	\$0.00043	\$ -				
50	Vegetation Management				\$0.00070	\$0.00070	\$ -				
51	Tax Act Credit Factor				(\$0.00084)	(\$0.00084)	\$ -				
52	Grid Modernization				\$0.00003	\$0.00025	\$0.00022				
53	Transition				\$0.00002	\$0.00002	\$ -				
54	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -				
55	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
56	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -				
57	Basic Service Charge				\$0.09091	\$0.09091	\$ -				

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Cambridge Service Area
Rate G-3 Large General Time-Of-Use - 13.8kV Service**

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kVA	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 400										
4	300	120,000	\$5,429.78	\$10,909.20	\$16,338.98	\$5,446.58	\$10,909.20	\$16,355.78	\$16.80	0.1%	
5	500	200,000	\$9,528.58	\$18,182.00	\$27,710.58	\$9,556.58	\$18,182.00	\$27,738.58	\$28.00	0.1%	
6	1,000	400,000	\$19,775.58	\$36,364.00	\$56,139.58	\$19,831.58	\$36,364.00	\$56,195.58	\$56.00	0.1%	
7	2,000	800,000	\$40,269.58	\$72,728.00	\$112,997.58	\$40,381.58	\$72,728.00	\$113,109.58	\$112.00	0.1%	
8	3,000	1,200,000	\$60,763.58	\$109,092.00	\$169,855.58	\$60,931.58	\$109,092.00	\$170,023.58	\$168.00	0.1%	
9	5,000	2,000,000	\$101,751.58	\$181,820.00	\$283,571.58	\$102,031.58	\$181,820.00	\$283,851.58	\$280.00	0.1%	
10	Avg	802	320,800	\$15,717.77	\$29,163.93	\$44,881.70	\$15,762.68	\$29,163.93	\$44,926.61	\$44.91	0.1%
11	Hours Use: 500										
12	300	150,000	\$5,997.08	\$13,636.50	\$19,633.58	\$6,018.08	\$13,636.50	\$19,654.58	\$21.00	0.1%	
13	500	250,000	\$10,474.08	\$22,727.50	\$33,201.58	\$10,509.08	\$22,727.50	\$33,236.58	\$35.00	0.1%	
14	1,000	500,000	\$21,666.58	\$45,455.00	\$67,121.58	\$21,736.58	\$45,455.00	\$67,191.58	\$70.00	0.1%	
15	2,000	1,000,000	\$44,051.58	\$90,910.00	\$134,961.58	\$44,191.58	\$90,910.00	\$135,101.58	\$140.00	0.1%	
16	3,000	1,500,000	\$66,436.58	\$136,365.00	\$202,801.58	\$66,646.58	\$136,365.00	\$203,011.58	\$210.00	0.1%	
17	5,000	2,500,000	\$111,206.58	\$227,275.00	\$338,481.58	\$111,556.58	\$227,275.00	\$338,831.58	\$350.00	0.1%	
18	Avg	1,170	585,000	\$25,472.03	\$53,182.35	\$78,654.38	\$25,553.93	\$53,182.35	\$78,736.28	\$81.90	0.1%
19	Hours Use: 600										
20	300	180,000	\$6,564.38	\$16,363.80	\$22,928.18	\$6,589.58	\$16,363.80	\$22,953.38	\$25.20	0.1%	
21	500	300,000	\$11,419.58	\$27,273.00	\$38,692.58	\$11,461.58	\$27,273.00	\$38,734.58	\$42.00	0.1%	
22	1,000	600,000	\$23,557.58	\$54,546.00	\$78,103.58	\$23,641.58	\$54,546.00	\$78,187.58	\$84.00	0.1%	
23	2,000	1,200,000	\$47,833.58	\$109,092.00	\$156,925.58	\$48,001.58	\$109,092.00	\$157,093.58	\$168.00	0.1%	
24	3,000	1,800,000	\$72,109.58	\$163,638.00	\$235,747.58	\$72,361.58	\$163,638.00	\$235,999.58	\$252.00	0.1%	
25	5,000	3,000,000	\$120,661.58	\$272,730.00	\$393,391.58	\$121,081.58	\$272,730.00	\$393,811.58	\$420.00	0.1%	
26	Avg	1,192	715,200	\$28,218.57	\$65,018.83	\$93,237.40	\$28,318.70	\$65,018.83	\$93,337.53	\$100.13	0.1%
27											
28											
29	Customer Charge				Current Rates	Proposed Rates	Change				
29	Customer Charge				\$97.00	\$97.00	\$ -				
30	Distribution Demand <=100 kVA				\$0.00	\$0.00	\$ -				
31	Distribution Demand >100 kVA				\$4.45	\$4.45	\$ -				
32	Transmission Demand <=100 kVA				\$477.58	\$477.58	\$ -				
33	Transmission Demand >100 kVA				\$8.48	\$8.48	\$ -				
34	Distribution Energy				\$0.00357	\$0.00357	\$	-			
35	Revenue Decoupling				\$0.00020	\$0.00020	\$	-			
36	Solar Massachusetts Renewable Target				\$0.00044	\$0.00044	\$	-			
37	Residential Assistance Adjustment Factor				\$0.00110	\$0.00110	\$	-			
38	Pension Adjustment Factor				\$0.00027	\$0.00027	\$	-			
39	Net Metering Recovery Surcharge				\$0.00143	\$0.00143	\$	-			
40	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$	-			
41	AG Consulting Expense				\$0.00000	\$0.00000	\$	-			
42	Storm Cost Recovery Adjustment Factor				\$0.00082	\$0.00082	\$	-			
43	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$	-			
44	Basic Service Cost True Up Factor				\$0.00007	\$0.00007	\$	-			
45	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$	-			
46	Solar Expansion Cost Recovery Factor				\$0.00024	\$0.00024	\$	-			
47	Vegetation Management				\$0.00053	\$0.00053	\$	-			
48	Tax Act Credit Factor				(\$0.00047)	(\$0.00047)	\$	-			
49	Grid Modernization				\$0.00001	\$0.00015	\$0.00014				
50	Transition				\$0.00002	\$0.00002	\$	-			
51	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$	-			
52	System Benefits Charge				\$0.00250	\$0.00250	\$	-			
53	Renewable Energy Charge				\$0.00050	\$0.00050	\$	-			
54	Basic Service Charge				\$0.09091	\$0.09091	\$	-			

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Cambridge Service Area
Rate G-4 Optional Time-of-Use**

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	<u>kW</u>	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>	
3	Hours Use: 400										
4	5	2,000	\$135.82	\$240.14	\$375.96	\$136.26	\$240.14	\$376.40	\$0.44	0.1%	
5	15	6,000	\$383.46	\$720.42	\$1,103.88	\$384.78	\$720.42	\$1,105.20	\$1.32	0.1%	
6	25	10,000	\$631.10	\$1,200.70	\$1,831.80	\$633.30	\$1,200.70	\$1,834.00	\$2.20	0.1%	
7	50	20,000	\$1,250.20	\$2,401.40	\$3,651.60	\$1,254.60	\$2,401.40	\$3,656.00	\$4.40	0.1%	
8	75	30,000	\$1,869.30	\$3,602.10	\$5,471.40	\$1,875.90	\$3,602.10	\$5,478.00	\$6.60	0.1%	
9	Avg	36	14,400	\$903.50	\$1,729.01	\$2,632.51	\$906.67	\$1,729.01	\$2,635.68	\$3.17	0.1%
10	Hours Use: 500										
11	5	2,500	\$151.08	\$300.18	\$451.26	\$151.63	\$300.18	\$451.81	\$0.55	0.1%	
12	15	7,500	\$429.23	\$900.53	\$1,329.76	\$430.88	\$900.53	\$1,331.41	\$1.65	0.1%	
13	25	12,500	\$707.38	\$1,500.88	\$2,208.26	\$710.13	\$1,500.88	\$2,211.01	\$2.75	0.1%	
14	50	25,000	\$1,402.75	\$3,001.75	\$4,404.50	\$1,408.25	\$3,001.75	\$4,410.00	\$5.50	0.1%	
15	75	37,500	\$2,098.13	\$4,502.63	\$6,600.76	\$2,106.38	\$4,502.63	\$6,609.01	\$8.25	0.1%	
16	Avg	38	19,000	\$1,068.97	\$2,281.33	\$3,350.30	\$1,073.15	\$2,281.33	\$3,354.48	\$4.18	0.1%
17	Hours Use: 600										
18	5	3,000	\$166.33	\$360.21	\$526.54	\$166.99	\$360.21	\$527.20	\$0.66	0.1%	
19	15	9,000	\$474.99	\$1,080.63	\$1,555.62	\$476.97	\$1,080.63	\$1,557.60	\$1.98	0.1%	
20	25	15,000	\$783.65	\$1,801.05	\$2,584.70	\$786.95	\$1,801.05	\$2,588.00	\$3.30	0.1%	
21	50	30,000	\$1,555.30	\$3,602.10	\$5,157.40	\$1,561.90	\$3,602.10	\$5,164.00	\$6.60	0.1%	
22	75	45,000	\$2,326.95	\$5,403.15	\$7,730.10	\$2,336.85	\$5,403.15	\$7,740.00	\$9.90	0.1%	
23	Avg	35	21,000	\$1,092.31	\$2,521.47	\$3,613.78	\$1,096.93	\$2,521.47	\$3,618.40	\$4.62	0.1%
24						Current	Proposed				
25						<u>Rates</u>	<u>Rates</u>	<u>Change</u>			
26	Customer Charge					\$12.00	\$12.00	\$ -			
27	Distribution Demand					\$4.43	\$4.43	\$ -			
28	Transmission Demand					\$8.13	\$8.13	\$ -			
29	Distribution Energy					\$0.01113	\$0.01113	\$ -			
30	Revenue Decoupling					\$0.00035	\$0.00035	\$ -			
31	Solar Massachusetts Renewable Target					\$0.00076	\$0.00076	\$ -			
32	Residential Assistance Adjustment Factor					\$0.00191	\$0.00191	\$ -			
33	Pension Adjustment Factor					\$0.00067	\$0.00067	\$ -			
34	Net Metering Recovery Surcharge					\$0.00249	\$0.00249	\$ -			
35	Long Term Renewable Contract Adjustment					\$0.00049	\$0.00049	\$ -			
36	AG Consulting Expense					\$0.00000	\$0.00000	\$ -			
37	Storm Cost Recovery Adjustment Factor					\$0.00144	\$0.00144	\$ -			
38	Storm Reserve Adjustment					\$0.00000	\$0.00000	\$ -			
39	Basic Service Cost True Up Factor					\$0.00012	\$0.00012	\$ -			
40	Solar Program Cost Adjustment Factor					\$0.00000	\$0.00000	\$ -			
41	Solar Expansion Cost Recovery Factor					\$0.00042	\$0.00042	\$ -			
42	Vegetation Management					\$0.00130	\$0.00130	\$ -			
43	Tax Act Credit Factor					(\$0.00081)	(\$0.00081)	\$ -			
44	Grid Modernization					\$0.00003	\$0.00025	\$0.00022			
45	Transition					\$0.00002	\$0.00002	\$ -			
46	Energy Efficiency Reconciliation Factor					\$0.00719	\$0.00719	\$ -			
47	System Benefits Charge					\$0.00250	\$0.00250	\$ -			
48	Renewable Energy Charge					\$0.00050	\$0.00050	\$ -			
49	Basic Service Charge					\$0.12007	\$0.12007	\$ -			

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Cambridge Service Area
Rate G-5 Commercial Space Heating**

	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
1	500	\$38.36	\$60.04	\$98.40	\$38.49	\$60.04	\$98.53	\$0.13	0.1%
2	750	\$53.53	\$90.05	\$143.58	\$53.74	\$90.05	\$143.79	\$0.21	0.1%
3	1,000	\$68.71	\$120.07	\$188.78	\$68.98	\$120.07	\$189.05	\$0.27	0.1%
4	1,500	\$99.07	\$180.11	\$279.18	\$99.47	\$180.11	\$279.58	\$0.40	0.1%
5	2,000	\$129.42	\$240.14	\$369.56	\$129.96	\$240.14	\$370.10	\$0.54	0.1%
6	2,500	\$159.78	\$300.18	\$459.96	\$160.45	\$300.18	\$460.63	\$0.67	0.1%
7	3,000	\$190.13	\$360.21	\$550.34	\$190.94	\$360.21	\$551.15	\$0.81	0.1%
8	5,000	\$311.55	\$600.35	\$911.90	\$312.90	\$600.35	\$913.25	\$1.35	0.1%
9	10,000	\$678.75	\$1,200.70	\$1,879.45	\$681.45	\$1,200.70	\$1,882.15	\$2.70	0.1%
10	35,000	\$2,514.75	\$4,202.45	\$6,717.20	\$2,524.20	\$4,202.45	\$6,726.65	\$9.45	0.1%
11	Avg	4,756	\$296.74	\$571.05	\$298.02	\$571.05	\$869.07	\$1.28	0.1%

		Current Rates	Proposed Rates	Change
14	Customer Charge	\$8.00	\$8.00	\$ -
15	Distribution Energy <=5,000 kWh	\$0.01896	\$0.01896	\$ -
16	Distribution Energy >5,000 kWh	\$0.02491	\$0.02491	\$ -
17	Revenue Decoupling	\$0.00041	\$0.00041	\$ -
18	Solar Massachusetts Renewable Target	\$0.00088	\$0.00088	\$ -
19	Residential Assistance Adjustment Factor	\$0.00221	\$0.00221	\$ -
20	Pension Adjustment Factor	\$0.00081	\$0.00081	\$ -
21	Net Metering Recovery Surcharge	\$0.00287	\$0.00287	\$ -
22	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
23	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
24	Storm Cost Recovery Adjustment Factor	\$0.00161	\$0.00161	\$ -
25	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
26	Basic Service Cost True Up Factor	\$0.00013	\$0.00013	\$ -
27	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
28	Solar Expansion Cost Recovery Factor	\$0.00049	\$0.00049	\$ -
29	Vegetation Management	\$0.00156	\$0.00156	\$ -
30	Tax Act Credit Factor	(\$0.00094)	(\$0.00094)	\$ -
31	Grid Modernization	\$0.00003	\$0.00030	\$0.00027
32	Transition	\$0.00002	\$0.00002	\$ -
33	Transmission Energy <=5,000 kWh	\$0.02099	\$0.02099	\$ -
34	Transmission Energy >5,000 kWh	\$0.02777	\$0.02777	\$ -
35	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
36	System Benefits Charge	\$0.00250	\$0.00250	\$ -
37	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
38	Basic Service Charge	\$0.12007	\$0.12007	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**Cambridge Service Area
Rate G-6 General Non-Demand Time-of-Use**

	Monthly kWh	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
1									
2									
3	25	\$10.33	\$3.00	\$13.33	\$10.34	\$3.00	\$13.34	\$0.01	0.1%
4	50	\$11.87	\$6.00	\$17.87	\$11.88	\$6.00	\$17.88	\$0.01	0.1%
5	100	\$14.94	\$12.01	\$26.95	\$14.98	\$12.01	\$26.99	\$0.04	0.1%
6	150	\$18.02	\$18.01	\$36.03	\$18.07	\$18.01	\$36.08	\$0.05	0.1%
7	250	\$24.17	\$30.02	\$54.19	\$24.25	\$30.02	\$54.27	\$0.08	0.1%
8	400	\$33.40	\$48.03	\$81.43	\$33.53	\$48.03	\$81.56	\$0.13	0.2%
9	600	\$45.70	\$72.04	\$117.74	\$45.90	\$72.04	\$117.94	\$0.20	0.2%
10	900	\$64.16	\$108.06	\$172.22	\$64.46	\$108.06	\$172.52	\$0.30	0.2%
11	1,500	\$101.07	\$180.11	\$281.18	\$101.57	\$180.11	\$281.68	\$0.50	0.2%
12	2,500	\$162.59	\$300.18	\$462.77	\$163.42	\$300.18	\$463.60	\$0.83	0.2%
13	Avg 593	\$45.27	\$71.20	\$116.47	\$45.47	\$71.20	\$116.67	\$0.20	0.2%

		Current Rates	Proposed Rates	Change
14				
15				
16	Customer Charge	\$8.79	\$8.79	\$ -
17	Distribution Energy - Peak	\$0.06346	\$0.06346	\$ -
18	Distribution Energy - Low Load	\$0.02338	\$0.02338	\$ -
19	Revenue Decoupling	\$0.00054	\$0.00054	\$ -
20	Solar Massachusetts Renewable Target	\$0.00116	\$0.00116	\$ -
21	Residential Assistance Adjustment Factor	\$0.00291	\$0.00291	\$ -
22	Pension Adjustment Factor	\$0.00048	\$0.00048	\$ -
23	Net Metering Recovery Surcharge	\$0.00378	\$0.00378	\$ -
24	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
25	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
26	Storm Cost Recovery Adjustment Factor	\$0.00217	\$0.00217	\$ -
27	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
28	Basic Service Cost True Up Factor	\$0.00017	\$0.00017	\$ -
29	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
30	Solar Expansion Cost Recovery Factor	\$0.00064	\$0.00064	\$ -
31	Vegetation Management	\$0.00093	\$0.00093	\$ -
32	Tax Act Credit Factor	(\$0.00124)	(\$0.00124)	\$ -
33	Grid Modernization	\$0.00004	\$0.00037	\$0.00033
34	Transition	\$0.00002	\$0.00002	\$ -
35	Transmission Energy - Peak	\$0.02601	\$0.02601	\$ -
36	Transmission Energy - Low Load	\$0.00000	\$0.00000	\$ -
37	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
38	System Benefits Charge	\$0.00250	\$0.00250	\$ -
39	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
40	Basic Service Charge	\$0.12007	\$0.12007	\$ -
41	On-Peak Use:	24%		
42	Off-Peak Use:	76%		

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

South Shore, Cape Cod, and Martha's Vineyard Service Area
Rate G-1 Small General Service

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 200										
4	5	1,000	\$97.47	\$120.07	\$217.54	\$97.84	\$120.07	\$217.91	\$0.37	0.2%	
5	10	2,000	\$188.94	\$240.14	\$429.08	\$189.68	\$240.14	\$429.82	\$0.74	0.2%	
6	15	3,000	\$284.20	\$360.21	\$644.41	\$285.31	\$360.21	\$645.52	\$1.11	0.2%	
7	25	5,000	\$455.60	\$600.35	\$1,055.95	\$457.45	\$600.35	\$1,057.80	\$1.85	0.2%	
8	50	10,000	\$884.10	\$1,200.70	\$2,084.80	\$887.80	\$1,200.70	\$2,088.50	\$3.70	0.2%	
9	100	20,000	\$1,741.10	\$2,401.40	\$4,142.50	\$1,748.50	\$2,401.40	\$4,149.90	\$7.40	0.2%	
10	Avg	2	400	\$42.59	\$48.03	\$90.62	\$42.74	\$48.03	\$90.77	\$0.15	0.2%
11	Hours Use: 300										
12	5	1,500	\$143.21	\$180.11	\$323.32	\$143.76	\$180.11	\$323.87	\$0.55	0.2%	
13	10	3,000	\$258.10	\$360.21	\$618.31	\$259.21	\$360.21	\$619.42	\$1.11	0.2%	
14	15	4,500	\$373.60	\$540.32	\$913.92	\$375.27	\$540.32	\$915.59	\$1.67	0.2%	
15	25	7,500	\$604.60	\$900.53	\$1,505.13	\$607.38	\$900.53	\$1,507.91	\$2.78	0.2%	
16	50	15,000	\$1,182.10	\$1,801.05	\$2,983.15	\$1,187.65	\$1,801.05	\$2,988.70	\$5.55	0.2%	
17	100	30,000	\$2,337.10	\$3,602.10	\$5,939.20	\$2,348.20	\$3,602.10	\$5,950.30	\$11.10	0.2%	
18	Avg	19	5,700	\$466.00	\$684.40	\$1,150.40	\$468.11	\$684.40	\$1,152.51	\$2.11	0.2%
19	Hours Use: 400										
20	5	2,000	\$188.94	\$240.14	\$429.08	\$189.68	\$240.14	\$429.82	\$0.74	0.2%	
21	10	4,000	\$317.70	\$480.28	\$797.98	\$319.18	\$480.28	\$799.46	\$1.48	0.2%	
22	15	6,000	\$463.00	\$720.42	\$1,183.42	\$465.22	\$720.42	\$1,185.64	\$2.22	0.2%	
23	25	10,000	\$753.60	\$1,200.70	\$1,954.30	\$757.30	\$1,200.70	\$1,958.00	\$3.70	0.2%	
24	50	20,000	\$1,480.10	\$2,401.40	\$3,881.50	\$1,487.50	\$2,401.40	\$3,888.90	\$7.40	0.2%	
25	100	40,000	\$2,933.10	\$4,802.80	\$7,735.90	\$2,947.90	\$4,802.80	\$7,750.70	\$14.80	0.2%	
26	Avg	27	10,800	\$811.72	\$1,296.76	\$2,108.48	\$815.72	\$1,296.76	\$2,112.48	\$4.00	0.2%
27					Current	Proposed					
28					Rates	Rates	Change				
29	Customer Charge				\$6.00	\$6.00	\$ -				
30	Distribution Demand <=10 kW				\$0.00	\$0.00	\$ -				
31	Distribution Demand >10 kW				\$5.22	\$5.22	\$ -				
32	Distribution Energy <=2,300 kWh				\$0.04372	\$0.04372	\$ -				
33	Distribution Energy >2,300 kWh				\$0.01185	\$0.01185	\$ -				
34	Revenue Decoupling				\$0.00058	\$0.00058	\$ -				
35	Solar Massachusetts Renewable Target				\$0.00124	\$0.00124	\$ -				
36	Residential Assistance Adjustment Factor				\$0.00312	\$0.00312	\$ -				
37	Pension Adjustment Factor				\$0.00061	\$0.00061	\$ -				
38	Net Metering Recovery Surcharge				\$0.00405	\$0.00405	\$ -				
39	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
40	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
41	Storm Cost Recovery Adjustment Factor				\$0.00233	\$0.00233	\$ -				
42	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
43	Basic Service Cost True Up Factor				\$0.00019	\$0.00019	\$ -				
44	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
45	Solar Expansion Cost Recovery Factor				\$0.00069	\$0.00069	\$ -				
46	Vegetation Management				\$0.00117	\$0.00117	\$ -				
47	Tax Act Credit Factor				(\$0.00133)	(\$0.00133)	\$ -				
48	Grid Modernization				\$0.00004	\$0.00041	\$0.00037				
49	Transition				\$0.00002	\$0.00002	\$ -				
50	Transmission Energy				\$0.02436	\$0.02436	\$ -				
51	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -				
52	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
53	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -				
54	Basic Service Charge				\$0.12007	\$0.12007	\$ -				

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**South Shore, Cape Cod, and Martha's Vineyard Service Area
Rate G-1 Seasonal Small General Service**

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
3	Hours Use: 50									
4	5	250	\$38.18	\$30.02	\$68.20	\$38.27	\$30.02	\$68.29	\$0.09	0.1%
5	10	500	\$70.36	\$60.04	\$130.40	\$70.54	\$60.04	\$130.58	\$0.18	0.1%
6	20	1,000	\$180.61	\$120.07	\$300.68	\$180.98	\$120.07	\$301.05	\$0.37	0.1%
7	50	2,500	\$472.71	\$300.18	\$772.89	\$473.63	\$300.18	\$773.81	\$0.92	0.1%
8	Avg 9	450	\$63.92	\$54.03	\$117.95	\$64.09	\$54.03	\$118.12	\$0.17	0.1%
9	Hours Use: 150									
10	5	750	\$102.53	\$90.05	\$192.58	\$102.81	\$90.05	\$192.86	\$0.28	0.1%
11	10	1,500	\$199.07	\$180.11	\$379.18	\$199.62	\$180.11	\$379.73	\$0.55	0.1%
12	20	3,000	\$371.74	\$360.21	\$731.95	\$372.85	\$360.21	\$733.06	\$1.11	0.2%
13	50	7,500	\$840.06	\$900.53	\$1,740.59	\$842.83	\$900.53	\$1,743.36	\$2.77	0.2%
14	Avg 8	1,200	\$160.45	\$144.08	\$304.53	\$160.90	\$144.08	\$304.98	\$0.45	0.1%
15	Hours Use: 300									
16	5	1,500	\$199.07	\$180.11	\$379.18	\$199.62	\$180.11	\$379.73	\$0.55	0.1%
17	10	3,000	\$325.84	\$360.21	\$686.05	\$326.95	\$360.21	\$687.16	\$1.11	0.2%
18	20	6,000	\$592.15	\$720.42	\$1,312.57	\$594.37	\$720.42	\$1,314.79	\$2.22	0.2%
19	50	15,000	\$1,391.08	\$1,801.05	\$3,192.13	\$1,396.63	\$1,801.05	\$3,197.68	\$5.55	0.2%
20	Avg 9	2,700	\$303.80	\$324.19	\$627.99	\$304.80	\$324.19	\$628.99	\$1.00	0.2%
21										
22					Current Rates	Proposed Rates	Change			
23	Customer Charge				\$6.00	\$6.00	\$ -			
24	Distribution Demand <=10 kW				\$0.00	\$0.00	\$ -			
25	Distribution Demand >10 kW				\$4.59	\$4.59	\$ -			
26	Distribution Energy <=1,800 kWh				\$0.08096	\$0.08096	\$ -			
27	Distribution Energy >1,800 kWh				\$0.02572	\$0.02572	\$ -			
28	Revenue Decoupling				\$0.00058	\$0.00058	\$ -			
29	Solar Massachusetts Renewable Target				\$0.00124	\$0.00124	\$ -			
30	Residential Assistance Adjustment Factor				\$0.00312	\$0.00312	\$ -			
31	Pension Adjustment Factor				\$0.00061	\$0.00061	\$ -			
32	Net Metering Recovery Surcharge				\$0.00405	\$0.00405	\$ -			
33	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -			
34	AG Consulting Expense				\$0.00000	\$0.00000	\$ -			
35	Storm Cost Recovery Adjustment Factor				\$0.00233	\$0.00233	\$ -			
36	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -			
37	Basic Service Cost True Up Factor				\$0.00019	\$0.00019	\$ -			
38	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -			
39	Solar Expansion Cost Recovery Factor				\$0.00069	\$0.00069	\$ -			
40	Vegetation Management				\$0.00117	\$0.00117	\$ -			
41	Tax Act Credit Factor				(\$0.00133)	(\$0.00133)	\$ -			
42	Grid Modernization				\$0.00004	\$0.00041	\$0.00037			
43	Transition				\$0.00002	\$0.00002	\$ -			
44	Transmission Energy				\$0.02436	\$0.02436	\$ -			
45	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -			
46	System Benefits Charge				\$0.00250	\$0.00250	\$ -			
47	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -			
48	Basic Service Charge				\$0.12007	\$0.12007	\$ -			

24		Current	Proposed	
25		Rates	Rates	Change
26	Customer Charge	\$370.00	\$370.00	\$ -
27	Distribution Demand	\$1.64	\$1.64	\$ -
28	Transmission Demand	\$6.75	\$6.75	\$ -
29	Distribution Energy - Peak	\$0.01921	\$0.01921	\$ -
30	Distribution Energy - Low A	\$0.01616	\$0.01616	\$ -
31	Distribution Energy - Low B	\$0.01048	\$0.01048	\$ -
32	Revenue Decoupling	\$0.00035	\$0.00035	\$ -
33	Solar Massachusetts Renewable Target	\$0.00076	\$0.00076	\$ -
34	Residential Assistance Adjustment Factor	\$0.00190	\$0.00190	\$ -
35	Pension Adjustment Factor	\$0.00038	\$0.00038	\$ -
36	Net Metering Recovery Surcharge	\$0.00247	\$0.00247	\$ -
37	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
38	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
39	Storm Cost Recovery Adjustment Factor	\$0.00142	\$0.00142	\$ -
40	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
41	Basic Service Cost True Up Factor	\$0.00011	\$0.00011	\$ -
42	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
43	Solar Expansion Cost Recovery Factor	\$0.00042	\$0.00042	\$ -
44	Vegetation Management	\$0.00073	\$0.00073	\$ -
45	Tax Act Credit Factor	(\$0.00081)	(\$0.00081)	\$ -
46	Grid Modernization	\$0.00003	\$0.00026	\$0.00023
47	Transition	\$0.00002	\$0.00002	\$ -
48	Transmission Energy	\$0.00244	\$0.00244	\$ -
49	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
50	System Benefits Charge	\$0.00250	\$0.00250	\$ -
51	Renewable Energy	\$0.00050	\$0.00050	\$ -
52	Basic Service	\$0.08136	\$0.08136	\$ -
53	Peak Use:	28%		
54	Low A Use:	25%		
55	Low B Use:	47%		

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**South Shore, Cape Cod, and Martha's Vineyard Service Area
Rate G-3 Large General Time-Of-Use**

2	Monthly kVA	Monthly kWh	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
			Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 350										
4	500	175,000	\$9,939.36	\$14,238.00	\$24,177.36	\$9,965.61	\$14,238.00	\$24,203.61	\$26.25	0.1%	
5	750	262,500	\$14,444.04	\$21,357.00	\$35,801.04	\$14,483.41	\$21,357.00	\$35,840.41	\$39.37	0.1%	
6	1,000	350,000	\$18,948.72	\$28,476.00	\$47,424.72	\$19,001.22	\$28,476.00	\$47,477.22	\$52.50	0.1%	
7	2,000	700,000	\$36,967.43	\$56,952.00	\$93,919.43	\$37,072.43	\$56,952.00	\$94,024.43	\$105.00	0.1%	
8	3,000	1,050,000	\$54,986.15	\$85,428.00	\$140,414.15	\$55,143.65	\$85,428.00	\$140,571.65	\$157.50	0.1%	
9	Avg 1,066	373,100	\$20,137.95	\$30,355.42	\$50,493.37	\$20,193.92	\$30,355.42	\$50,549.34	\$55.97	0.1%	
10	Hours Use: 450										
11	500	225,000	\$11,270.60	\$18,306.00	\$29,576.60	\$11,304.35	\$18,306.00	\$29,610.35	\$33.75	0.1%	
12	750	337,500	\$16,440.90	\$27,459.00	\$43,899.90	\$16,491.53	\$27,459.00	\$43,950.53	\$50.63	0.1%	
13	1,000	450,000	\$21,611.21	\$36,612.00	\$58,223.21	\$21,678.71	\$36,612.00	\$58,290.71	\$67.50	0.1%	
14	2,000	900,000	\$42,292.41	\$73,224.00	\$115,516.41	\$42,427.41	\$73,224.00	\$115,651.41	\$135.00	0.1%	
15	3,000	1,350,000	\$62,973.62	\$109,836.00	\$172,809.62	\$63,176.11	\$109,836.00	\$173,012.11	\$202.49	0.1%	
16	Avg 788	354,600	\$17,226.79	\$28,850.26	\$46,077.05	\$17,279.98	\$28,850.26	\$46,130.24	\$53.19	0.1%	
17	Hours Use: 550										
18	500	275,000	\$12,601.85	\$22,374.00	\$34,975.85	\$12,643.10	\$22,374.00	\$35,017.10	\$41.25	0.1%	
19	750	412,500	\$18,437.77	\$33,561.00	\$51,998.77	\$18,499.65	\$33,561.00	\$52,060.65	\$61.88	0.1%	
20	1,000	550,000	\$24,273.70	\$44,748.00	\$69,021.70	\$24,356.20	\$44,748.00	\$69,104.20	\$82.50	0.1%	
21	2,000	1,100,000	\$47,617.39	\$89,496.00	\$137,113.39	\$47,782.39	\$89,496.00	\$137,278.39	\$165.00	0.1%	
22	3,000	1,650,000	\$70,961.09	\$134,244.00	\$205,205.09	\$71,208.59	\$134,244.00	\$205,452.59	\$247.50	0.1%	
23	Avg 1,118	614,900	\$27,028.25	\$50,028.26	\$77,056.51	\$27,120.49	\$50,028.26	\$77,148.75	\$92.24	0.1%	
24					Current	Proposed					
25					Rates	Rates	Change				
26	Customer Charge				\$930.00	\$930.00	\$ -				
27	Distribution Demand				\$0.94	\$0.94	\$ -				
28	Transmission Demand				\$7.76	\$7.76	\$ -				
29	Distribution Energy - Peak				\$0.01342	\$0.01342	\$ -				
30	Distribution Energy - Low A				\$0.01235	\$0.01235	\$ -				
31	Distribution Energy - Low B				\$0.00855	\$0.00855	\$ -				
32	Revenue Decoupling				\$0.00023	\$0.00023	\$ -				
33	Solar Massachusetts Renewable Target				\$0.00049	\$0.00049	\$ -				
34	Residential Assistance Adjustment Factor				\$0.00123	\$0.00123	\$ -				
35	Pension Adjustment Factor				\$0.00028	\$0.00028	\$ -				
36	Net Metering Recovery Surcharge				\$0.00160	\$0.00160	\$ -				
37	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
38	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
39	Storm Cost Recovery Adjustment Factor				\$0.00092	\$0.00092	\$ -				
40	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
41	Basic Service Cost True Up Factor				\$0.00007	\$0.00007	\$ -				
42	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
43	Solar Expansion Cost Recovery Factor				\$0.00027	\$0.00027	\$ -				
44	Vegetation Management				\$0.00053	\$0.00053	\$ -				
45	Tax Act Credit Factor				(\$0.00053)	(\$0.00053)	\$ -				
46	Grid Modernization				\$0.00002	\$0.00017	\$0.00015				
47	Transition				\$0.00002	\$0.00002	\$ -				
48	Transmission Energy				\$0.00000	\$0.00000	\$ -				
49	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719	\$ -				
50	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
51	Renewable Energy				\$0.00050	\$0.00050	\$ -				
52	Basic Service				\$0.08136	\$0.08136	\$ -				
53	Peak Use:		27%								
54	Low A Use:		25%								
55	Low B Use:		48%								

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**South Shore, Cape Cod, and Martha's Vineyard Service Area
Rate G-4 General Power**

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 150										
4	20	3,000	\$230.06	\$360.21	\$590.27	\$231.08	\$360.21	\$591.29	\$1.02	0.2%	
5	30	4,500	\$342.09	\$540.32	\$882.41	\$343.62	\$540.32	\$883.94	\$1.53	0.2%	
6	40	6,000	\$454.12	\$720.42	\$1,174.54	\$456.16	\$720.42	\$1,176.58	\$2.04	0.2%	
7	70	10,500	\$790.21	\$1,260.74	\$2,050.95	\$793.78	\$1,260.74	\$2,054.52	\$3.57	0.2%	
8	100	15,000	\$1,126.30	\$1,801.05	\$2,927.35	\$1,131.40	\$1,801.05	\$2,932.45	\$5.10	0.2%	
9	Avg	52	7,800	\$588.56	\$936.55	\$1,525.11	\$591.21	\$936.55	\$1,527.76	\$2.65	0.2%
10	Hours Use: 250										
11	20	5,000	\$324.10	\$600.35	\$924.45	\$325.80	\$600.35	\$926.15	\$1.70	0.2%	
12	30	7,500	\$483.15	\$900.53	\$1,383.68	\$485.70	\$900.53	\$1,386.23	\$2.55	0.2%	
13	40	10,000	\$642.20	\$1,200.70	\$1,842.90	\$645.60	\$1,200.70	\$1,846.30	\$3.40	0.2%	
14	70	17,500	\$1,119.35	\$2,101.23	\$3,220.58	\$1,125.30	\$2,101.23	\$3,226.53	\$5.95	0.2%	
15	100	25,000	\$1,596.50	\$3,001.75	\$4,598.25	\$1,605.00	\$3,001.75	\$4,606.75	\$8.50	0.2%	
16	Avg	27	6,750	\$435.44	\$810.47	\$1,245.91	\$437.73	\$810.47	\$1,248.20	\$2.29	0.2%
17	Hours Use: 350										
18	20	7,000	\$418.14	\$840.49	\$1,258.63	\$420.52	\$840.49	\$1,261.01	\$2.38	0.2%	
19	30	10,500	\$624.21	\$1,260.74	\$1,884.95	\$627.78	\$1,260.74	\$1,888.52	\$3.57	0.2%	
20	40	14,000	\$830.28	\$1,680.98	\$2,511.26	\$835.04	\$1,680.98	\$2,516.02	\$4.76	0.2%	
21	70	24,500	\$1,448.49	\$2,941.72	\$4,390.21	\$1,456.82	\$2,941.72	\$4,398.54	\$8.33	0.2%	
22	100	35,000	\$2,066.70	\$4,202.45	\$6,269.15	\$2,078.60	\$4,202.45	\$6,281.05	\$11.90	0.2%	
23	Avg	27	9,450	\$562.39	\$1,134.66	\$1,697.05	\$565.60	\$1,134.66	\$1,700.26	\$3.21	0.2%
24	Current					Proposed					
25	Rates					Rates		Change			
26	Customer Charge					\$6.00	\$6.00	\$ -			
27	Distribution Demand					\$1.86	\$1.86	\$ -			
28	Transmission Demand					\$2.29	\$2.29	\$ -			
29	Distribution Energy					\$0.02139	\$0.02139	\$ -			
30	Revenue Decoupling					\$0.00053	\$0.00053	\$ -			
31	Solar Massachusetts Renewable Target					\$0.00115	\$0.00115	\$ -			
32	Residential Assistance Adjustment Factor					\$0.00289	\$0.00289	\$ -			
33	Pension Adjustment Factor					\$0.00065	\$0.00065	\$ -			
34	Net Metering Recovery Surcharge					\$0.00376	\$0.00376	\$ -			
35	Long Term Renewable Contract Adjustment					\$0.00049	\$0.00049	\$ -			
36	AG Consulting Expense					\$0.00000	\$0.00000	\$ -			
37	Storm Cost Recovery Adjustment Factor					\$0.00212	\$0.00212	\$ -			
38	Storm Reserve Adjustment					\$0.00000	\$0.00000	\$ -			
39	Basic Service Cost True Up Factor					\$0.00017	\$0.00017	\$ -			
40	Solar Program Cost Adjustment Factor					\$0.00000	\$0.00000	\$ -			
41	Solar Expansion Cost Recovery Factor					\$0.00064	\$0.00064	\$ -			
42	Vegetation Management					\$0.00126	\$0.00126	\$ -			
43	Tax Act Credit Factor					(\$0.00123)	(\$0.00123)	\$ -			
44	Grid Modernization					\$0.00004	\$0.00038	\$0.00034			
45	Transition					\$0.00002	\$0.00002	\$ -			
46	Transmission Energy					\$0.00295	\$0.00295	\$ -			
47	Energy Efficiency Reconciliation Factor					\$0.00719	\$0.00719	\$ -			
48	System Benefits Charge					\$0.00250	\$0.00250	\$ -			
49	Renewable Energy					\$0.00050	\$0.00050	\$ -			
50	Basic Service					\$0.12007	\$0.12007	\$ -			

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**South Shore, Cape Cod, and Martha's Vineyard Service Area
Rate G-5 Commercial Space Heating**

1	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	<u>kWh</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Delivery</u>	<u>Supplier</u>	<u>Total</u>	<u>Change</u>	<u>% Change</u>
3	100	\$15.17	\$12.01	\$27.18	\$15.21	\$12.01	\$27.22	\$0.04	0.1%
4	200	\$24.33	\$24.01	\$48.34	\$24.42	\$24.01	\$48.43	\$0.09	0.2%
5	300	\$33.50	\$36.02	\$69.52	\$33.63	\$36.02	\$69.65	\$0.13	0.2%
6	500	\$51.84	\$60.04	\$111.88	\$52.05	\$60.04	\$112.09	\$0.21	0.2%
7	750	\$74.75	\$90.05	\$164.80	\$75.08	\$90.05	\$165.13	\$0.33	0.2%
8	1,000	\$97.67	\$120.07	\$217.74	\$98.10	\$120.07	\$218.17	\$0.43	0.2%
9	1,500	\$143.51	\$180.11	\$323.62	\$144.15	\$180.11	\$324.26	\$0.64	0.2%
10	3,000	\$281.01	\$360.21	\$641.22	\$282.30	\$360.21	\$642.51	\$1.29	0.2%
11	5,000	\$464.35	\$600.35	\$1,064.70	\$466.50	\$600.35	\$1,066.85	\$2.15	0.2%
12	Avg 1,472	\$140.94	\$176.74	\$317.68	\$141.57	\$176.74	\$318.31	\$0.63	0.2%

13		Current	Proposed	
14		<u>Rates</u>	<u>Rates</u>	<u>Change</u>
15	Customer Charge	\$6.00	\$6.00	\$ -
16	Distribution Energy	\$0.03839	\$0.03839	\$ -
17	Revenue Decoupling	\$0.00064	\$0.00064	\$ -
18	Solar Massachusetts Renewable Target	\$0.00139	\$0.00139	\$ -
19	Residential Assistance Adjustment Factor	\$0.00348	\$0.00348	\$ -
20	Pension Adjustment Factor	\$0.00111	\$0.00111	\$ -
21	Net Metering Recovery Surcharge	\$0.00452	\$0.00452	\$ -
22	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
23	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
24	Storm Cost Recovery Adjustment Factor	\$0.00259	\$0.00259	\$ -
25	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
26	Basic Service Cost True Up Factor	\$0.00021	\$0.00021	\$ -
27	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
28	Solar Expansion Cost Recovery Factor	\$0.00077	\$0.00077	\$ -
29	Vegetation Management	\$0.00215	\$0.00215	\$ -
30	Tax Act Credit Factor	(\$0.00148)	(\$0.00148)	\$ -
31	Grid Modernization	\$0.00005	\$0.00048	\$0.00043
32	Transition	\$0.00002	\$0.00002	\$ -
33	Transmission Energy	\$0.02715	\$0.02715	\$ -
34	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
35	System Benefits Charge	\$0.00250	\$0.00250	\$ -
36	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
37	Basic Service Charge	\$0.12007	\$0.12007	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**South Shore, Cape Cod, and Martha's Vineyard Service Area
Rate G-6 All Electric Schools**

	Monthly kWh	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
3	25,000	\$1,497.25	\$3,001.75	\$4,499.00	\$1,501.25	\$3,001.75	\$4,503.00	\$4.00	0.1%
4	40,000	\$2,377.60	\$4,802.80	\$7,180.40	\$2,384.00	\$4,802.80	\$7,186.80	\$6.40	0.1%
5	50,000	\$2,964.50	\$6,003.50	\$8,968.00	\$2,972.50	\$6,003.50	\$8,976.00	\$8.00	0.1%
6	60,000	\$3,551.40	\$7,204.20	\$10,755.60	\$3,561.00	\$7,204.20	\$10,765.20	\$9.60	0.1%
7	150,000	\$8,833.50	\$18,010.50	\$26,844.00	\$8,857.50	\$18,010.50	\$26,868.00	\$24.00	0.1%
8 Avg	60,748	\$3,595.30	\$7,294.01	\$10,889.31	\$3,605.02	\$7,294.01	\$10,899.03	\$9.72	0.1%

		Current Rates	Proposed Rates	Change
11	Customer Charge	\$30.00	\$30.00	\$ -
12	Distribution Energy	\$0.01749	\$0.01749	\$ -
13	Revenue Decoupling	\$0.00028	\$0.00028	\$ -
14	Solar Massachusetts Renewable Target	\$0.00060	\$0.00060	\$ -
15	Residential Assistance Adjustment Factor	\$0.00150	\$0.00150	\$ -
16	Pension Adjustment Factor	\$0.00054	\$0.00054	\$ -
17	Net Metering Recovery Surcharge	\$0.00195	\$0.00195	\$ -
18	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
19	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
20	Storm Cost Recovery Adjustment Factor	\$0.00110	\$0.00110	\$ -
21	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
22	Basic Service Cost True Up Factor	\$0.00009	\$0.00009	\$ -
23	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
24	Solar Expansion Cost Recovery Factor	\$0.00033	\$0.00033	\$ -
25	Vegetation Management	\$0.00104	\$0.00104	\$ -
26	Tax Act Credit Factor	(\$0.00064)	(\$0.00064)	\$ -
27	Grid Modernization	\$0.00002	\$0.00018	\$0.00016
28	Transition	\$0.00002	\$0.00002	\$ -
29	Transmission Energy	\$0.02369	\$0.02369	\$ -
30	Energy Efficiency Reconciliation Factor	\$0.00719	\$0.00719	\$ -
31	System Benefits Charge	\$0.00250	\$0.00250	\$ -
32	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
33	Basic Service Charge	\$0.12007	\$0.12007	\$ -

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

South Shore, Cape Cod, and Martha's Vineyard Service Area Rate G-7 Optional General Time-of-Use

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kVA	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 350										
4	5	1,750	\$146.50	\$210.12	\$356.62	\$147.15	\$210.12	\$357.27	\$0.65	0.2%	
5	10	3,500	\$283.00	\$420.25	\$703.25	\$284.29	\$420.25	\$704.54	\$1.29	0.2%	
6	20	7,000	\$555.99	\$840.49	\$1,396.48	\$558.58	\$840.49	\$1,399.07	\$2.59	0.2%	
7	50	17,500	\$1,374.98	\$2,101.23	\$3,476.21	\$1,381.45	\$2,101.23	\$3,482.68	\$6.47	0.2%	
8	75	26,250	\$2,057.47	\$3,151.84	\$5,209.31	\$2,067.18	\$3,151.84	\$5,219.02	\$9.71	0.2%	
9	Avg	20	7,000	\$555.99	\$840.49	\$1,396.48	\$558.58	\$840.49	\$1,399.07	\$2.59	0.2%
10	Hours Use: 500										
11	5	2,500	\$178.25	\$300.18	\$478.43	\$179.18	\$300.18	\$479.36	\$0.93	0.2%	
12	10	5,000	\$346.51	\$600.35	\$946.86	\$348.36	\$600.35	\$948.71	\$1.85	0.2%	
13	20	10,000	\$683.02	\$1,200.70	\$1,883.72	\$686.72	\$1,200.70	\$1,887.42	\$3.70	0.2%	
14	50	25,000	\$1,692.54	\$3,001.75	\$4,694.29	\$1,701.79	\$3,001.75	\$4,703.54	\$9.25	0.2%	
15	75	37,500	\$2,533.81	\$4,502.63	\$7,036.44	\$2,547.69	\$4,502.63	\$7,050.32	\$13.88	0.2%	
16	Avg	31	15,500	\$1,053.17	\$1,861.09	\$2,914.26	\$1,058.91	\$1,861.09	\$2,920.00	\$5.74	0.2%
17	Hours Use: 650										
18	5	3,250	\$210.01	\$390.23	\$600.24	\$211.21	\$390.23	\$601.44	\$1.20	0.2%	
19	10	6,500	\$410.02	\$780.46	\$1,190.48	\$412.43	\$780.46	\$1,192.89	\$2.41	0.2%	
20	20	13,000	\$810.04	\$1,560.91	\$2,370.95	\$814.85	\$1,560.91	\$2,375.76	\$4.81	0.2%	
21	50	32,500	\$2,010.10	\$3,902.28	\$5,912.38	\$2,022.13	\$3,902.28	\$5,924.41	\$12.03	0.2%	
22	75	48,750	\$3,010.15	\$5,853.41	\$8,863.56	\$3,028.19	\$5,853.41	\$8,881.60	\$18.04	0.2%	
23	Avg	18	11,700	\$730.04	\$1,404.82	\$2,134.86	\$734.37	\$1,404.82	\$2,139.19	\$4.33	0.2%
24					Current	Proposed					
25					Rates	Rates		Change			
26	Customer Charge				\$10.00	\$10.00		\$ -			
27	Distribution Demand				\$3.57	\$3.57		\$ -			
28	Transmission Demand				\$8.91	\$8.91		\$ -			
29	Distribution Energy - Peak				\$0.02453	\$0.02453		\$ -			
30	Distribution Energy - Low Load				\$0.01719	\$0.01719		\$ -			
31	Revenue Decoupling				\$0.00058	\$0.00058		\$ -			
32	Solar Massachusetts Renewable Target				\$0.00124	\$0.00124		\$ -			
33	Residential Assistance Adjustment Factor				\$0.00312	\$0.00312		\$ -			
34	Pension Adjustment Factor				\$0.00061	\$0.00061		\$ -			
35	Net Metering Recovery Surcharge				\$0.00405	\$0.00405		\$ -			
36	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049		\$ -			
37	AG Consulting Expense				\$0.00000	\$0.00000		\$ -			
38	Storm Cost Recovery Adjustment Factor				\$0.00233	\$0.00233		\$ -			
39	Storm Reserve Adjustment				\$0.00000	\$0.00000		\$ -			
40	Basic Service Cost True Up Factor				\$0.00019	\$0.00019		\$ -			
41	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000		\$ -			
42	Solar Expansion Cost Recovery Factor				\$0.00069	\$0.00069		\$ -			
43	Vegetation Management				\$0.00117	\$0.00117		\$ -			
44	Tax Act Credit Factor				(\$0.00133)	(\$0.00133)		\$ -			
45	Grid Modernization				\$0.00004	\$0.00041		\$0.00037			
46	Transition				\$0.00002	\$0.00002		\$ -			
47	Energy Efficiency Reconciliation Factor				\$0.00719	\$0.00719		\$ -			
48	System Benefits Charge				\$0.00250	\$0.00250		\$ -			
49	Renewable Energy Charge				\$0.00050	\$0.00050		\$ -			
50	Basic Service Charge				\$0.12007	\$0.12007		\$ -			
51	Peak Use:		24%								
52	Low A Use:		76%								

**Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

**South Shore, Cape Cod, and Martha's Vineyard Service Area
Rate G-7 Optional Seasonal General Time-of-Use**

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kVA	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 50										
4	5	250	\$63.18	\$30.02	\$93.20	\$63.28	\$30.02	\$93.30	\$0.10	0.1%	
5	10	500	\$116.37	\$60.04	\$176.41	\$116.55	\$60.04	\$176.59	\$0.18	0.1%	
6	20	1,000	\$222.74	\$120.07	\$342.81	\$223.11	\$120.07	\$343.18	\$0.37	0.1%	
7	50	2,500	\$541.85	\$300.18	\$842.03	\$542.77	\$300.18	\$842.95	\$0.92	0.1%	
8	75	3,750	\$807.77	\$450.26	\$1,258.03	\$809.16	\$450.26	\$1,259.42	\$1.39	0.1%	
	Avg	9	450	\$105.73	\$54.03	\$159.76	\$105.90	\$54.03	\$159.93	\$0.17	0.1%
10	Hours Use: 150										
11	5	750	\$95.85	\$90.05	\$185.90	\$96.13	\$90.05	\$186.18	\$0.28	0.2%	
12	10	1,500	\$181.71	\$180.11	\$361.82	\$182.26	\$180.11	\$362.37	\$0.55	0.2%	
13	20	3,000	\$353.41	\$360.21	\$713.62	\$354.52	\$360.21	\$714.73	\$1.11	0.2%	
14	50	7,500	\$868.54	\$900.53	\$1,769.07	\$871.31	\$900.53	\$1,771.84	\$2.77	0.2%	
15	75	11,250	\$1,297.80	\$1,350.79	\$2,648.59	\$1,301.97	\$1,350.79	\$2,652.76	\$4.17	0.2%	
	Avg	10	1,500	\$181.71	\$180.11	\$361.82	\$182.26	\$180.11	\$362.37	\$0.55	0.2%
17	Hours Use: 300										
18	5	1,500	\$144.86	\$180.11	\$324.97	\$145.41	\$180.11	\$325.52	\$0.55	0.2%	
19	10	3,000	\$279.71	\$360.21	\$639.92	\$280.82	\$360.21	\$641.03	\$1.11	0.2%	
20	20	6,000	\$549.43	\$720.42	\$1,269.85	\$551.65	\$720.42	\$1,272.07	\$2.22	0.2%	
21	50	15,000	\$1,358.57	\$1,801.05	\$3,159.62	\$1,364.12	\$1,801.05	\$3,165.17	\$5.55	0.2%	
22	75	22,500	\$2,032.86	\$2,701.58	\$4,734.44	\$2,041.18	\$2,701.58	\$4,742.76	\$8.32	0.2%	
	Avg	13	3,900	\$360.63	\$468.27	\$828.90	\$362.07	\$468.27	\$830.34	\$1.44	0.2%
24						Current	Proposed				
25						Rates	Rates	Change			
26	Customer Charge					\$10.00	\$10.00	\$ -			
27	Distribution Demand					\$3.61	\$3.61	\$ -			
28	Transmission Demand					\$3.76	\$3.76	\$ -			
29	Distribution Energy - Peak					\$0.04780	\$0.04780	\$ -			
30	Distribution Energy - Low Load					\$0.04020	\$0.04020	\$ -			
31	Revenue Decoupling					\$0.00058	\$0.00058	\$ -			
32	Solar Massachusetts Renewable Target					\$0.00124	\$0.00124	\$ -			
33	Residential Assistance Adjustment Factor					\$0.00312	\$0.00312	\$ -			
34	Pension Adjustment Factor					\$0.00061	\$0.00061	\$ -			
35	Net Metering Recovery Surcharge					\$0.00405	\$0.00405	\$ -			
36	Long Term Renewable Contract Adjustment					\$0.00049	\$0.00049	\$ -			
37	AG Consulting Expense					\$0.00000	\$0.00000	\$ -			
38	Storm Cost Recovery Adjustment Factor					\$0.00233	\$0.00233	\$ -			
39	Storm Reserve Adjustment					\$0.00000	\$0.00000	\$ -			
40	Basic Service Cost True Up Factor					\$0.00019	\$0.00019	\$ -			
41	Solar Program Cost Adjustment Factor					\$0.00000	\$0.00000	\$ -			
42	Solar Expansion Cost Recovery Factor					\$0.00069	\$0.00069	\$ -			
43	Vegetation Management					\$0.00117	\$0.00117	\$ -			
44	Tax Act Credit Factor					(\$0.00133)	(\$0.00133)	\$ -			
45	Grid Modernization					\$0.00004	\$0.00041	\$0.00037			
46	Transition					\$0.00002	\$0.00002	\$ -			
47	Energy Efficiency Reconciliation Factor					\$0.00719	\$0.00719	\$ -			
48	System Benefits Charge					\$0.00250	\$0.00250	\$ -			
49	Renewable Energy Charge					\$0.00050	\$0.00050	\$ -			
50	Basic Service Charge					\$0.12007	\$0.12007	\$ -			
51	Peak Use:		23%								
52	Low A Use:		77%								

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Schedule 23 Optional Water Heating

1	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
3	50	\$20.75	\$5.90	\$26.65	\$20.77	\$5.90	\$26.67	\$0.02	0.1%
4	100	\$24.50	\$11.79	\$36.29	\$24.54	\$11.79	\$36.33	\$0.04	0.1%
5	150	\$28.25	\$17.69	\$45.94	\$28.31	\$17.69	\$46.00	\$0.06	0.1%
6	300	\$39.50	\$35.37	\$74.87	\$39.63	\$35.37	\$75.00	\$0.13	0.2%
7	500	\$54.50	\$58.96	\$113.45	\$54.71	\$58.96	\$113.67	\$0.22	0.2%
8	1,000	\$91.99	\$117.91	\$209.90	\$92.42	\$117.91	\$210.33	\$0.43	0.2%
9	2,000	\$166.98	\$235.82	\$402.80	\$167.84	\$235.82	\$403.66	\$0.86	0.2%
10	Avg 644	\$65.29	\$75.93	\$141.23	\$65.57	\$75.93	\$141.50	\$0.28	0.2%

11		Current	Proposed	
12		Rates	Rates	Change
13	Customer Charge	\$17.00	\$17.00	\$ -
14	Distribution Energy	\$0.02758	\$0.02758	\$ -
15	Revenue Decoupling	\$0.00068	\$0.00068	\$ -
16	Solar Massachusetts Renewable Target	\$0.00147	\$0.00147	\$ -
17	Residential Assistance Adjustment Factor	\$0.00369	\$0.00369	\$ -
18	Pension Adjustment Factor	\$0.00054	\$0.00054	\$ -
19	Net Metering Recovery Surcharge	\$0.00480	\$0.00480	\$ -
20	Long Term Renewable Contract Adjustment	\$0.00049	\$0.00049	\$ -
21	AG Consulting Expense	\$0.00000	\$0.00000	\$ -
22	Storm Cost Recovery Adjustment Factor	\$0.00084	\$0.00084	\$ -
23	Storm Reserve Adjustment	\$0.00000	\$0.00000	\$ -
24	Basic Service Cost True Up Factor	\$0.00022	\$0.00022	\$ -
25	Solar Program Cost Adjustment Factor	\$0.00000	\$0.00000	\$ -
26	Solar Expansion Cost Recovery Factor	\$0.00081	\$0.00081	\$ -
27	Vegetation Management	\$0.00104	\$0.00104	\$ -
28	Tax Act Credit Factor	(\$0.00157)	(\$0.00157)	\$ -
29	Grid Modernization	\$0.00005	\$0.00048	\$0.00043
30	Transition	\$0.00002	\$0.00002	\$ -
31	Transmission Energy	\$0.02188	\$0.02188	\$ -
32	Energy Efficiency Reconciliation Factor	\$0.00945	\$0.00945	\$ -
33	System Benefits Charge	\$0.00250	\$0.00250	\$ -
34	Renewable Energy Charge	\$0.00050	\$0.00050	\$ -
35	Basic Service Charge	\$0.11791	\$0.11791	\$ -

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate 24 Optional Church Service

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
3	Hours Use: 100									
4	5	500	\$105.25	\$58.96	\$164.21	\$105.47	\$58.96	\$164.42	\$0.22	0.1%
5	10	1,000	\$161.98	\$117.91	\$279.89	\$162.41	\$117.91	\$280.32	\$0.43	0.2%
6	15	1,500	\$218.71	\$176.87	\$395.58	\$219.36	\$176.87	\$396.22	\$0.64	0.2%
7	30	3,000	\$388.90	\$353.73	\$742.63	\$390.19	\$353.73	\$743.92	\$1.29	0.2%
8	60	6,000	\$729.28	\$707.46	\$1,436.74	\$731.86	\$707.46	\$1,439.32	\$2.58	0.2%
9	100	10,000	\$1,183.12	\$1,179.10	\$2,362.22	\$1,187.42	\$1,179.10	\$2,366.52	\$4.30	0.2%
10	Avg	13	\$196.02	\$153.28	\$349.30	\$196.58	\$153.28	\$349.86	\$0.56	0.2%
11	Hours Use: 200									
12	5	1,000	\$120.78	\$117.91	\$238.69	\$121.21	\$117.91	\$239.12	\$0.43	0.2%
13	10	2,000	\$193.04	\$235.82	\$428.86	\$193.90	\$235.82	\$429.72	\$0.86	0.2%
14	15	3,000	\$265.30	\$353.73	\$619.03	\$266.59	\$353.73	\$620.32	\$1.29	0.2%
15	30	6,000	\$482.08	\$707.46	\$1,189.54	\$484.66	\$707.46	\$1,192.12	\$2.58	0.2%
16	60	12,000	\$915.64	\$1,414.92	\$2,330.56	\$920.80	\$1,414.92	\$2,335.72	\$5.16	0.2%
17	100	20,000	\$1,493.72	\$2,358.20	\$3,851.92	\$1,502.32	\$2,358.20	\$3,860.52	\$8.60	0.2%
18	Avg	21	\$352.01	\$495.22	\$847.23	\$353.82	\$495.22	\$849.04	\$1.81	0.2%
19	Hours Use: 300									
20	5	1,500	\$136.31	\$176.87	\$313.18	\$136.96	\$176.87	\$313.82	\$0.65	0.2%
21	10	3,000	\$224.10	\$353.73	\$577.83	\$225.39	\$353.73	\$579.12	\$1.29	0.2%
22	15	4,500	\$311.89	\$530.60	\$842.49	\$313.83	\$530.60	\$844.42	\$1.94	0.2%
23	30	9,000	\$575.26	\$1,061.19	\$1,636.45	\$579.13	\$1,061.19	\$1,640.32	\$3.87	0.2%
24	60	18,000	\$1,102.00	\$2,122.38	\$3,224.38	\$1,109.74	\$2,122.38	\$3,232.12	\$7.74	0.2%
25	100	30,000	\$1,804.32	\$3,537.30	\$5,341.62	\$1,817.22	\$3,537.30	\$5,354.52	\$12.90	0.2%
26	Avg	24	\$469.91	\$848.95	\$1,318.86	\$473.01	\$848.95	\$1,321.96	\$3.10	0.2%
27										
28			Current Rates			Proposed Rates			Change	
29	Customer Charge		\$65.00			\$65.00			\$ -	
30	Distribution Demand >2 KW		\$4.34			\$4.34			\$ -	
31	Transmission Demand >2 KW		\$3.90			\$3.90			\$ -	
32	Distribution Energy		\$0.00553			\$0.00553			\$ -	
33	Revenue Decoupling		\$0.00068			\$0.00068			\$ -	
34	Solar Massachusetts Renewable Target		\$0.00147			\$0.00147			\$ -	
35	Residential Assistance Adjustment Factor		\$0.00369			\$0.00369			\$ -	
36	Pension Adjustment Factor		\$0.00054			\$0.00054			\$ -	
37	Net Metering Recovery Surcharge		\$0.00480			\$0.00480			\$ -	
38	Long Term Renewable Contract Adjustment		\$0.00049			\$0.00049			\$ -	
39	AG Consulting Expense		\$0.00000			\$0.00000			\$ -	
40	Storm Cost Recovery Adjustment Factor		\$0.00084			\$0.00084			\$ -	
41	Storm Reserve Adjustment		\$0.00000			\$0.00000			\$ -	
42	Basic Service Cost True Up Factor		\$0.00022			\$0.00022			\$ -	
43	Solar Program Cost Adjustment Factor		\$0.00000			\$0.00000			\$ -	
44	Solar Expansion Cost Recovery Factor		\$0.00081			\$0.00081			\$ -	
45	Vegetation Management		\$0.00104			\$0.00104			\$ -	
46	Tax Act Credit Factor		(\$0.00157)			(\$0.00157)			\$ -	
47	Grid Modernization		\$0.00005			\$0.00048			\$0.00043	
48	Transition		\$0.00002			\$0.00002			\$ -	
49	Transmission Energy		\$0.00000			\$0.00000			\$ -	
50	Energy Efficiency Reconciliation Factor		\$0.00945			\$0.00945			\$ -	
51	System Benefits Charge		\$0.00250			\$0.00250			\$ -	
52	Renewable Energy Charge		\$0.00050			\$0.00050			\$ -	
53	Basic Service Charge		\$0.11791			\$0.11791			\$ -	

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate G-0 Small General Service

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 150										
4	5	750	\$88.17	\$88.43	\$176.60	\$88.49	\$88.43	\$176.93	\$0.32	0.2%	
5	10	1,500	\$196.38	\$176.87	\$373.25	\$197.03	\$176.87	\$373.89	\$0.64	0.2%	
6	15	2,250	\$304.59	\$265.30	\$569.89	\$305.56	\$265.30	\$570.86	\$0.97	0.2%	
7	20	3,000	\$412.80	\$353.73	\$766.53	\$414.09	\$353.73	\$767.82	\$1.29	0.2%	
8	50	7,500	\$1,062.06	\$884.33	\$1,946.39	\$1,065.29	\$884.33	\$1,949.61	\$3.23	0.2%	
9	Avg	6	900	\$109.81	\$106.12	\$215.93	\$110.20	\$106.12	\$216.32	\$0.39	0.2%
10	Hours Use: 300										
11	5	1,500	\$108.78	\$176.87	\$285.65	\$109.43	\$176.87	\$286.29	\$0.65	0.2%	
12	10	3,000	\$237.60	\$353.73	\$591.33	\$238.89	\$353.73	\$592.62	\$1.29	0.2%	
13	15	4,500	\$366.42	\$530.60	\$897.02	\$368.36	\$530.60	\$898.95	\$1.94	0.2%	
14	20	6,000	\$495.24	\$707.46	\$1,202.70	\$497.82	\$707.46	\$1,205.28	\$2.58	0.2%	
15	50	15,000	\$1,268.16	\$1,768.65	\$3,036.81	\$1,274.61	\$1,768.65	\$3,043.26	\$6.45	0.2%	
16	Avg	11	3,300	\$263.36	\$389.10	\$652.47	\$264.78	\$389.10	\$653.89	\$1.42	0.2%
17	Hours Use: 450										
18	5	2,250	\$129.39	\$265.30	\$394.69	\$130.36	\$265.30	\$395.66	\$0.97	0.2%	
19	10	4,500	\$278.82	\$530.60	\$809.42	\$280.76	\$530.60	\$811.35	\$1.94	0.2%	
20	15	6,750	\$428.25	\$795.89	\$1,224.14	\$431.15	\$795.89	\$1,227.05	\$2.90	0.2%	
21	20	9,000	\$577.68	\$1,061.19	\$1,638.87	\$581.55	\$1,061.19	\$1,642.74	\$3.87	0.2%	
22	50	22,500	\$1,474.26	\$2,652.98	\$4,127.24	\$1,483.94	\$2,652.98	\$4,136.91	\$9.68	0.2%	
23	Avg	17	7,650	\$488.02	\$902.01	\$1,390.03	\$491.31	\$902.01	\$1,393.32	\$3.29	0.2%

	Current Rates	Proposed Rates	Change
24			
25			
26	Customer Charge	\$15.00	\$ -
27	Distribution Demand >2 KW	\$9.92	\$ -
28	Transmission Demand >2 KW	\$7.60	\$ -
29	Distribution Energy	\$0.00195	\$ -
30	Revenue Decoupling	\$0.00068	\$ -
31	Solar Massachusetts Renewable Target	\$0.00147	\$ -
32	Residential Assistance Adjustment Factor	\$0.00369	\$ -
33	Pension Adjustment Factor	\$0.00054	\$ -
34	Net Metering Recovery Surcharge	\$0.00480	\$ -
35	Long Term Renewable Contract Adjustment	\$0.00049	\$ -
36	AG Consulting Expense	\$0.00000	\$ -
37	Storm Cost Recovery Adjustment Factor	\$0.00084	\$ -
38	Storm Reserve Adjustment	\$0.00000	\$ -
39	Basic Service Cost True Up Factor	\$0.00022	\$ -
40	Solar Program Cost Adjustment Factor	\$0.00000	\$ -
41	Solar Expansion Cost Recovery Factor	\$0.00081	\$ -
42	Vegetation Management	\$0.00104	\$ -
43	Tax Act Credit Factor	(\$0.00157)	\$ -
44	Grid Modernization	\$0.00005	\$0.00048
45	Transition	\$0.00002	\$ -
46	Transmission Energy	\$0.00000	\$ -
47	Energy Efficiency Reconciliation Factor	\$0.00945	\$ -
48	System Benefits Charge	\$0.00250	\$ -
49	Renewable Energy Charge	\$0.00050	\$ -
50	Basic Service Charge	\$0.11791	\$ -

Rate T-0 Small General Service Time-Of-Use

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 150										
4	5	750	\$102.34	\$88.43	\$190.77	\$102.66	\$88.43	\$191.09	\$0.32	0.2%	
5	10	1,500	\$209.46	\$176.87	\$386.32	\$210.10	\$176.87	\$386.97	\$0.65	0.2%	
6	15	2,250	\$316.57	\$265.30	\$581.87	\$317.54	\$265.30	\$582.84	\$0.97	0.2%	
7	20	3,000	\$423.69	\$353.73	\$777.42	\$424.98	\$353.73	\$778.71	\$1.29	0.2%	
8	50	7,500	\$1,066.40	\$884.33	\$1,950.72	\$1,069.62	\$884.33	\$1,953.95	\$3.22	0.2%	
	Avg	1	150	\$34.03	\$17.69	\$51.72	\$34.10	\$17.69	\$51.78	\$0.06	0.1%
10	Hours Use: 300										
11	5	1,500	\$122.51	\$176.87	\$299.37	\$123.15	\$176.87	\$300.02	\$0.64	0.2%	
12	10	3,000	\$249.79	\$353.73	\$603.52	\$251.08	\$353.73	\$604.81	\$1.29	0.2%	
13	15	4,500	\$377.08	\$530.60	\$907.67	\$379.01	\$530.60	\$909.61	\$1.93	0.2%	
14	20	6,000	\$504.36	\$707.46	\$1,211.82	\$506.94	\$707.46	\$1,214.40	\$2.58	0.2%	
15	50	15,000	\$1,268.07	\$1,768.65	\$3,036.72	\$1,274.52	\$1,768.65	\$3,043.17	\$6.45	0.2%	
	Avg	4	1,200	\$97.05	\$141.49	\$238.54	\$97.56	\$141.49	\$239.06	\$0.52	0.2%
17	Hours Use: 450										
18	5	2,250	\$142.67	\$265.30	\$407.97	\$143.64	\$265.30	\$408.94	\$0.97	0.2%	
19	10	4,500	\$290.13	\$530.60	\$820.72	\$292.06	\$530.60	\$822.66	\$1.93	0.2%	
20	15	6,750	\$437.58	\$795.89	\$1,233.47	\$440.48	\$795.89	\$1,236.37	\$2.90	0.2%	
21	20	9,000	\$585.03	\$1,061.19	\$1,646.22	\$588.90	\$1,061.19	\$1,650.09	\$3.87	0.2%	
22	50	22,500	\$1,469.75	\$2,652.98	\$4,122.72	\$1,479.42	\$2,652.98	\$4,132.40	\$9.68	0.2%	
	Avg	10	4,500	\$290.13	\$530.60	\$820.72	\$292.06	\$530.60	\$822.66	\$1.93	0.2%
24					Current	Proposed					
25					Rates	Rates		Change			
26	Customer Charge				\$30.00	\$30.00		\$ -			
27	Distribution Demand >2 KW				\$9.79	\$9.79		\$ -			
28	Transmission Demand >2 KW				\$7.60	\$7.60		\$ -			
29	Distribution Energy - Peak				\$0.00307	\$0.00307		\$ -			
30	Distribution Energy - Off Peak				\$0.00082	\$0.00082		\$ -			
31	Revenue Decoupling				\$0.00068	\$0.00068		\$ -			
32	Solar Massachusetts Renewable Target				\$0.00147	\$0.00147		\$ -			
33	Residential Assistance Adjustment Factor				\$0.00369	\$0.00369		\$ -			
34	Pension Adjustment Factor				\$0.00054	\$0.00054		\$ -			
35	Net Metering Recovery Surcharge				\$0.00480	\$0.00480		\$ -			
36	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049		\$ -			
37	AG Consulting Expense				\$0.00000	\$0.00000		\$ -			
38	Storm Cost Recovery Adjustment Factor				\$0.00084	\$0.00084		\$ -			
39	Storm Reserve Adjustment				\$0.00000	\$0.00000		\$ -			
40	Basic Service Cost True Up Factor				\$0.00022	\$0.00022		\$ -			
41	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000		\$ -			
42	Solar Expansion Cost Recovery Factor				\$0.00081	\$0.00081		\$ -			
43	Vegetation Management				\$0.00104	\$0.00104		\$ -			
44	Tax Act Credit Factor				(\$0.00157)	(\$0.00157)		\$ -			
45	Grid Modernization				\$0.00005	\$0.00048		\$0.00043			
46	Transition				\$0.00002	\$0.00002		\$ -			
47	Transmission Energy				\$0.00000	\$0.00000		\$ -			
48	Energy Efficiency Reconciliation Factor				\$0.00945	\$0.00945		\$ -			
49	System Benefits Charge				\$0.00250	\$0.00250		\$ -			
50	Renewable Energy Charge				\$0.00050	\$0.00050		\$ -			
51	Basic Service Charge				\$0.11791	\$0.11791		\$ -			
52	On-Peak Use:		24%								
53	Off-Peak Use:		76%								

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate G-2 Primary General Service

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 250										
4	50	12,500	\$1,070.25	\$1,031.75	\$2,102.00	\$1,074.13	\$1,031.75	\$2,105.88	\$3.88	0.2%	
5	75	18,750	\$1,595.38	\$1,547.63	\$3,143.00	\$1,601.19	\$1,547.63	\$3,148.81	\$5.81	0.2%	
6	100	25,000	\$2,120.50	\$2,063.50	\$4,184.00	\$2,128.25	\$2,063.50	\$4,191.75	\$7.75	0.2%	
7	150	37,500	\$3,170.75	\$3,095.25	\$6,266.00	\$3,182.38	\$3,095.25	\$6,277.63	\$11.63	0.2%	
8	200	50,000	\$4,221.00	\$4,127.00	\$8,348.00	\$4,236.50	\$4,127.00	\$8,363.50	\$15.50	0.2%	
9	300	75,000	\$6,321.50	\$6,190.50	\$12,512.00	\$6,344.75	\$6,190.50	\$12,535.25	\$23.25	0.2%	
10	Avg	95	23,750	\$2,015.48	\$1,960.33	\$3,975.80	\$2,022.84	\$1,960.33	\$3,983.16	\$7.36	0.2%
11	Hours Use: 350										
12	50	10,000	\$1,012.60	\$825.40	\$1,838.00	\$1,015.70	\$825.40	\$1,841.10	\$3.10	0.2%	
13	75	22,500	\$1,681.85	\$1,857.15	\$3,539.00	\$1,688.83	\$1,857.15	\$3,545.98	\$6.97	0.2%	
14	100	40,000	\$2,466.40	\$3,301.60	\$5,768.00	\$2,478.80	\$3,301.60	\$5,780.40	\$12.40	0.2%	
15	150	75,000	\$4,035.50	\$6,190.50	\$10,226.00	\$4,058.75	\$6,190.50	\$10,249.25	\$23.25	0.2%	
16	200	100,000	\$5,374.00	\$8,254.00	\$13,628.00	\$5,405.00	\$8,254.00	\$13,659.00	\$31.00	0.2%	
17	300	150,000	\$8,051.00	\$12,381.00	\$20,432.00	\$8,097.50	\$12,381.00	\$20,478.50	\$46.50	0.2%	
18	Avg	84	42,000	\$2,268.68	\$3,466.68	\$5,735.36	\$2,281.70	\$3,466.68	\$5,748.38	\$13.02	0.2%
19	Hours Use: 450										
20	50	22,500	\$1,300.85	\$1,857.15	\$3,158.00	\$1,307.83	\$1,857.15	\$3,164.98	\$6.97	0.2%	
21	75	33,750	\$1,941.28	\$2,785.73	\$4,727.00	\$1,951.74	\$2,785.73	\$4,737.46	\$10.46	0.2%	
22	100	45,000	\$2,581.70	\$3,714.30	\$6,296.00	\$2,595.65	\$3,714.30	\$6,309.95	\$13.95	0.2%	
23	150	67,500	\$3,862.55	\$5,571.45	\$9,434.00	\$3,883.48	\$5,571.45	\$9,454.93	\$20.92	0.2%	
24	200	90,000	\$5,143.40	\$7,428.60	\$12,572.00	\$5,171.30	\$7,428.60	\$12,599.90	\$27.90	0.2%	
25	300	135,000	\$7,705.10	\$11,142.90	\$18,848.00	\$7,746.95	\$11,142.90	\$18,889.85	\$41.85	0.2%	
26	Avg	94	42,300	\$2,428.00	\$3,491.44	\$5,919.44	\$2,441.11	\$3,491.44	\$5,932.55	\$13.11	0.2%
27						Current	Proposed				
28						Rates	Rates	Change			
29	Customer Charge					\$353.00	\$353.00	\$ -			
30	Distribution Demand <= 50 kW					\$1.80	\$1.80	\$ -			
31	Distribution Demand Charge >50 kW					\$8.46	\$8.46	\$ -			
32	Transmission Demand					\$6.78	\$6.78	\$ -			
33	Distribution Energy					\$0.00189	\$0.00189	\$ -			
34	Revenue Decoupling					\$0.00045	\$0.00045	\$ -			
35	Solar Massachusetts Renewable Target					\$0.00097	\$0.00097	\$ -			
36	Residential Assistance Adjustment Factor					\$0.00244	\$0.00244	\$ -			
37	Pension Adjustment Factor					\$0.00032	\$0.00032	\$ -			
38	Net Metering Recovery Surcharge					\$0.00317	\$0.00317	\$ -			
39	Long Term Renewable Contract Adjustment					\$0.00049	\$0.00049	\$ -			
40	AG Consulting Expense					\$0.00000	\$0.00000	\$ -			
41	Storm Cost Recovery Adjustment Factor					\$0.00056	\$0.00056	\$ -			
42	Storm Reserve Adjustment					\$0.00000	\$0.00000	\$ -			
43	Basic Service Cost True Up Factor					\$0.00015	\$0.00015	\$ -			
44	Solar Program Cost Adjustment Factor					\$0.00000	\$0.00000	\$ -			
45	Solar Expansion Cost Recovery Factor					\$0.00054	\$0.00054	\$ -			
46	Vegetation Management					\$0.00062	\$0.00062	\$ -			
47	Tax Act Credit Factor					(\$0.00104)	(\$0.00104)	\$ -			
48	Grid Modernization					\$0.00003	\$0.00034	\$0.00031			
49	Transition					\$0.00002	\$0.00002	\$ -			
50	Transmission Energy					\$0.00000	\$0.00000	\$ -			
51	Energy Efficiency Reconciliation Factor					\$0.00945	\$0.00945	\$ -			
52	System Benefits Charge					\$0.00250	\$0.00250	\$ -			
53	Renewable Energy Charge					\$0.00050	\$0.00050	\$ -			
54	Basic Service Charge					\$0.08254	\$0.08254	\$ -			

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate T-4 Primary General Service Time-Of-Use

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
3	Hours Use: 250									
4	50	12,500	\$1,063.35	\$1,031.75	\$2,095.10	\$1,067.22	\$1,031.75	\$2,098.97	\$3.88	0.2%
5	75	18,750	\$1,585.27	\$1,547.63	\$3,132.90	\$1,591.08	\$1,547.63	\$3,138.71	\$5.81	0.2%
6	100	25,000	\$2,107.20	\$2,063.50	\$4,170.70	\$2,114.95	\$2,063.50	\$4,178.45	\$7.75	0.2%
7	150	37,500	\$3,151.04	\$3,095.25	\$6,246.29	\$3,162.67	\$3,095.25	\$6,257.92	\$11.63	0.2%
8	200	50,000	\$4,194.89	\$4,127.00	\$8,321.89	\$4,210.39	\$4,127.00	\$8,337.39	\$15.50	0.2%
9	300	75,000	\$6,282.59	\$6,190.50	\$12,473.09	\$6,305.84	\$6,190.50	\$12,496.34	\$23.25	0.2%
10	Avg 70	17,500	\$1,480.89	\$1,444.45	\$2,925.34	\$1,486.31	\$1,444.45	\$2,930.76	\$5.43	0.2%
11	Hours Use: 350									
12	50	17,500	\$1,175.89	\$1,444.45	\$2,620.34	\$1,181.31	\$1,444.45	\$2,625.76	\$5.42	0.2%
13	75	26,250	\$1,754.08	\$2,166.68	\$3,920.75	\$1,762.22	\$2,166.68	\$3,928.89	\$8.14	0.2%
14	100	35,000	\$2,332.27	\$2,888.90	\$5,221.17	\$2,343.12	\$2,888.90	\$5,232.02	\$10.85	0.2%
15	150	52,500	\$3,488.66	\$4,333.35	\$7,822.01	\$3,504.93	\$4,333.35	\$7,838.28	\$16.28	0.2%
16	200	70,000	\$4,645.05	\$5,777.80	\$10,422.85	\$4,666.75	\$5,777.80	\$10,444.55	\$21.70	0.2%
17	300	105,000	\$6,957.82	\$8,666.70	\$15,624.52	\$6,990.37	\$8,666.70	\$15,657.07	\$32.55	0.2%
18	Avg 106	37,100	\$2,471.04	\$3,062.23	\$5,533.27	\$2,482.54	\$3,062.23	\$5,544.77	\$11.50	0.2%
19	Hours Use: 450									
20	50	22,500	\$1,288.43	\$1,857.15	\$3,145.58	\$1,295.40	\$1,857.15	\$3,152.55	\$6.98	0.2%
21	75	33,750	\$1,922.89	\$2,785.73	\$4,708.61	\$1,933.35	\$2,785.73	\$4,719.08	\$10.46	0.2%
22	100	45,000	\$2,557.35	\$3,714.30	\$6,271.65	\$2,571.30	\$3,714.30	\$6,285.60	\$13.95	0.2%
23	150	67,500	\$3,826.28	\$5,571.45	\$9,397.73	\$3,847.20	\$5,571.45	\$9,418.65	\$20.92	0.2%
24	200	90,000	\$5,095.20	\$7,428.60	\$12,523.80	\$5,123.10	\$7,428.60	\$12,551.70	\$27.90	0.2%
25	300	135,000	\$7,633.05	\$11,142.90	\$18,775.95	\$7,674.90	\$11,142.90	\$18,817.80	\$41.85	0.2%
26	Avg 119	53,550	\$3,039.54	\$4,420.02	\$7,459.56	\$3,056.14	\$4,420.02	\$7,476.16	\$16.60	0.2%
27					Current	Proposed				
28					Rates	Rates		Change		
29	Customer Charge				\$353.00	\$353.00		\$ -		
30	Distribution Demand <= 50 kW				\$1.80	\$1.80		\$ -		
31	Distribution Demand Charge >50 kW				\$8.47	\$8.47		\$ -		
32	Transmission Demand				\$6.78	\$6.78		\$ -		
33	Distribution Energy - Peak				\$0.00284	\$0.00284		\$ -		
34	Distribution Energy - Off Peak				\$0.00081	\$0.00081		\$ -		
35	Revenue Decoupling				\$0.00045	\$0.00045		\$ -		
36	Solar Massachusetts Renewable Target				\$0.00097	\$0.00097		\$ -		
37	Residential Assistance Adjustment Factor				\$0.00244	\$0.00244		\$ -		
38	Pension Adjustment Factor				\$0.00032	\$0.00032		\$ -		
39	Net Metering Recovery Surcharge				\$0.00317	\$0.00317		\$ -		
40	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049		\$ -		
41	AG Consulting Expense				\$0.00000	\$0.00000		\$ -		
42	Storm Cost Recovery Adjustment Factor				\$0.00056	\$0.00056		\$ -		
43	Storm Reserve Adjustment				\$0.00000	\$0.00000		\$ -		
44	Basic Service Cost True Up Factor				\$0.00015	\$0.00015		\$ -		
45	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000		\$ -		
46	Solar Expansion Cost Recovery Factor				\$0.00054	\$0.00054		\$ -		
47	Vegetation Management				\$0.00062	\$0.00062		\$ -		
48	Tax Act Credit Factor				(\$0.00104)	(\$0.00104)		\$ -		
49	Grid Modernization				\$0.00003	\$0.00034		\$0.00031		
50	Transition				\$0.00002	\$0.00002		\$ -		
51	Transmission Energy				\$0.00000	\$0.00000		\$ -		
52	Energy Efficiency Reconciliation Factor				\$0.00945	\$0.00945		\$ -		
53	System Benefits Charge				\$0.00250	\$0.00250		\$ -		
54	Renewable Energy Charge				\$0.00050	\$0.00050		\$ -		
55	Basic Service Charge				\$0.08254	\$0.08254		\$ -		
56	On-Peak Use:		26%							
57	Off-Peak Use:		74%							

1	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact		
2	kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change	
3	Hours Use: 350										
4	350	122,500	\$8,621.05	\$10,111.15	\$18,732.20	\$8,648.00	\$10,111.15	\$18,759.15	\$26.95	0.1%	
5	425	148,750	\$10,305.56	\$12,277.83	\$22,583.38	\$10,338.28	\$12,277.83	\$22,616.11	\$32.72	0.1%	
6	500	175,000	\$11,990.07	\$14,444.50	\$26,434.57	\$12,028.57	\$14,444.50	\$26,473.07	\$38.50	0.1%	
7	650	227,500	\$15,359.09	\$18,777.85	\$34,136.94	\$15,409.14	\$18,777.85	\$34,186.99	\$50.05	0.1%	
8	1,000	350,000	\$24,085.14	\$28,889.00	\$52,974.14	\$24,162.14	\$28,889.00	\$53,051.14	\$77.00	0.1%	
9	1,500	525,000	\$36,390.21	\$43,333.50	\$79,723.71	\$36,505.71	\$43,333.50	\$79,839.21	\$115.50	0.1%	
10	2,000	700,000	\$47,620.28	\$57,778.00	\$105,398.28	\$47,774.28	\$57,778.00	\$105,552.28	\$154.00	0.1%	
11	Avg	410	143,500	\$9,968.66	\$11,844.49	\$21,813.15	\$10,000.23	\$11,844.49	\$21,844.72	\$31.57	0.1%
12	Hours Use: 450										
13	350	157,500	\$9,328.06	\$13,000.05	\$22,328.11	\$9,362.71	\$13,000.05	\$22,362.76	\$34.65	0.2%	
14	425	191,250	\$11,164.08	\$15,785.78	\$26,949.85	\$11,206.15	\$15,785.78	\$26,991.93	\$42.08	0.2%	
15	500	225,000	\$13,000.09	\$18,571.50	\$31,571.59	\$13,049.59	\$18,571.50	\$31,621.09	\$49.50	0.2%	
16	650	292,500	\$16,672.12	\$24,142.95	\$40,815.07	\$16,736.47	\$24,142.95	\$40,879.42	\$64.35	0.2%	
17	1,000	450,000	\$26,105.18	\$37,143.00	\$63,248.18	\$26,204.18	\$37,143.00	\$63,347.18	\$99.00	0.2%	
18	1,500	675,000	\$39,420.27	\$55,714.50	\$95,134.77	\$39,568.77	\$55,714.50	\$95,283.27	\$148.50	0.2%	
19	2,000	900,000	\$51,660.36	\$74,286.00	\$125,946.36	\$51,858.36	\$74,286.00	\$126,144.36	\$198.00	0.2%	
20	Avg	571	256,950	\$14,738.18	\$21,208.65	\$35,946.84	\$14,794.71	\$21,208.65	\$36,003.36	\$56.53	0.2%
21	Hours Use: 550										
22	350	192,500	\$10,035.08	\$15,888.95	\$25,924.03	\$10,077.43	\$15,888.95	\$25,966.38	\$42.35	0.2%	
23	425	233,750	\$12,022.59	\$19,293.73	\$31,316.32	\$12,074.02	\$19,293.73	\$31,367.74	\$51.42	0.2%	
24	500	275,000	\$14,010.11	\$22,698.50	\$36,708.61	\$14,070.61	\$22,698.50	\$36,769.11	\$60.50	0.2%	
25	650	357,500	\$17,985.14	\$29,508.05	\$47,493.19	\$18,063.79	\$29,508.05	\$47,571.84	\$78.65	0.2%	
26	1,000	550,000	\$28,125.22	\$45,397.00	\$73,522.22	\$28,246.22	\$45,397.00	\$73,643.22	\$121.00	0.2%	
27	1,500	825,000	\$42,450.33	\$68,095.50	\$110,545.83	\$42,631.83	\$68,095.50	\$110,727.33	\$181.50	0.2%	
28	2,000	1,100,000	\$55,700.44	\$90,794.00	\$146,494.44	\$55,942.44	\$90,794.00	\$146,736.44	\$242.00	0.2%	
29	Avg	580	319,000	\$16,130.13	\$26,330.26	\$42,460.39	\$16,200.31	\$26,330.26	\$42,530.57	\$70.18	0.2%
30					Current	Proposed					
31					Rates	Rates	Change				
32	Customer Charge <1000 kW				\$760.00	\$760.00	\$ -				
33	Customer Charge 1000 <= kW <1500kW				\$1,625.00	\$1,625.00	\$ -				
34	Customer Charge 1500 <= kW <2500kW				\$2,700.00	\$2,700.00	\$ -				
35	Distribution Demand - Peak				\$6.75	\$6.75	\$ -				
36	Transmission Demand - Peak				\$8.64	\$8.64	\$ -				
37	Distribution Energy - Peak				\$0.00274	\$0.00274	\$ -				
38	Distribution Energy - Off Peak				\$0.00081	\$0.00081	\$ -				
39	Revenue Decoupling				\$0.00032	\$0.00032	\$ -				
40	Solar Massachusetts Renewable Target				\$0.00069	\$0.00069	\$ -				
41	Residential Assistance Adjustment Factor				\$0.00173	\$0.00173	\$ -				
42	Pension Adjustment Factor				\$0.00025	\$0.00025	\$ -				
43	Net Metering Recovery Surcharge				\$0.00225	\$0.00225	\$ -				
44	Long Term Renewable Contract Adjustment				\$0.00049	\$0.00049	\$ -				
45	AG Consulting Expense				\$0.00000	\$0.00000	\$ -				
46	Storm Cost Recovery Adjustment Factor				\$0.00040	\$0.00040	\$ -				
47	Storm Reserve Adjustment				\$0.00000	\$0.00000	\$ -				
48	Basic Service Cost True Up Factor				\$0.00010	\$0.00010	\$ -				
49	Solar Program Cost Adjustment Factor				\$0.00000	\$0.00000	\$ -				
50	Solar Expansion Cost Recovery Factor				\$0.00038	\$0.00038	\$ -				
51	Vegetation Management				\$0.00049	\$0.00049	\$ -				
52	Tax Act Credit Factor				(\$0.00074)	(\$0.00074)	\$ -				
53	Grid Modernization				\$0.00002	\$0.00024	\$0.00022				
54	Transition				\$0.00002	\$0.00002	\$ -				
55	Transmission Energy				\$0.00000	\$0.00000	\$ -				
56	Energy Efficiency Reconciliation Factor				\$0.00945	\$0.00945	\$ -				
57	System Benefits Charge				\$0.00250	\$0.00250	\$ -				
58	Renewable Energy Charge				\$0.00050	\$0.00050	\$ -				
59	Basic Service Charge				\$0.08254	\$0.08254	\$ -				
60	On-Peak Use:		28%								
61	Off-Peak Use:		72%								

**Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2020**

Rate T-5 Extra Large Primary General Service Time-of-Use

	Monthly kW	Monthly kWh	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
			Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
1										
2										
3	Hours Use: 350									
4	2,500	875,000	\$58,498.33	\$72,222.50	\$130,720.83	\$58,603.33	\$72,222.50	\$130,825.83	\$105.00	0.1%
5	3,000	1,050,000	\$69,437.99	\$86,667.00	\$156,104.99	\$69,563.99	\$86,667.00	\$156,230.99	\$126.00	0.1%
6	5,000	1,750,000	\$113,196.65	\$144,445.00	\$257,641.65	\$113,406.65	\$144,445.00	\$257,851.65	\$210.00	0.1%
7	10,000	3,500,000	\$222,593.30	\$288,890.00	\$511,483.30	\$223,013.30	\$288,890.00	\$511,903.30	\$420.00	0.1%
8	Avg 3,983	1,394,050	\$90,945.37	\$115,064.89	\$206,010.26	\$91,112.66	\$115,064.89	\$206,177.54	\$167.29	0.1%
9	Hours Use: 450									
10	2,500	1,125,000	\$62,919.28	\$92,857.50	\$155,776.78	\$63,054.28	\$92,857.50	\$155,911.78	\$135.00	0.1%
11	3,000	1,350,000	\$74,743.13	\$111,429.00	\$186,172.13	\$74,905.13	\$111,429.00	\$186,334.13	\$162.00	0.1%
12	5,000	2,250,000	\$122,038.55	\$185,715.00	\$307,753.55	\$122,308.55	\$185,715.00	\$308,023.55	\$270.00	0.1%
13	10,000	4,500,000	\$240,277.10	\$371,430.00	\$611,707.10	\$240,817.10	\$371,430.00	\$612,247.10	\$540.00	0.1%
14	Avg 6,855	3,084,750	\$165,905.05	\$254,615.27	\$420,520.32	\$166,275.22	\$254,615.27	\$420,890.49	\$370.17	0.1%
15	Hours Use: 550									
16	2,500	1,375,000	\$67,340.23	\$113,492.50	\$180,832.73	\$67,505.23	\$113,492.50	\$180,997.73	\$165.00	0.1%
17	3,000	1,650,000	\$80,048.27	\$136,191.00	\$216,239.27	\$80,246.27	\$136,191.00	\$216,437.27	\$198.00	0.1%
18	5,000	2,750,000	\$130,880.45	\$226,985.00	\$357,865.45	\$131,210.45	\$226,985.00	\$358,195.45	\$330.00	0.1%
19	10,000	5,500,000	\$257,960.90	\$453,970.00	\$711,930.90	\$258,620.90	\$453,970.00	\$712,590.90	\$660.00	0.1%
20	Avg 4,519	2,485,450	\$118,655.31	\$205,149.04	\$323,804.35	\$118,953.56	\$205,149.04	\$324,102.61	\$298.25	0.1%
21					Current			Proposed		
22					Rates			Rates	Change	
23	Customer Charge				\$3,800.00			\$3,800.00	\$ -	
24	Distribution Demand - Peak				\$4.81			\$4.81	\$ -	
25	Transmission Demand - Peak				\$10.88			\$10.88	\$ -	
26	Distribution Energy - Peak				\$0.00275			\$0.00275	\$ -	
27	Distribution Energy - Off Peak				\$0.00081			\$0.00081	\$ -	
28	Revenue Decoupling				\$0.00018			\$0.00018	\$ -	
29	Solar Massachusetts Renewable Target				\$0.00039			\$0.00039	\$ -	
30	Residential Assistance Adjustment Factor				\$0.00098			\$0.00098	\$ -	
31	Pension Adjustment Factor				\$0.00016			\$0.00016	\$ -	
32	Net Metering Recovery Surcharge				\$0.00127			\$0.00127	\$ -	
33	Long Term Renewable Contract Adjustment				\$0.00049			\$0.00049	\$ -	
34	AG Consulting Expense				\$0.00000			\$0.00000	\$ -	
35	Storm Cost Recovery Adjustment Factor				\$0.00022			\$0.00022	\$ -	
36	Storm Reserve Adjustment				\$0.00000			\$0.00000	\$ -	
37	Basic Service Cost True Up Factor				\$0.00006			\$0.00006	\$ -	
38	Solar Program Cost Adjustment Factor				\$0.00000			\$0.00000	\$ -	
39	Solar Expansion Cost Recovery Factor				\$0.00022			\$0.00022	\$ -	
40	Vegetation Management				\$0.00032			\$0.00032	\$ -	
41	Tax Act Credit Factor				(\$0.00042)			(\$0.00042)	\$ -	
42	Grid Modernization				\$0.00001			\$0.00013	\$0.00012	
43	Transition				\$0.00002			\$0.00002	\$ -	
44	Transmission Energy				\$0.00000			\$0.00000	\$ -	
45	Energy Efficiency Reconciliation Factor				\$0.00945			\$0.00945	\$ -	
46	System Benefits Charge				\$0.00250			\$0.00250	\$ -	
47	Renewable Energy Charge				\$0.00050			\$0.00050	\$ -	
48	Basic Service Charge				\$0.08254			\$0.08254	\$ -	
49	On-Peak Use:			27%						
50	Off-Peak Use:			73%						

NOTE: Transmission On Peak Demand Charge is being used to calculate bill impacts as Coincident Peak data is not available based on range of kWh shown



APS 1 Project Authorization Policy

Issue Date
10/20/17

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Policy Statement

Project authorization includes the evaluation, decision-making, and approval of all projects. A project is defined as a commitment by Eversource of internal and/or external resources to accomplish an initiative that will have economic impact to the company, its customer and/or is required by policy or regulatory standards. The overall policy objective is that projects should be evaluated and approved in accordance with the Delegation of Authority Policy (DOA) prior to the commitment of company resources.

Typically, projects include, but are not limited to:

- Purchase or construction of plant assets
- Purchase or lease of facilities, real estate, land or rights of way
- Purchase or development of information technology software and hardware, installations and upgrades
- Purchase of equipment, fixed assets, vehicles and materials including critical spares and those with long lead times
- Environmental projects
- Other significant corporate shared services projects taken on by the parent or service company
- Energy Efficiency special projects (not covered by annual recovery method)
- Non-routine maintenance and other expense projects

Please note this policy does not apply to the following:

- Energy supply obligations, which are monitored and approved by the Eversource Energy Risk Committee.
- Projects that require Eversource Board of Trustee (BOT) approval. Once BOT approval is obtained, a funding project must be established in Power Plant, approval documents attached, and approved according to DOA

If you believe you have a project that is an exception to this policy, for Operations projects, please contact the Director, Investment Planning, and for Corporate Shared Services projects, contact the Director, Budgeting and Financial Analysis.

Applicability of this Policy

All projects, regardless of size, must follow the authorization requirements in accordance with the DOA policy. In addition, for specific Operations and Corporate Shared Services projects that exceed the cost thresholds provided in

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Appendix 1, a Project Authorization Form (PAF) must be completed. If a specific project does not exceed the cost thresholds requiring a PAF, the project initiator or project manager may elect to complete a PAF, if desired.

The PAF specific to Operations projects (Operations PAF) is provided in Appendix 2. Questions concerning completion of a PAF for Operations should be directed to the Director, Investment Planning or a designee.

The PAF specific to Corporate Shared Services projects (Corporate Shared Services PAF) is provided in Appendix 3. Questions concerning completion of a PAF for Corporate Shared Services projects should be directed to the Director, Budgeting and Financial Analysis or a designee.

For purposes of this policy, an Operations project is defined as a project to be funded and/or managed by any organization under the Executive Vice President and Chief Operating Officer. All other projects are to be considered Corporate Shared Services projects. If the project is cross functional, between Operations and Corporate Shared Services, the project is to be defined based on the organization in which the Project Sponsor is located.

Other policies, charters or committees that govern capital projects of Eversource may introduce other requirements in addition to the requirements of this policy. However, this policy shall not be replaced in any way by any other policy or procedure, but rather those existing policies, charters or committees can augment what is required by this policy.

Authorization Process

Use of a Project Authorization Form

For capital projects a PAF must be completed to carry out the evaluation, decision-making, and approval process required by this policy. The items included in the Project Evaluation Criteria below should be reflected in the PAF in sufficient detail and with explanations so that the approver is fully informed and can make an educated approval decision. Templates of the PAF for Operations and Corporate Shared Services are included in Appendix 2 and Appendix 3 of this policy. The PAF must be approved by the project initiator and/or manager, Plant Accounting, Director, Investment Planning (Operations Projects) or Director, Budgeting and Financial Analysis (Corporate Shared Services Projects) or designees, followed by appropriate approvals in accordance with the signature authority levels in the DOA. See Completing a PAF for Corporate Shared

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Services Projects for additional IT and Facilities approval requirements. If there are cross functional financial and/or operational impacts associated with the project a representative from the impacted areas shall also be required to approve the PAF.

It is expected that the level of detail included in the PAF be commensurate with the size and complexity of the project. The cost information included in the PAF should represent the costs for the entire project (capital and expense), including, but not limited to, direct costs, internal labor, internal indirect costs (overheads and loaders) and an estimate of capitalized interest or AFUDC, as applicable. Contributions in aid of construction (CIAC) or other reimbursements should be included in the PAF and if any contingencies are included in the estimated costs, they need to be identified and described in the project authorization form as well. Estimates regarding future costs and benefits and functional areas impacted should also be noted in the PAF. If future costs impact areas outside of the project, approval by that organization is required.

The project initiator or project manager is responsible for working with Plant Accounting to ensure that the PAF has a proper break-out of capital and O&M amounts prior to submitting it for approval through the DOA and for Software as a Service (SaaS)/Cloud projects, that a separate analysis has been completed and included in the PAF (Appendix 3, page 7).

The Power Plant system is the system of record for projects and project approval documentation covered by this policy, and is administered by the Vice President, Controller and Chief Accounting Officer. All electronic signature approvals, completed and approved PAFs, Subsidiary Board presentations, and approval materials shall be maintained in Power Plant and will follow the pertinent corporate retention guidelines.

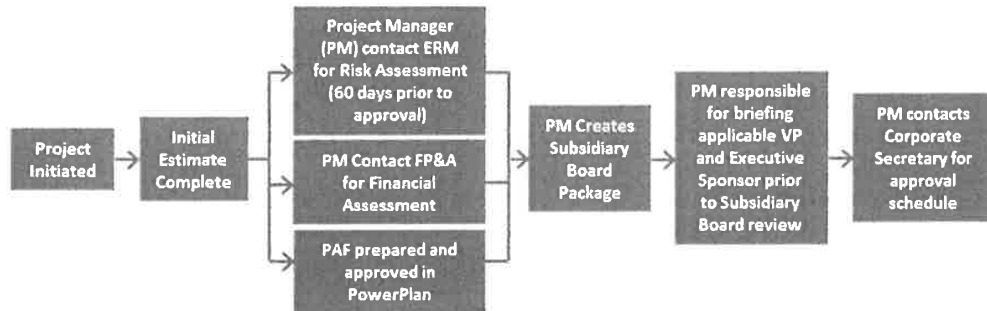
Whenever possible, the PAF should be completed during the capital planning process.

For any project that requires approval by one of the Eversource Subsidiary Boards in accordance with the DOA, presentation materials should be produced in addition to the PAF, and the items included in the Project Evaluation Criteria section of this policy should be included in the presentation materials or evaluated in addition to those materials. The Corporate Secretary will coordinate the review and approval of any project subject to Subsidiary Board approval and provide guidelines with respect to approval requests. Following a Subsidiary Board's approval of a project, the Corporate Secretary or a designee will provide copies of signed Board minutes or certified Board resolutions which shall constitute approval documentation. A completed and approved PAF should also

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be included as part of the approval documentation. Projects that require Subsidiary Board approval will follow the process flow diagram below. The template provided in Appendix 5 should be used for the presentation with applicable sections completed.



Prior to any work being performed or resource commitments being made on a project, a PAF must be completed and approved electronically in Power Plant by all required DOA levels and other individuals required to approve the PAF under this policy. In an emergency there may not be sufficient time to complete a PAF before a commitment is made. In such cases, the project sponsor must initiate the project and obtain approval via the signature page of the unfinished PAF as soon as practicable. The remainder of the PAF must be completed as soon as practicable. Please note that an emergency should be rare, limited to when there are significant impacts to customers and/or company operations, and should not be used when there are routine delays such as securing pricing terms.

Project Classifications

The PAF should classify projects as follows:

- Specific Project – a specific project requires a PAF. This applies to projects, programs and initiatives associated with one or more companies. Approvals should be obtained based upon the total cost of the project and in accordance with the DOA.
- Annual Program – an annual program includes many similar, small, and/or routine capital jobs performed over the course of a year for which one PAF, by operating company shall be prepared each year. As illustrated below, a PAF would be prepared each year for new service installations at CT Gas, but not for the new service installation projects established for each area work



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center or work orders used to track the new service installations. A similar example would apply to pole replacements at CT Electric.

Examples of Annual Program vs. Annual Project

	Project Authorization Form is Required at this Level	Work Orders Track Actual Installations
Business	Annual Program Type	Annual Project
Gas	New service installations for CT Gas	New service installations by area work center
	Emergency replacement of gas services for CT Gas	Emergency replacements of gas services by area work center
Electric	Pole replacements for CT Electric	Pole replacements by area work center

- Annual Projects roll up to an Annual Program. If a single work order within an Annual Project exceeds the applicable threshold established by each operating company included in Appendix1 then the work order shall be considered a separate project and require its own PAF.
- Preliminary Projects – in some cases, the full scope of a project may not be known or estimable, but authorization is required during the preliminary stage of a project where evaluation work, such as a preliminary study, engineering, environmental surveys, and other similar work may be done.
- Parent Projects – established when a) the scope of work spans more than one operating company, or b) there are multiple classes of plant to a project (e.g., distribution, transmission, land.)
- Authorization for Additional Resources may result from changes in scope and/or cost overruns and will require amended approval and require additional approvals as indicated under “Authorization Process for Additional Resources” below.

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Only an Approved PAF and, if required, Subsidiary Board Approval Constitutes Approval

Neither project initiation nor inclusion of a project in the annual capital budget constitutes project approval. Final approval of a completed PAF and, if required, Subsidiary Board approval, is required before commitment of company resources, including the signing of contract agreements, construction, development, or system integration, can occur.

The project initiator should prepare the necessary documentation and plan for the appropriate timing for submission and approval.

Project Approval is not Transferable Even if the Cost Will Be Offset by a Reduction to Another Segment, Company, or Area

It is the general intent of this policy that project approval is specific to the project or program for which a PAF was created and may not be transferred between projects or programs, between segments, between Corporate Shared Services and an operating subsidiary, or between operating subsidiaries. However, if such a transfer is desired, or if reductions in spending in one area will be utilized to offset additional spending in another area, a specific project authorization form is still required for the project being proposed and approval of any "transfer" or offsetting reductions should be documented in the form as well. Any transfers of budgets or agreements to offset significant spending between organizations must be approved by the Vice President, Financial Planning and Analysis and if the Vice President, Financial Planning and Analysis deems appropriate, additional approvals may be requested, and the required approvals must be documented in the PAF.

Authorization Process for Additional Resources (Supplement Request Form)

If a project is expected to exceed the original authorized dollar amount, then the project manager is responsible for submitting a Supplement Request Form (Appendix 4) with a new total requested dollar amount and justification as soon as it is likely that the project cost is expected to increase from the original authorized dollar amount in accordance with the following criteria:

For Corporate Shared Services Projects:

For projects \$500K to \$10M - An increase in total authorized cost > 15% or;
For projects > \$10M - An increase in total authorized cost > \$1.5M

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For Distribution Operations Projects:

For projects $\leq$ \$250K - An increase in direct costs $\geq$ \$25K or;
For projects $>$ \$250K - An increase in direct costs $>$ 10%

For Transmission Operations Projects:

For projects $\leq$ \$500K – An increase in total authorized cost $\geq$ \$75K
For projects \$500K to \$16.5M- An increase in total authorized cost $>$ 15% or;
For projects $>$ \$16.5M - An increase in total authorized cost $>$ \$2.5M

The supplemental authorization should include an estimate of the additional costs expected to complete the project. Prior to spending any additional funds, the Supplemental Request Form should be routed to and approved by the appropriate approvers in accordance with the DOA based on the total project cost including the supplement. If the supplement request triggers Subsidiary Board approval, when not previously required, a Subsidiary Board presentation will be needed. Please refer to Authorization Process section above for further details.

In addition, the Vice President, Financial Planning and Analysis or a designee must approve all Supplemental Request Forms for projects with total cost increases of \$1 million and above for Distribution Operations and Corporate Shared Services projects and \$5 million and above for Transmission Operation projects. Such approval will follow at least one functional Vice President approval and precede CFO approval if required.

Responsibilities

- The **project initiator** is responsible for
 - Proposing the project
 - Preparing the PAF and/or other material that may be presented to the Subsidiary Boards
 - Involving the appropriate personnel (e.g., accounting, financial, regulatory, legal) to assist with documenting the evaluation criteria
 - Engaging Enterprise Risk Management and Financial Planning & Analysis review, if required
 - Routing the PAF for authorization
- The **project manager** is responsible for
 - Assisting with the project initiator's responsibilities

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- Ensuring that consultation has occurred with appropriate areas as needed to avoid unexpected issues after the project is approved
 - Working with Plant Accounting to ensure that the PAF has a proper break-out of capital and O&M amounts prior to submitting for approval through the DOA and for Software as a Service (SaaS)/Cloud projects, that a separate analysis has been completed
 - Ensuring the Eversource Enterprise Risk Management group review of risks and risk mitigation plans and completion of Financial Planning & Analysis financial evaluation when required
 - Managing the project authorization
 - Overseeing the project
 - Submitting Supplement Request Forms when required.
-
- An area **Director or Vice President** or above is responsible for sponsoring the project
 - Plant Accounting is responsible for reviewing PAF and approving the classification of costs between capital and expense. This conclusion should be made and documented prior to obtaining final approvals.
 - The Eversource Enterprise Risk Management group is responsible for assisting project initiators or managers in identifying risks and risk mitigation plans for all projects requiring Subsidiary Board approval.
 - The Financial Planning & Analysis organization is responsible for assisting project managers in completing the financial evaluation for all projects requiring Subsidiary Board approval.
 - Questions regarding the appropriate group(s) to engage should be directed to the Director, Budgeting and Financial Analysis or the Director, Investment Planning.

Completing a PAF for Corporate Shared Services Projects

Information Technology (IT) Projects

For IT projects, the PAF should address the additional evaluation criteria for IT projects. Given the unique considerations related to IT projects, all PAFs for IT projects, and any associated requests for additional resources, must also be approved by the Senior Vice President and Chief Information Officer, or a



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designee, in addition to approvals through the appropriate levels of authority in accordance with the DOA.

For projects involving Software as a Service (SaaS)/Cloud or other agreements involving the right to use software, prior to project authorization a separate analysis is required to be completed by IT and Plant Accounting and included in the PAF (Appendix 3, page 7).

Facilities and Environmental Projects

Given the unique considerations that apply to Facilities and Environmental based projects, all of these types of projects regardless of size and any associated request for additional resources, must also be approved by the Vice President, Supply Chain, Environmental Affairs and Property Management, or a designee.

Project Evaluation Criteria for Corporate Shared Services Projects

The information below should be provided in order for an approver of a Corporate Shared Services project to evaluate a project subject to this policy. Spending for Corporate Shared Services projects may not commence until all required authorizations are obtained. The extent of the information provided should increase along with the size, complexity, and risk of the project.

- General Information
 - Project title, company and identification number
 - Project initiator, project manager and project sponsor
 - Indicate if the project is part of the approved Operating Plan for the year (capital and O&M budgets)
 - Indicate if a Transfer of Budgets Request or Emergency Related Request
 - Total request, estimated in-service date(s) and other information included on the PAF
- Project Authorization
- Executive Summary
- Project Cost Summary
- Financial Evaluation
 - Unique payment provisions
 - Project cost in total and by year, including
 - Direct capital costs (labor, outside services, materials and all other costs associated with getting the project ready for its intended use)
 - Indirect capital costs (including loaders and allocators)
 - An estimate of capitalized interest or AFUDC, as applicable
 - O&M costs



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- Contingency amounts, including assumptions and calculations, and justification
- Overall Justification
 - Project Needs
 - Project Scope
 - Project Objectives
 - Project Background/Justification
 - Business Process/Technical Improvements
 - Project benefits, including business performance metrics; describe assumptions used to estimate benefits and customer impacts
 - Future Financial Impacts including areas to be impacted, IRR, NPV, and payback period if applicable
 - Asset Retirement Obligation and/or associated Environmental Cleanup Costs
 - Alternatives Considered
 - Project Schedule
 - Regulatory Approvals required, if any
 - Risks and risk mitigation plans; risks to be considered include
 - Construction
 - Customer/reputational/regulatory
 - Schedule
 - Financial
 - Environmental
 - IT (if applicable)
 - References (additional supporting documentation)
 - Diagrams, Attachments, Images
- Additional evaluation criteria for IT projects
 - Applications impacted, including interfaces and interdependencies, and implications (diagram may be helpful)
 - Assessment of fit in overall IT strategy
 - Controls over migration, change management plan including impacts to business processes, business continuity and SOX assessments

Completing a PAF for Operations Projects

The PAF for Operations consists of two sections: financial requirements for the project are detailed in the first section and a comprehensive technical justification of the project is contained in the second section.

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The scope and complexity of an approved project will determine whether the PAF request is for full or initial partial funding. Initial partial funding will be requested for projects that require additional engineering to prepare a project cost estimate. In the case of less complex projects, they may move directly to the financial authorization stage with the completion of the PAF for full funding.

Note: If a PAF is not approved, then the project manager is required to determine the accounting disposition of the work order containing accumulated charges.

The two sections of the Operations PAF are described below:

Project Evaluation Criteria for Operations Projects

The information below should be provided in order for an approver to evaluate a project subject to this policy. The extent of the information provided should increase along with the size, complexity, and risk of the project.

Operations Project Authorization Form – Financial Requirements Section

- General information
 - Project name, company and identification number
 - Project initiator, project manager and project sponsor
 - Indicate if the project is for funding of an annual, full funding of a specific project or preliminary funding (Phase 1) of a specific project
 - Indicate if the project is Pool Transfer Facility (PTF), Non-PTF or NA
 - Indicate if the project is part of the approved Operating Plan for the year (capital and O&M budgets)
 - Indicate if this is for additional resources; if so, the reason for additional funding
 - Project timing and estimated in-service date
- Project Authorization
- Executive summary
- Project Cost Summary
- Financial evaluation
 - Project cost in total and by year, including
 - Direct capital costs (labor, outside services, materials and all other costs associated with getting the project ready for its intended use)
 - Indirect capital costs (including loaders and allocators)
 - Less customer contribution
 - An estimate of capitalized interest or AFUDC, as applicable
 - O&M costs
 - Unique payment provisions
 - Future costs and area affected



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- Asset Retirement Obligation and/or associated Environmental Cleanup Costs

Operations Project Authorization Form – Technical Justification Section

- Project Need Statement
- Project Objectives
- Project Scope
- Background / Justification
- Business Process and / or Technical Improvements
- Cost Estimate and Assumptions
- Alternatives considered with associated cost estimates
- Project Schedule
 - Milestone / Phase Name
 - Estimated Completion Dates
- Regulatory Approvals Required
- Project Risks and Risk Mitigation Plans
- Reference Material
- Additional Information
 - One-line diagrams
 - Attachments
 - Images



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Policy Sponsorship

The Executive Vice President and Chief Financial Officer is the sponsor of this policy. The Vice President, Financial Planning and Analysis is responsible for the administration of project authorizations related to this policy. The Vice President, Controller and Chief Accounting Officer is responsible for the administration of accounting, internal controls and Power Plant system and processes related to this policy.

Revision History

0 Original issue – May 3, 2013

1 Updates for authorization process, PAF changes and DOA references – June 25, 2014

2 Updates to clarify the policy as it relates to project approvals of budget transfers or utilization of spending reductions to offset increased spending between organizations, requiring a PAF that documents CFO or if he deems appropriate, CEO approval of a significant transfer between organizations. Indicates that the threshold for approval of additional project resources is based on direct cost increases and that PAFs will be maintained in Power Plant. Adds subsidiary board approval template and requires consultation with a designated representative of the CFO organization for financial evaluation of projects requiring approval by subsidiary board or CEO – January 23, 2015

3 Updates for organizational and approval changes and Eversource name change. Components of capital spending added to the PAF – June 18, 2015

4 Combine APS1 & APS2 and provide specific PAF Forms for Corporate Shared Services, and Operations, and supplemental requests – January 20, 2017

5 Removes estimating criteria for a PAF and incorporates project technical justification into the PAF (eliminating references to a separate TAF) – October 20, 2017



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Appendix 1
Project Authorization Form Thresholds

Project Authorization Form (PAF) Thresholds

For projects with a cost estimate that exceeds the thresholds shown below, a PAF is required. Organizations may elect to use lower thresholds. The project cost is defined as the gross cost of the project before offsets such as CIAC or other reimbursements.

Distribution and Generation – (Direct Cost)	
CT Electric	\$100,000
MA Electric	\$100,000
NH Electric	\$100,000
Gas – (Direct Cost)	
NSTAR Gas	\$100,000
Yankee Gas	\$100,000
Transmission – (Total Cost)	\$500,000
Corporate Shared Services – (Total Cost)	\$500,000



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Appendix 2
Operations Project Authorization Form

Operations Project Authorization Form

Date Prepared:	Project Title:
Company/ies:	Project ID Number:
Organization:	Class(es) of Plant:
Project Initiator:	Project Category:
Project Manager:	Project Type: <i>Specific / Annual / Prelim Project / Parent</i>
Project Sponsor:	Project Purpose: part of regulatory tracked program?
Estimated in service date:	If Transmission Project: PTF / Non-PTF / NA
Eng. /Constr. Resources Budgeted?	Capital Investment Part of Original Operating Plan?
Authorization Type: Initial Funding / Full Funding	O&M Expenses Part of the Original Operating Plan?
Total Request:	

Financial Requirements:

Project Authorization

Project authorization must be in accordance with the approval levels included in the Delegation of Authority Policy (DOA).

If Subsidiary Board approval is required, document the review by Enterprise Risk Management (ERM) and Financial Planning and Analysis (FP&A)

ERM: _____

FP&A: _____

Executive Summary

Project Costs Summary

See APS3 and APS8 requirements and consult with Plant Accounting for capital/O&M determination. Use published loaders for benefits, materials, and invoices, maintained by the Director, Budget and Internal Reporting.

Note: Dollar values are in thousands

	Prior				
	Authorized	20__	20__	20__+	Totals
Capital Additions - Direct	\$ -	\$ -	\$ -	\$ -	\$ -
Less Customer Contribution	-	-	-	-	-
Removals net of Salvage ____%	-	-	-	-	-
Total - Direct Spending	\$ -	\$ -	\$ -	\$ -	\$ -
Capital Additions - Indirect	-	-	-	-	-
Subtotal Request	\$ -	\$ -	\$ -	\$ -	\$ -
AFUDC	-	-	-	-	-
Total Capital Request	\$ -	\$ -	\$ -	\$ -	\$ -
O&M	-	-	-	-	-
Total Request	\$ -	\$ -	\$ -	\$ -	\$ -



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Appendix 2
Operations Project Authorization Form

Financial Evaluation

Provide the following financial information (attach additional detail if summarized items are significant or additional information is needed). Note: Dollar values are in thousands

Direct Capital Costs	Year 1	Year 2	Year 3+	Total
Straight Time Labor				
Overtime Labor				
Outside Services				
Materials				
Other, including contingency amounts (describe)				
Total				

Indirect Capital Costs	Year 1	Year 2	Year 3+	Total
Indirects/Overheads (including benefits)				
Capitalized interest or AFUDC, if any				
Total				

Total Capital Costs				

Less Total Customer Contribution				

Total Capital Project Costs				

Total O&M Project Costs				

Note: Explain unique payment provisions, if applicable

If this is a new business project, is a customer contribution required? If yes, please note the contribution amount.

In addition, for all electric and gas growth / new business projects, please attach the CIAC calculation

Provide other financial documentation as warranted by management and / or regulatory precedent. When performing financial analysis, use appropriate discount rate by company (can be provided by Budgeting and Internal Reporting or Financial Planning and Analysis).



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Appendix 2
Operations Project Authorization Form

Future Financial Impacts:

Provide below the estimated future costs that will result from the project:

Note: Dollar values are in thousands:

Future Costs	Year 20__	Year 20__	Year20__	Year 20__ +	Total Future Project Costs
Capital	\$ -	\$ -	\$ -	\$ -	\$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	\$ -	\$ -	\$ -	\$ -	\$ -

Describe the estimated future Capital, O&M and/or Other costs noted above:

What functional area(s) will these future costs be funded in? _____

A representative from the respective functional area is required to be included as a project approver.

If this is other than a Reliability Project, please complete the section below:

Provide below the estimated financial benefits that will result from the project:

Note: Dollar values are in thousands:

Future Benefits	Year 20__	Year 20__	Year20__	Year 20__ +	Total Future Project Benefits
Capital	\$ -	\$ -	\$ -	\$ -	\$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	-	-	-	-	-

Describe the estimated future Capital, O&M and/or Other benefits noted above:

What functional area(s) will these benefits be reflected in? _____

A representative from the respective functional area is required to be included as a project approver.

**Asset Retirement Obligation (ARO) and/ or Environmental Cleanup Costs
(Environmental Liabilities):**

An ARO is a current legal obligation to remove or retire property, plant or equipment at some point in the future. Please refer to APS8 or contact Plant Accounting for further detail.

Is there an ARO associated with this project? If yes, please provide details:

Are there other environmental cleanup costs associated with this project? If yes, please provide details.



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Appendix 2
Operations Project Authorization Form

Operations Technical Authorization Form

Technical Justification:

Project Need Statement *(Description of Issue)*

Project Objectives

Project Scope

Background / Justification

Business Process and / or Technical Improvements:

Quantitative and qualitative project benefits, including assumptions used to estimate benefits and customer impacts; describe the changes in performance to the business process or technology performance metrics that can be expected as a result of this project

Cost Estimate and Assumptions

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Appendix 2
Operations Project Authorization Form

Alternatives Considered with Cost Estimates

Project Schedule

Describe the project schedule and milestones. Include estimated start and end dates.

Milestone/Phase Name	Estimated Completion Date

Regulatory Approvals

Risks and Risk Mitigation Plans

Describe the applicable risks and associated risk mitigation plans: e.g., construction, customer, reputational, schedule, financial, regulatory, environmental and IT risks. Indicate discussions with relevant subject matter experts.

References

One-Line Diagrams, Attachments, and Images



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Appendix 3

Corporate Shared Service Project Authorization Form

Corporate Shared Services Project Authorization Form

Date Prepared:	Project Title:
Company/Companies:	Project ID Number:
Organization:	Plant Class/(F.P.Type):
Project Initiator:	Project Type: <i>Specific / Annual / Prelim Project / Parent</i>
Project Manager:	Capital Investment Part of Original Operating Plan? Y / N
Project Sponsor:	Transfer of Budgets Request: Y / N
Estimated in service date(s):	Emergency Related Request: Y / N
Total Capital Request:	Software Projects Only – Estimated Life of Asset: ____ 5 years ____ 10 Years ____ 15 Years
Total Funding Request:	

Project Authorization

Project Authorization Forms must be completed for Corporate Shared Services projects totaling \$500K or greater in accordance with the Project Authorization Policy and approval levels in the Delegation of Authority Policy (DOA).

If Subsidiary Board approval is required (Corporate Shared Services capital projects > \$15M), document the review by Enterprise Risk Management (ERM) and Financial Planning and Analysis (FP&A) (attach email approval).

ERM: _____

FP&A: _____

If this is a Transfer of Budgets Request Vice President of Financial Planning and Analysis approval is required. If the Vice President of Financial Planning and Analysis deems appropriate, additional approvals may also be required (see page 7 of the Project Authorization Policy – Project Approval is not Transferable for further detail):

Date of Approval
VP of FP&A: _____

Other: _____

Documentation/Explanation: _____

Executive Summary

(If related to an Emergency Request – please provide specific details of emergency situation and operational impacts to business and/or customer.)



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Appendix 3

Corporate Shared Service Project Authorization Form

Project Costs Summary

See APS3 and APS8 requirements and consult with Plant Accounting for capital/O&M determination. Use published loaders for benefits, materials, and invoices, maintained by the Director, Budget and Financial Analysis.

Note: Dollar values are in whole dollars:

	Year 20__	Year 20__	Year 20__ +	Totals
Capital Additions - Direct	\$ -	\$ -	\$ -	\$ -
Capital Additions - Indirect	-	-	-	-
Removals net of salvage ____%	-	-	-	-
Subtotal Request	-	-	-	-
O&M	-	-	-	-
Total Request	\$ -	\$ -	\$ -	\$ -

Financial Evaluation

Provide the following financial information (provide additional detail if summarized items are significant, additional information is needed or there are unique payment provisions).

Note: Dollar values are in whole dollars:

Direct Capital Costs	Year 20__	Year 20__	Year 20__ +	Total
Straight Time Labor	\$ -	\$ -	\$ -	\$ -
Overtime	-	-	-	-
Outside Services/Consultants	-	-	-	-
Software	-	-	-	-
Hardware	-	-	-	-
Materials	-	-	-	-
Other, including contingency amounts	-	-	-	-
(Describe) Contingency ____%	-	-	-	-
Total Direct Capital Costs	\$ -	\$ -	\$ -	\$ -
Indirect Capital Costs	Year 20__	Year 20__	Year 20__ +	Total
Indirects/Overheads (including benefits)	\$ -	\$ -	\$ -	\$ -
Capitalized interest or AFUDC , if any	-	-	-	-
Total Indirect Capital Costs	\$ -	\$ -	\$ -	\$ -
Total Capital Costs	\$ -	\$ -	\$ -	\$ -
Total O&M Costs	\$ -	\$ -	\$ -	\$ -
Total Project Costs	\$ -	\$ -	\$ -	\$ -

Vendor software payments (indicate whether or not included in the above)*

\$ - \$ - \$ - \$ -

*Accounting for vendor software payments for SaaS/Cloud or other agreements involving the right to use software is to be determined by a separate analysis, which is included in Appendix 3, page 7.



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Appendix 3

Corporate Shared Service Project Authorization Form

By Company Summary:

Note: Dollar values are in whole dollars:

	Entity ____	Entity ____	Entity ____	Entity ____	Totals
Capital Additions - Direct	\$ -	\$ -	\$ -	\$ -	\$ -
Capital Additions - Indirect	-	-	-	-	-
Removals net of salvage ____%	-	-	-	-	-
Subtotal Request	-	-	-	-	-
O&M	-	-	-	-	-
Total Request	\$ -	\$ -	\$ -	\$ -	\$ -

Overall Justification:

Project Need Statement *(Description of Issue)*

Project Scope

Project Objectives

Background / Justification

Business Process and / or Technical Improvements: *Quantitative and qualitative project benefits, including assumptions used to estimate benefits and customer impacts; describe the changes in performance to the business process or technology performance metrics that can be expected as a result of this project*



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Appendix 3

Corporate Shared Service Project Authorization Form

Future Financial Impacts:

Provide below the estimated future costs that will result from the project:

Note: Dollar values are in whole dollars:

Future Costs	Year 20__	Year 20__	Year 20__	Year 20__ +	Total Future Project Costs
Capital	\$ -	\$ -	\$ -	\$ -	\$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	\$ -	\$ -	\$ -	\$ -	\$ -

Describe the estimated future Capital, O&M (including cloud costs) and/or Other costs noted above:

What functional area(s) will these future costs be funded in? _____

A representative from the respective functional area is required to be included as a project approver.

Provide below the estimated financial benefits that will result from the project:

Note: Dollar values are in whole dollars:

Future Benefits	Year 20__	Year 20__	Year 20__	Year 20__ +	Total Future Project Benefits
Capital	\$ -	\$ -	\$ -	\$ -	\$ -
O&M	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	\$ -	\$ -	\$ -	\$ -	\$ -

Describe the estimated future Capital, O&M and/or Other benefits noted above:

What functional area(s) will these benefits be reflected in? _____

A representative from the respective functional area is required to be included as a project approver.

What is the project's IRR? _____

What is the project's NPV? _____

What is the project's payback period? _____

Use appropriate discount rate by company and associated corporate models (to be provided by Financial Planning and Analysis).

If the above items are not applicable, explain why (e.g., if negative but there are other reasons to proceed).



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Appendix 3

Corporate Shared Service Project Authorization Form

**Asset Retirement Obligation (ARO) and/or Environmental Cleanup Costs
(Environmental Liabilities):**

An ARO is a current legal obligation to remove or retire property, plant or equipment at some point in the future. Please refer to APS8 or contact Plant Accounting for further detail.

Is there an ARO associated with this project? If yes, please provide details:

Are there other environmental cleanup costs associated with this project? If yes, please provide details.

Alternatives Considered with Cost Estimates

Project Schedule

Describe the project schedule and milestones. Include estimated start and end dates.

Milestone/Phase Name	Estimated Start - Completion Date

Regulatory Approvals

Risks and Risk Mitigation Plans

Describe the applicable risks and associated risk mitigation plans: e.g., construction, customer, reputational, schedule, financial, regulatory, environmental, safety and IT risks. Indicate discussions with relevant subject matter experts.



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Appendix 3
Corporate Shared Service Project Authorization Form

References *(additional supporting documentation)*

Diagrams, Attachments, and Images

Authorization Criteria Specific to IT Projects

Describe the applications that are impacted and include information regarding the interfaces and interdependencies related to this IT project (diagrams may be considered to assist in review and approval).

Assess the fit of this IT project with the overall IT strategy.

Describe control matters, such as the processes for data migration, change management plan including impacts to business processes, data maintenance controls, whether or not this IT project will be or impacts a Sarbanes-Oxley critical application, and the business continuity plan.

Attached SaaS/Cloud form where applicable.



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Appendix 3

Corporate Shared Service Project Authorization Form

Analysis of Vendor Software Payments for Cloud-Based Software Applications
Hosting Fees ONLY

This document **ONLY** needs to be utilized if Eversource Energy is entering into a Cloud-Based Application and the Application has Hosting Fees which are also referred to as; Hosted Solution, Cloud Fees, Cloud Solution, Enterprise Agreement (EA), Enterprise License Agreement (ELA), Licensing Fee, RTU's (Rights to Use), Maintenance Agreement, Support & Service Agreement.

Project Name:

Complete the following analysis of vendor software payments for cloud-based software applications for the *hosting fees only* (as defined above):

- Accounting should be determined by Plant Accounting Services during PAF development.
- Attach documentation or information from IT supporting the nature of software payments.
- Also see APS 3 for capitalization policy for software costs.

NOTE: A pro rata portion of the hosting fees incurred during the development phase (described below) may be capitalized up to the point when the product goes **in-service**.

Development phase: In accordance with APS 3, SaaS/Cloud projects that do not meet the two capitalization criteria as outlined in APS 3 may have internal and external direct costs during the development phase (**prior to in service date**) that may be capitalized. External direct costs may include the pro-rata portion of an up-front software usage fee applicable to use of the software to develop the project before it is in service. Indicate below pro rata portion of development phase hosting fees requested to be capitalized:

Development phase: # months (provide support) (A) _____

÷ Total hosting contract period: # months (B) _____

= Pro rata portion that may be capitalized (A) ÷ (B) _____ %

Total hosting fees over contract period \$ _____

Development phase amount requested to be capitalized (% x Total fees above) \$ _____
For costs after development phase, complete PAF break-out of capital/expense.



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Appendix 4
Supplement Request Form

Supplement Request Form

Date Prepared:	Project Title:
Company/Companies:	Project ID Number:
Organization:	Plant Class/(F.P.Type):
Project Initiator:	Project Type: <i>Specific / Annual / Prelim Project / Parent</i>
Project Manager:	Capital Investment Part of Original Operating Plan? Y / N
Project Sponsor:	O&M Expenses Part of the Original Operating Plan? Y / N
Current Authorized Amount:	Estimated in service date(s):
Supplement Request:	Other:
Total Request:	

Supplement Justification

Supplement Request Forms must be completed for projects in accordance with the Project Authorization Policy and approval levels in the Delegation of Authority Policy (DOA) as follows:

For Corporate Shared Services Projects:

*For projects \$500K to \$10M - An increase in total authorized cost > 15% or;
For projects > \$10M - An increase in total authorized cost > \$1.5M*

For Distribution Operations Projects:

*For projects <= \$250K - An increase in direct costs >= \$25K or;
For projects >\$250K - An increase in direct costs >10%*

For Transmission Operations Projects:

*For projects <= \$500K - An increase in total authorized cost >= \$75K
For projects \$500K to \$16.5M- An increase in total authorized cost > 15% or;
For projects > \$16.5M - An increase in total authorized cost > \$2.5M*

Justification for Additional Resources

In this section, please provide a detailed and comprehensive justification for the additional resources. Please include, scope changes, dollar changes, the reasons for the changes, etc.

In addition, please attach a copy of the prior authorized PAF as reference



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Appendix 4
Supplement Request Form

Supplement Cost Summary

Note: Dollar values are in thousands:

	Prior Authorized	Supplement Request	Total
Capital Additions - Direct	\$ -	\$ -	\$ -
Less Customer Contribution	-	-	-
Removals net of Salvage ____%	-	-	-
Total Direct Spending	\$ -	\$ -	\$ -
Capital Additions - Indirect AFUDC	-	-	-
Total Capital Request	\$ -	\$ -	\$ -
O&M	-	-	-
Total Request	\$ -	\$ -	\$ -

Note: Dollar values are in thousands:

Total Supplement Request by year view:

	Year 20__	Year 20__	Year 20__ +	Total
Capital Additions - Direct	\$ -	\$ -	\$ -	\$ -
Less Customer Contribution	-	-	-	-
Removals net of Salvage ____%	-	-	-	-
Total Direct Spending	\$ -	\$ -	\$ -	\$ -
Capital Additions - Indirect AFUDC	-	-	-	-
Total Capital Request	\$ -	\$ -	\$ -	\$ -
O&M	-	-	-	-
Total Request	\$ -	\$ -	\$ -	\$ -

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Appendix 5
Subsidiary Board Approval Package Template

Subsidiary Board Approval Package Template



Note: to save, complete and print the template, please right click on the above icon and select Presentation Object and Open

2019 Grid Modernization Investment
Summary of Costs by Investment Type

Line #	Grid Modernization Description	Plant Account	Line of Business	Line of Business Description	Actual Jan	Actual Feb	Actual Mar	Actual Apr	Actual May	Actual Jun	Actual Jul	Actual Aug	Actual Sep	Actual Oct	Actual Nov	Actual Dec	Total 2019
	Additions																
1	Grid Modernization - 2019 Projects	362	12185	Distribution System Network Operator	\$ 696,864	\$ 286,389	\$ (16,826)	\$ (5,964)	\$ 42,042	\$ (19,610)	\$ 397,819	\$ (66,579)	\$ (3,127)	\$ 7,589	\$ 2,397	\$ 4,876	\$ 1,325,871
2			12190	Advanced Sensing Technology	\$ 3,018,504	\$ 59,297	\$ 64,248	\$ 38,428	\$ 632,898	\$ 14,712	\$ 984,091	\$ (163,741)	\$ 10,208	\$ 10,774	\$ (2,330)	\$ 7,728,116	\$ 12,393,184
3					\$ 3,715,368	\$ 345,685	\$ 47,422	\$ 32,464	\$ 674,940	\$ (4,898)	\$ 1,381,909	\$ (226,239)	\$ 7,082	\$ 18,363	\$ 47	\$ 7,736,992	\$ 13,719,055
4			12105	Electric Vehicle Infrastructure	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 26,495	\$ (26,495)	\$ -	\$ -	\$ -
5			12170	Automated Feeder Reconfiguration	\$ -	\$ 3,717	\$ 264,902	\$ 71,452	\$ 121,421	\$ 39,479	\$ 52,634	\$ 33,086	\$ 104,434	\$ 47,539	\$ 272,763	\$ 913,362	\$ 1,958,237
6	Grid Modernization - 2019 Projects	364	12175	Urban Underground Automation	\$ -	\$ -	\$ 0	\$ (0)	\$ -	\$ -	\$ 5,558	\$ -	\$ 147,690	\$ 934,816	\$ 897,792	\$ 1,104,055	\$ 3,089,911
7			12180	Communications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 14,093	\$ 14,093
8			12185	Distribution System Network Operator	\$ -	\$ -	\$ 179,174	\$ 22,211	\$ (2,569)	\$ (79)	\$ (121,148)	\$ 22,878	\$ 413,695	\$ 292,601	\$ 254,609	\$ 1,463,637	\$ 1,206,104
9			12190	Advanced Sensing Technology	\$ 1,450	\$ 4,545	\$ 1,113	\$ 6,618	\$ 1,967	\$ 55,651	\$ 10,147	\$ 598	\$ (2,839)	\$ 1,525	\$ 89,018	\$ (3,297)	\$ 156,886
10					\$ 7,899	\$ 35,662	\$ 445,189	\$ 100,281	\$ 120,820	\$ 95,855	\$ (52,809)	\$ 56,551	\$ 609,474	\$ 1,249,955	\$ 1,514,273	\$ 2,172,852	\$ 6,435,231
11			12165	Electric Vehicle Infrastructure	\$ 5,555	\$ 12	\$ (2)	\$ -	\$ -	\$ -	\$ 0	\$ -	\$ 11,930	\$ (17,494)	\$ -	\$ 4,183	\$ 4,183
12			12170	Automated Feeder Reconfiguration	\$ 262,483	\$ 169,578	\$ 377,797	\$ 674,824	\$ 1,115,022	\$ 2,049,144	\$ 1,430,821	\$ 918,212	\$ 563,404	\$ 655,716	\$ 567,145	\$ 1,274,695	\$ 10,757,531
13	Grid Modernization - 2019 Projects	365	12175	Urban Underground Automation	\$ -	\$ -	\$ 0	\$ (0)	\$ -	\$ -	\$ 5,558	\$ -	\$ 147,690	\$ 934,817	\$ 897,794	\$ 1,104,056	\$ 3,090,527
14			12180	Communications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 14,093	\$ 14,093
15			12185	Distribution System Network Operator	\$ -	\$ -	\$ 179,174	\$ 22,211	\$ (2,569)	\$ (79)	\$ (121,148)	\$ 22,878	\$ 413,695	\$ 292,601	\$ 254,609	\$ 1,463,637	\$ 1,206,104
16			12190	Advanced Sensing Technology	\$ 1,450	\$ 4,545	\$ 1,113	\$ 6,618	\$ 1,967	\$ 55,651	\$ 10,147	\$ 598	\$ (2,839)	\$ 1,525	\$ 89,018	\$ (3,297)	\$ 156,886
17					\$ 114,201	\$ 123,239	\$ 102,916	\$ 272,986	\$ 119,443	\$ 125,565	\$ 206,879	\$ 56,468	\$ (240)	\$ 5,142	\$ 88,012	\$ (10,915)	\$ 1,203,698
18			12165	Electric Vehicle Infrastructure	\$ 382,238	\$ 292,829	\$ 525,926	\$ 955,727	\$ 1,234,130	\$ 2,174,762	\$ 1,640,776	\$ 1,252,793	\$ 792,027	\$ 1,708,562	\$ 1,664,135	\$ 2,875,186	\$ 15,499,033
19			12170	Automated Feeder Reconfiguration	\$ 66,467	\$ 147,720	\$ 10	\$ 5,076	\$ 20,462	\$ 81,427	\$ 93,938	\$ 45,316	\$ 18,273	\$ (80,765)	\$ -	\$ -	\$ (64,457)
20	Grid Modernization - 2019 Projects	366	12175	Urban Underground Automation	\$ -	\$ 19,096	\$ 259,119	\$ 52,036	\$ 93,489	\$ (11,729)	\$ 12,173	\$ 14,121	\$ 100,088	\$ 33,846	\$ 268,820	\$ 882,748	\$ 1,724,408
21			12180	Communications	\$ -	\$ -	\$ 0	\$ (0)	\$ -	\$ -	\$ 5,558	\$ -	\$ 147,690	\$ 934,817	\$ 897,794	\$ 1,104,058	\$ 3,089,916
22			12185	Distribution System Network Operator	\$ -	\$ -	\$ 179,174	\$ 22,211	\$ (2,569)	\$ (79)	\$ (121,148)	\$ 22,878	\$ 413,695	\$ 292,601	\$ 254,609	\$ 1,463,637	\$ 1,206,104
23			12190	Advanced Sensing Technology	\$ -	\$ -	\$ 1,113	\$ 6,618	\$ 1,967	\$ 55,651	\$ 10,147	\$ 598	\$ (2,839)	\$ 1,525	\$ 89,018	\$ (3,297)	\$ 156,886
24					\$ 66,467	\$ 17,819	\$ 259,129	\$ 57,112	\$ 113,952	\$ 124,526	\$ 118,769	\$ 59,437	\$ 263,297	\$ 600,380	\$ 1,255,190	\$ 1,997,547	\$ 4,933,534
25			12165	Electric Vehicle Infrastructure	\$ 37,988	\$ -	\$ -	\$ 12,328	\$ -	\$ -	\$ 29,849	\$ 37,340	\$ (117,505)	\$ -	\$ 4,487	\$ -	\$ 3,487
26			12170	Automated Feeder Reconfiguration	\$ -	\$ 19,096	\$ 259,119	\$ 52,036	\$ 93,489	\$ (11,729)	\$ 12,173	\$ 14,121	\$ 100,088	\$ 33,846	\$ 268,820	\$ 882,752	\$ 1,724,408
27	Grid Modernization - 2019 Projects	367	12175	Urban Underground Automation	\$ -	\$ -	\$ 0	\$ (0)	\$ -	\$ -	\$ 5,558	\$ -	\$ 147,690	\$ 934,817	\$ 899,009	\$ 1,170,684	\$ 3,157,798
28			12180	Communications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 14,093	\$ 14,093
29			12185	Distribution System Network Operator	\$ -	\$ -	\$ 107,154	\$ 13,476	\$ (1,283)	\$ (34)	\$ (79,981)	\$ 8,060	\$ 147,224	\$ 189,880	\$ 117,717	\$ 187,251	\$ 689,464
30			12190	Advanced Sensing Technology	\$ -	\$ -	\$ 2,844	\$ 365,274	\$ 77,840	\$ 92,202	\$ 43,965	\$ 52,630	\$ 147,716	\$ 1,715,146	\$ 1,386,848	\$ 2,277,271	\$ 6,456,809
31	Grid Modernization - 2019 Projects	368	12185	Distribution System Network Operator	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 370,702	\$ 551,909	\$ 456,560	\$ 572,629	\$ 98,495	\$ 131,909	\$ 2,182,205
32			12165	Electric Vehicle Infrastructure	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 370,702	\$ 551,909	\$ 456,560	\$ 572,629	\$ 98,495	\$ 131,909	\$ 2,182,205
33	Grid Modernization - 2019 Projects	369	12170	Automated Feeder Reconfiguration	\$ 86,584	\$ (1,331)	\$ 180,609	\$ 7,174	\$ 14,696	\$ 1,693,380	\$ 139,182	\$ 1,069,088	\$ 282,661	\$ 1,956,929	\$ 784,554	\$ 2,051,819	\$ 8,265,646
34			12185	Distribution System Network Operator	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
35			12190	Advanced Sensing Technology	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
36					\$ 86,584	\$ (1,331)	\$ 180,609	\$ 7,174	\$ 14,696	\$ 1,693,380	\$ 139,182	\$ 1,069,088	\$ 282,661	\$ 1,956,929	\$ 784,554	\$ 2,051,819	\$ 8,265,646
37	Grid Modernization - 2019 Projects	371	12170	Automated Feeder Reconfiguration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
38			12185	Distribution System Network Operator	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
39	Grid Modernization - 2019 Projects	374	12165	Electric Vehicle Infrastructure	\$ -	\$ 407,790	\$ 145,011	\$ 274,467	\$ 429,147	\$ (1,012,158)	\$ 224,862	\$ -	\$ -	\$ 7	\$ -	\$ -	\$ 7
40					\$ -	\$ 407,790	\$ 145,011	\$ 274,467	\$ 429,147	\$ (1,012,158)	\$ 224,862	\$ -	\$ -	\$ 7	\$ -	\$ -	\$ 7
41	Grid Modernization - 2019 Projects	390	12180	Communications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
42					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
43	Grid Modernization - Subtotal Additions - 2019 Projects				\$ 4,296,844	\$ 1,120,995	\$ 1,969,561	\$ 1,505,064	\$ 2,679,887	\$ 3,113,672	\$ 3,708,182	\$ 2,463,685	\$ 2,931,886	\$ 7,822,022	\$ 6,703,543	\$ 19,343,160	\$ 57,718,500
44					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
45	Grid Modernization - 2018 Carry Over Projects	364	12175	Urban Underground Automation	\$ 39,977	\$ 8,797	\$ 18,143	\$ (49,177)	\$ 6,016	\$ 290	\$ -	\$ -	\$ -	\$ -	\$ (4,907)	\$ -	\$ 19,140
46					\$ 39,977	\$ 8,797	\$ 18,143	\$ (49,177)	\$ 6,016	\$ 290	\$ -	\$ -	\$ -	\$ -	\$ (4,907)	\$ -	\$ 19,140
47	Grid Modernization - 2018 Carry Over Projects	365	12175	Urban Underground Automation	\$ 39,977	\$ 8,797	\$ 18,143	\$ (49,177)	\$ 6,016	\$ 290	\$ -	\$ -	\$ -	\$ -	\$ (4,907)	\$ -	\$ 19,140
48					\$ 39,977	\$ 8,797	\$ 18,143	\$ (49,177)	\$ 6,016	\$ 290	\$ -	\$ -	\$ -	\$ -	\$ (4,907)	\$ -	\$ 19,140
49	Grid Modernization - 2018 Carry Over Projects	366	12175	Urban Underground Automation	\$ 39,977	\$ 8,797	\$ 18,143	\$ (49,177)	\$ 6,016	\$ 290	\$ -	\$ -	\$ -	\$ -	\$ (4,907)	\$ -	\$ 19,140
50					\$ 39,977	\$ 8,797	\$ 18,143	\$ (49,177)	\$ 6,016	\$ 290	\$ -	\$ -	\$ -	\$ -	\$ (4,907)	\$ -	\$ 19,140
51	Grid Modernization - 2018 Carry Over Projects	367	12175	Urban Underground Automation	\$ 39,977	\$ 8,797	\$ 18,143	\$ (49,177)	\$ 6,016	\$ 290	\$ -	\$ -	\$ -	\$ -	\$ (4,907)	\$ -	\$ 19,140
52					\$ 39,977	\$ 8,797	\$ 18,143	\$ (49,177)	\$ 6,016	\$ 290	\$ -	\$ -	\$ -	\$ -	\$ (4,904)	\$ 78,448	\$ 97,591
53	Grid Modernization - 2018 Carry Over Projects	369	12165	Electric Vehicle Infrastructure	\$ -	\$ -	\$ -	\$ 1,383	\$ -	\$ 1,230,970	\$ -	\$ (189,802)	\$ -	\$ 189,747	\$ -	\$ (11,379)	\$ 1,220,919
54					\$ -	\$ -	\$ -	\$ 1,383	\$ -	\$ 1,230,970	\$ -	\$ (189,802)	\$ -	\$ 189,747	\$ -	\$ (11,379)	\$ 1,220,919
55	Grid Modernization - 2018 Carry Over Projects	373	12185	Electric Vehicle Infrastructure	\$ 24,312	\$ 19,225	\$ 53,502	\$ -	\$ (12,930,970)	\$ -	\$ (451)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (1,132,367)
56					\$ 24,312	\$ 19,225	\$ 53,502	\$ -	\$ (12,930,970)	\$ -	\$ (451)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (1,132,367)
57	Grid Modernization - Subtotal Additions - 2018 Carry Over Projects				\$ 184,220	\$ 54,412	\$ 74,587	\$ (141,824)	\$ 24,065	\$ 1,162	\$ -	\$ (190,253)	\$ -	\$ 189,747	\$ (19,624)	\$ 67,070	\$ 243,562
58					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
59	Grid Modernization - Total Additions in 2019				\$ 4,481,064	\$ 1,175,407	\$ 2,044,148	\$ 1,363,240	\$ 2,703,952	\$ 3,114,834	\$ 3,708,182	\$ 2,273,432	\$ 2,931,886	\$ 8,011,768	\$ 6,693,919	\$ 19,410,230	\$ 57,962,062
60					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
61					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
62					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
63					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
64					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
65	Cost of Removal																
66	Grid Modernization - 2019 Projects	362	12185	Distribution System Network Operator	\$ 42,741.38	\$ 37,658.81	\$ (2,898.11)	\$ (8.21)	\$ (2,005.48)	\$ (828.88)	\$ (106,496.43)	\$ -	\$ -	\$ 5,331.94	\$ 141.61	\$ 16.33	\$ 10.01
67			12190	Advanced Sensing Technology	\$ 22,808.39	\$ 34,667.48	\$ 53,392.53	\$ 80,552.49	\$ (23,177.49)	\$ 20,493.75	\$ (337,476.13)	\$ (7,048.03)	\$ 15,113.44	\$ 28,988.82	\$ 27,157.03	\$ 30,934.28	\$ 223,394
68					\$ 65,550	\$ 72,326	\$ 50,044	\$ 80,544	\$ (25,243)	\$ 19,611	\$ (443,973)	\$ (7,048)	\$ 20,445	\$ 28,740	\$ 27,173	\$ 308,355	\$ 196,997
69			12170	Automated Feeder Reconfiguration	\$ 648.23	\$ 2,402.28	\$ (12,376.06)	\$ 1,420.02	\$ 2,361.56	\$ 2,034.13	\$ 2,123.59	\$ 2,585.03	\$ 4,516.71	\$ 6,503.29	\$ 9,521.06	\$ 9,887.36	\$ 31,627
70	Grid Modernization - 2019 Projects	364	12175	Urban Underground Automation	\$ 1,347.13	\$ 714.72	\$ 4,089.61	\$ 6,409.30	\$ (1,447)	\$ 3,690.83	\$ 10,861.60	\$ 3,833.12	\$ 17,265.73	\$ 9,983.60	\$ 18,966.07	\$ 11,599.63	\$ 89,567
71			12185	Distribution System Network Operator	\$ -	\$ 79.58	\$ 1,210.25	\$ 3,927.67	\$ 566.12	\$ 2,299.16	\$ 7,881.40	\$ 6,176.90	\$ 11,841.47	\$ 9,963.14	\$ 2,403.90	\$ 2,127.43	\$ 48,522
72			12190	Advanced Sensing Technology	\$ 10.40	\$ 145.69	\$ 4.89	\$ 93.84	\$ 1,044.								

2019 Total Additions and Carry Over by Investment Type

	Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions	
12165	Electric Vehicle Infrastructure	18294	02299104	EVL2NEJC NAT 280 CARCHARGER ELIOT	53,324	2,920	4,977	747	-	61,968	
		18294 Total			53,324	2,920	4,977	747	-	61,968	
		18295	02338310	EVL2-EJC HYA (EV) 600 CAPE1 BARNSTA	68,149	1,937	2,190	989	9	73,274	
			02338314	EVL2-EJC HYA (EV) 660 CAPE2 BARNSTA	63,530	2,265	2,380	1,001	0	69,177	
			02339422	EVL2-EJC HYA (EV) 215 IYANOUGH RD C	115,233	4,039	4,932	1,573	11	125,788	
			02339845	EVL2-EJC HYA (EV) 215 CCRT2 IYANOUG	103,169	3,383	4,029	2,634	2	113,217	
			02359227	EVL2NEJC NEE 250 FIRST AVE FIRST	104,712	3,797	2,558	-	22	111,089	
			02359228	EVL2NEJC NEE 144 CHARGER GOULD ST	58,313	1,853	1,888	-	22	62,076	
			02359230	EVL2NEJC NEE 117 CHARGER KENDRICK	64,720	1,893	2,360	-	22	68,995	
			02359231	EVL2NEJC NEE 100 CHARGER SECOND A	56,437	2,847	2,810	-	22	62,116	
			02359232	EVL2NEJC NEE 75 CHARGER SECOND AV	22,099	1,512	1,904	63	22	25,600	
			02359233	EVL2NEJC NEE 15 CHARGER CRAWFORD	57,525	2,272	2,378	-	22	62,196	
			18295 Total			713,888	25,798	27,429	6,260	153	773,528
			18296	02288353	EVL2NEJC BED 125 EV MIDDLESEX TPK	449	(32)	-	-	-	416
				02288360	EVL2NEJC WIN EV LARAWAY RD WINCHES	19,115	96	-	-	-	19,211
				02288387	EVL2NEJC CAM, 1 BENNETT ST/PROPARK	136,784	5,118	8,460	-	54	150,417
				02288454	EVL2NEJC WLF 300 EV MAIN ST (96100	543,973	9,006	13,554	1,362	-	567,895
				02288493	EVL2NEJC WTD 247 EV-1 STATION DR	58,306	296	-	-	-	58,602
				02288673	EVL2NEJC LIN 208 S GREAT RD MASS	(2,090)	283	1,178	-	-	(628)
				02293085	EVL2NEJC LEX 300 EV CHARGER SHIR	-	(36)	-	-	-	(36)
				02294023	EVL2NEJC NEW EV MELROSE AVE CITY O	15,310	3,339	6,171	56	65	24,942
				02294136	EVL2NEJC NEW 1000 COMM AVE. C OF NE	0	(121)	(0)	-	-	(121)
				02295014	EVL2NEJC WHO 49A EV SCHOOL ST W	133,970	1,856	2,615	230	-	138,671
				02295021	EVL2NEJC WHO 360 WH ROAD EV CHARGER	172,712	4,747	6,661	604	36	184,760
				02296316	EVL2NEJC PLY 5 EV RUSSELL ST PLYM	-	-	-	-	-	-
				02296613	EVL2NEJC NEW 26 RICHARDSON ST. C.	29,610	1,799	3,247	87	2	34,745
				02298508	EVL2NEJC MAT 500 WALK-HILL ST MAS	59,306	1,773	3,412	135	2	64,628
				02300157	EVL2NEJC MIL 525 EV CHARGER CANT	(0)	(35)	-	-	-	(35)
				02300187	EVL2NEJC MDW 155 EV CHARGE VILLAG	3,174	17	2	-	-	3,193
				02300215	EVL2NEJC MDW 26 EV CHARGE HIGH ST	748	1	(5)	-	-	744
				02300340	EVL2NEJC CAM 9- 29 CAMP ST TRUST	13,574	734	1,880	-	-	16,188
				02301279	EVL2NEJC WLF 291 EV RTE-6 MASSACHUS	70,264	1,501	2,704	-	-	74,468
				02304430	EVL2NEJC SHA 293 EV-3 MOOSE-HILL	42,853	2,035	2,729	895	-	48,512
				02305344	EVL2NEJC CAM 420 EV CHARGE GREEN	130,895	3,828	6,347	-	72	141,143
				02305358	EVL2NEJC CAM 375 EV CHARGER GREEN	192,907	6,843	9,947	1,991	36	211,723
				02307872	EVL2NEJC WHO 7 PARKING LOT NORTH ST	130,125	2,957	3,901	682	-	137,665
				02311288	EVL2NEJC BED 99 MCMAHON RD BEDFORD	59,523	1,699	2,728	458	-	64,407
				02311296	EVL2NEJC BED 9 MUDGE WAY EV-HS	58,484	1,547	2,728	-	-	62,759
				02311346	EVL2NEJC BED 66 SWEETWATER AVE E	64,684	3,530	5,329	816	-	74,359
				02311474	EVL2NEJC BED 10 MUDGE WAY EV-TH	82,199	2,727	4,600	277	27	89,830
				02311845	EVL2NEJC BED 410 DAVIS RD EV B	65,725	1,429	2,433	536	-	70,123
				02319199	EVL2NEJC WAL 170 TRACER LN. EV CHAR	88,818	1,433	1,697	-	27	91,974
				02324941	EVL2NEJC WTD 392 UNIVERSITY AVE EV	90,360	3,659	4,891	-	90	99,000
				02325096	EVL2NEJC WTD 375 EV UNIVERSITY AV	59,119	1,649	2,255	145	-	63,168
				02325189	EVL2NEJC LEX 450 BEDFORD ST EV BE	127,796	1,968	1,739	829	2	132,335
				02325192	EVL2NEJC LEX 785 MARRETT RD EV C	53,857	12,897	17,346	596	267	84,962
				02325193	EVL2NEJC WTD 60 GLACIER DR EV G	15,875	5,390	7,860	1,302	24	30,450
				02325349	EVL2NEJC FRA 1 EV SPEEN ST ONE SP	66,374	2,734	4,305	285	45	73,742
				02325448	EVL2NEJC FRA 3 EV SPEEN ST THREE	106,021	3,219	4,567	381	45	114,232
				02325464	EVL2NEJC FRA 5 EV SPEEN ST FIVE S	132,264	3,335	4,487	438	54	140,578
				02326959	EVL2NEJC 22 FLUTIE PASS FRA EV CHAR	22,375	2,974	4,357	280	60	30,045
				02329139	EVL2NEJC BOS 131 EV DARTMOUTH ST (T	30,875	1,537	2,494	-	24	34,930
				02329194	EVFCNEJC SOM, 449 CANAL ST/ELECTRIF	5,290	10,575	13,081	2,319	168	31,433
				02329484	EVL2NEJC FRA 1 WORCESTER RD 203-1	27,673	4,363	5,491	1,524	142	39,193
				02330222	EVL2NEJC FRA 500 EV OLD-CONN PTH	78,295	4,594	7,274	447	60	90,670
				02331264	EVL2NEJC MIL 325 EV RANDOLPH AVE	47,087	1,379	1,387	539	27	50,420
				02332078	EVL2NEJC BUR 20 SOUTH AVE (200A	21,907	1,320	2,189	-	2	25,419
				02333754	EVL2NEJC HOP 77 MAIN ST HOPKINTON	153,262	2,779	2,749	-	20	158,811
				02335180	EVL2NEJC BOS CHARLES ST BOSTON COMM	31,280	4,709	5,875	2,698	96	44,658
				02335678	EVL2NEJC WOB 477 EV1 MAIN ST WOBU	16,020	3,062	4,710	-	24	23,816
				02336026	EVL2NEJC 36 KNOX TRAIL ACT CONCORD	51,479	2,031	2,389	1,031	2	56,933
				02339838	EVL2NEJC WAL 14R PINE ST EV WALTHA	61,556	5,728	8,117	1,079	132	76,612
				02340604	EVL2NEJC ACU 800 EV MIDDLE RD ACUSH	85,027	1,802	952	-	2	87,783
				02340628	EVL2NEJC ACU 708 EV MIDDLE RD ACU	55,855	1,353	977	-	2	58,187
				02340690	EVL2NEJC ACU 64 EV MIDDLE RD ACU	66,529	1,153	850	-	2	68,534
				02340891	EVL2NEJC ACU 232 EV MIDDLE RD ACU	47,304	2,154	2,334	903	2	52,697

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		02340910	EVL2NEJC ARL 85 EV PARK AVE ARLIN	56,921	3,509	5,374	76	39	65,919
		02341001	EVL2NEJC EAS (EV) 3800 RTE-6 EASTHA	148,229	6,186	7,786	2,310	3	164,513
		02342018	EVL2NEJC CHA 15 EV CHARGE TUFTS S	-	-	-	-	-	-
		02343716	EVL2NEJC MAR 2000 EV MAIN ST MASS	79,836	2,237	2,370		24	84,467
		02344679	EVL2NEJC WAR 8 REAR EV THACHER LN	1,056	240	595		2	1,893
		02344934	EVL2NEJC WAR 8 FRONT THACHER LN C	1,056	240	595		2	1,893
		02345708	EVL2NEJC LIN 208 SOUTH GREAT RD (PO	58,728	2,205	2,334	451	2	63,720
		02347714	EVL2NEJC ARL 11 WATER ST ARLINGTON	66,883	4,576	4,493	739	24	76,714
		02348397	EVL2NEJC NEW 90 EV CRAFTS ST NEWT	16,860	1,639	1,544	570		20,613
		02349142	EVL2NEJC LEX 13 DEPOT SQUARE	58,077	5,837	6,999	82	22	71,016
		02349164	EVL2NEJC LEX 17 GRANT ST EV LEXI	73,097	1,938	1,580		22	76,637
		02351931	EVL2NEJC CAN 963 EV-3 WASHINGTON	53,056	7,330	9,535	737	31	70,689
		02352027	EVL2NEJC MIL 98 EV WHARF ST MILTO	50,295	5,847	5,969	1,830	22	63,964
		02353605	EVL2NEJC WOB 200 EV CHARGR PRESID	58,953	2,085	1,582		22	62,641
		02353695	EVL2NEJC WOB 200 EV PRESIDENTIAL	57,214	2,046	1,582		22	60,863
		02354146	EVL2NEJC NAT 179 BODEN LN TOWN OF	37,112	3,586	4,298	679	22	45,697
		02355784	EVL2NEJC BUB 25 EV PERRY AVE BOUR	12,225	1,229	1,917		22	15,393
		02356314	EVL2NEJC STN 101 MONTVALE AVE TOWN	60,290	2,115	1,582		22	64,009
		02356546	EVL2NEJC ACT 177 MAIN ST DISCOVER	80,308	12,469	11,586	8,407	57	112,828
		02356605	EVL2NEJC LEX 110 EV-1 HARTWELL AV	19,725	1,750	2,277		22	23,773
		02358746	EVL2NEJC YAR 484 EV CHARGR WILLOW	12,168	8,685	6,597	9,574	80	37,104
		02358779	EVL2NEJC WAL 1560 EV-1 TRAPELO RD	76,221	3,084	2,344	25	22	81,696
		02358782	EVL2NEJC PLY 273 EV CHARGR SUMMER S	15,625	2,168	3,041	996	22	21,852
		02358945	EVL2NEJC NEB 50 DUCHAINE BLV EV CHA	18,325	3,569	3,752	2,804	22	28,472
		02358990	EVL2NEJC WAL 271 WAVERLEY-OAKS RD.	58,058	2,519	2,536	55	31	63,199
		02358993	EVL2NEJC WAL 307 WAVERLEY-OAKS RD	63,725	2,494	2,373		22	68,614
		02359600	EVL2NEJC NEE 168 GARDEN ST (EV NEED	48,232	1,916	1,674		22	51,844
		02359821	EVL2NEJC LEX 33 EV CHARGR HAYDEN	84,650	5,891	5,756	785	22	97,105
		02359937	EVL2NEJC H-P 1 EV WESTINGHOUSE PL	112,862	4,757	3,176	511	22	121,329
		02361259	EVL2NEJC FRA 400 EV CHARGR WORCES	83,014	2,793	3,101	141	22	89,070
		02369385	EVL2NEJC S-B #133 EV SEAPORT	127	539	1,165		21	1,852
	18296 Total			5,187,824	250,212	314,506	53,695	2,303	5,808,541
	EV41L2EJ	6A821844	NJC - Greenfield, Olive St - Elec V	8,476	575	714	411	30,077	40,253
		6A920753	NJC - Amherst, West St - # 417 -MAV	116,239	1,083	1,309		2	118,633
		6A921137	NJC - Amherst, Kellogg Ave - # 33 -	67,864	2,826	4,078	1,093	78	75,939
		6A921138	NJC - Amherst, Boltwood Wlk - EV Ch	63,336	1,299	2,355		22	67,012
		6A921139	NJC - Amherst, Pray St - EV Charger	16,397	1,939	3,140	468	50	21,995
		6A921265	NJC - Amherst, University Dr - # 70	55,780	1,727	2,742		22	60,271
		6B821194	ETB - PITTSFIELD, KENT AVE; Elec Ve	7,083	114	113	136		7,447
		6B920519	ETB - PITTSFIELD, MCKAY ST; Elec	76,150	2,172	3,151	249	2	81,724
		6B920707	WOODJA- 557 MAIN ST, BECKET EV CHAR	61,256	264	337	150		62,006
		6S822396	AN:NEW SVC EV CHARGERS AT GAS STATI	52,542	1,283	2,541		3,981	60,347
		6S822416	AN:NEW SVC EV CHARGERS AT GAS STATI	86,207	4,080	6,871	1,410	24	98,592
		6S822707	***MUNI IN*** Elec Vehicle Make Rea	84,998	2,059	3,452	913		91,423
		6S921875	MGF - Springfield, Hickory St - #10	57,601	1,749	1,036	6,990		67,375
		6S921937	***EV Charger*** - 1160 DICKINSON	91,953	983	1,948		21	94,905
		6S921940	MGF - Springfield, Monarch Pl - #1.	105,895	3,217	4,915	1,578	22	115,628
		6S922575	MGF - West Springfield, Memorial Av	73,283	1,437	2,659		21	77,399
	EV41L2EJ Total			1,025,059	26,809	41,361	13,399	34,324	1,140,951
	EV41L2NE	6A821699	NJC - Hadley, Russell St # 55 - EV	73,803	1,053	1,965	118		76,939
		6A821700	KC-Hadley, Russell St - # 340 - EV	101,086	1,563	2,820		2	105,471
		6A921159	NAL - Shelburne, Cross St - #5 - EV	52,035	290	519	120	1	52,965
		6A921161	NAL - Shelburne, Baker Ave- #2-14 -	60,961	1,129	2,174	239	22	64,524
		6B920708	WOODJA- 45 WOODLAWN AVE, PITTSFIELD	134,582	6,166	6,942	3,826	22	151,538
		6S921909	MGF - Agawam, River Rd - #254. New	69,317	1,564	2,926		22	73,830
		6S921948	MGF - Agawam, Cooper St - #750. New	74,653	519	748			75,920
		6S921980	MGF - Agawam, Corey St - #418. New	50,192	275	525		1	50,994
	EV41L2NE Total			616,630	12,560	18,619	4,302	69	652,181
12165 Electric Vehicle Infrastructure Total				7,620,350	319,534	409,508	82,750	-	8,437,167
12170 Automated Feeder Reconfiguration	18326	02313947	ASU MAY PARKER ST P73/33 NOVA		35,976	6,868	35,227	711	78,783
		02313949	ASU ACT MAIN ST P31/139 GRID	1,533	34,011	3,994	36,314	1,578	77,430
		02313955	ASU MLS PLAIN ST P13/48 INSTA		24,441	5,229	23,276	667	53,613
		02313959	ASU WTD BURGESS AVE P 85/1 IN		28,022	6,609	26,142	770	61,543
		02313979	ASU WES WINTER ST P411/18 433	471	27,957	5,544	26,900	687	61,559
		02313980	ASU FRA PLEASANT ST P179/107	103	45,614	5,474	55,135	1,442	107,768
		02313982	ASU ACT CENTRAL ST P6/47 416-	915	41,909	5,123	44,521	1,589	94,058

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		02313984	ASU NAT CIRCULAR AVE P29/1 24	396	36,037	5,510	36,222	1,374	79,539
		02313985	ASU ASH HIGH ST P5/5 274-1429	440	25,322	4,046	24,766	655	55,229
		02316296	ASU FAL DAVISVILLE RD 22/1 IN	4,515	27,185	11,115	32,495	1,342	76,653
		02316305	ASU MAR CANAL ST 79/4 INSTALL	3,240	20,634	8,368	11,939	28,005	72,186
		02316310	ASU YAR OLD MAIN ST 37/183	2,600	24,727	8,332	30,583	1,040	67,281
		02316312	ASU FAL W FALMOUTH HWY 29/202	3,182	22,124	7,745	42,073	467	75,590
		02316315	ASU RT 6A 36/448 INSTALL NEW 552-4 NOVA RECLOSER C	3,216	21,055	6,017	43,394	183	73,864
		02316710	ASU LEX P42/59 WOBURN ST. INST	1,654	20,919	5,027	32,701	819	61,120
		02316714	ASU MLS P34/48 FOREST RD GRID		20,217	8,121	27,119	716	56,174
		02316719	ASU MDF P1/26 NORTH ST GRIDMO		18,273	3,326	32,951	728	55,278
		02316782	ASU DEN RT 6A 36/450 INSTALL	2,575	17,643	2,647	50,709	152	73,726
		02316789	ASU SAN PIMILICO POND RD 83/1	2,944	22,813	9,767	23,153	741	59,418
		02316799	ASU PLY HERRING POND RD 90/91	1,058	23,259	5,726	37,239	1,487	68,769
		02316816	ASU YAR N DENNIS RD 9215/12 R	3,212	19,053	5,032	40,015	152	67,465
		02316836	ASU NEB DURFEE ST 207/13 INST	2,082	15,460	3,456	37,175	116	58,288
		02316838	ASU NEW P9/22A WAVERLY AVE RE	(0)	28,356	7,097	44,623	1,196	81,272
		02316844	ASU NEW P450/5 WATERTOWN ST. R	3,202	23,264	4,222	27,907	1,000	59,594
		02316861	ASU NEB SUMMER ST 664/11 4 KV	3,334	22,962	8,474	34,077	180	69,027
		02316862	ASU NEB BLACKMER ST 645/7 INS		186	131		3	321
		02316867	ASU NEB FIRST ST 644/21 INSTA	4,491	23,980	8,444	36,187	223	73,325
		02316871	ASU NEB RIVET ST 585/16 INSTA	2,169	17,336	5,098	34,448	115	59,165
		02316876	ASU NEB CEDAR ST 132/5 INSTAL	5,467	31,214	8,870	35,265	163	80,978
		02316878	ASU NEB CEDAR ST 132/35 INSTA	4,981	28,802	6,747	35,188	105	75,823
		02316880	ASU NEB BULLOCK ST 116/5 INST	6,899	36,877	10,699	35,099	256	89,830
		02316882	ASU NEB MILL ST 462/41 INSTAL	3,595	25,235	8,595	37,737	360	75,522
		02316883	ASU NEB MILL ST 462/21 INSTAL	3,964	18,914	5,118	36,759	177	64,932
		02316885	ASU NEB MILL ST 462/6 INSTALL	3,334	19,173	5,463	36,803	119	64,890
		02316890	ASU NEB HEMLOCK ST 311/17 INS	2,454	19,902	7,085	35,238	59	64,737
		02316892	ASU NEB ORCHARD ST 517/21 INS	1,865	17,570	5,988	34,605	188	60,215
		02316903	ASU NEB BELLEVILLE RD P64/22	11,152	27,627	7,236	35,373	172	81,561
		02316911	ASU BAR SCHOOL ST 313/2 INSTA	1,330	20,217	7,423	31,009	506	60,485
		02316915	ASU CVR PURCHASE ST 95/35 INS	619	19,387	5,464	36,849	1,413	63,732
		02316918	ASU SAN RT 6A 14/214 INSTALL	3,241	10,185	2,477	25,657	82	41,641
		02319076	ASU FRA 1106 EDGELL RD 74/128	1,842	17,444	6,316	35,486	1,299	62,387
		02319078	ASU NAT MILL ST 279/15 INSTAL	1,574	28,490	4,950	55,590	1,759	92,363
		02319080	ASU NAT 182 W. CENTRAL ST 19		4,673	1,171	8,241	25	14,110
		02319084	ASU FRA 368 BROOK ST 21/43 I	1,213	13,153	2,143	43,894	298	60,701
		02319087	ASU NAT 19 E. EVERGREEN RD 4	1,309	14,792	3,886	32,792	104	52,882
		02319088	ASU ACT 212 MAIN ST 31/77 IN	2,140	15,903	1,859	46,509	94	66,506
		02319091	ASU ASH 153 PROSPECT ST 8/24	1,673	15,333	4,798	34,503	180	56,487
		02319093	ASU WTD 845 HIGH ST 19/91 IN	2,268	25,269	7,982	33,449	1,676	70,644
		02319094	ASU BEL 370 HARTFORD AVE 2/6	8,168	20,790	6,655	34,797	207	70,617
		02319099	ASU LEX CLIFF AVE 120/2 INSTA	2,519	18,237	2,961	35,127	76	58,921
		02319101	ASU NEW 8 NEWTONVILLE AVE 24	4,153	16,780	4,798	34,071	132	59,935
		02319102	ASU LEX 91 GROVE ST 40/26 IN	2,955	16,935	6,136	33,033	91	59,149
		02319103	ASU NEW 89 FLORENCE ST 158/1	3,460	18,398	8,024	17,200	162	47,245
		02319105	ASU WAT 259 LEXINGTON ST 85/	4,141	18,346	4,200	33,899	369	60,956
		02319107	ASU WAT 187 LEXINGTON ST 85/	4,786	26,370	10,721	33,771	324	75,973
		02319108	ASU WAL 337 WARREN ST 284/40	3,200	14,466	5,794	20,833	769	45,061
		02320169	ASU W-R PATTEN ST INSTALL RCE	1,015	23,795	10,506	35,383	2,246	72,946
		02320170	ASU DOR WALK HILL ST INSTALL	1,521	22,670	7,318	39,910	2,422	73,842
		02320171	ASU DOR GREENDALE RD INSTALL	370	13,461	2,694	35,232	71	51,828
		02320172	ASU DED SPRAGUE ST REPL & INS	2,825	35,531	12,115	47,571	868	98,911
		02320174	ASU DED GREENLODGE ST REPL & I	3,876	31,085	8,468	58,492	709	102,629
		02320175	ASU BKL TAPPAN ST INSTALL RECL	1,320	26,927	12,306	34,507	2,320	77,381
		02320176	ASU BKL BEACONSFIELD ST INSTAL	1,453	21,947	8,461	35,338	1,468	68,668
		02320178	ASU BKL WINTHROP RD INSTALL R	4,237	18,682	5,410	32,776	392	61,497
		02320190	ASU H-P RESERVATION RD -RPL L	3,704	17,624	5,007	33,451	272	60,058
		02320191	ASU H-P AUSTIN ST INSTALL REC	3,255	15,849	3,878	33,699	1,240	57,920
		02320193	ASU MIL THACHER ST INSTALL RE	5,144	25,761	6,415	34,355	812	72,486
		02320194	ASU MIL THACHER ST INSTALL RE	3,944	20,783	3,734	34,826	786	64,073
		02320197	ASU MIL ROBBINS ST INSTALL RE	4,772	17,557	7,022	11,581	345	41,277
		02320201	ASU BKL NAPLES ST INSTALL REC	11,017	30,250	7,385	3,718	724	53,094
		02320204	ASU DOR ELDON ST INSTALL RECL	4,368	21,241	5,820	33,989	1,248	66,666
		02320206	ASU DOR GREENWOOD ST INSTALL	5,280	17,983	4,589	33,926	175	61,953
		02320207	ASU DOR HARVARD ST INSTALL RE	3,195	20,540	2,749	45,764	1,117	73,365

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		02326700	ASU CHE WEBSTER AVE NOVA RECL	2,432	17,263	11,400	2,111	378	33,585
		02326702	ASU E-B GLENDON ST-INSTALL RE	2,055	16,084	5,629	15,689	308	39,766
		02326712	ASU WOB BEDFORD RD NOVA RECL	5,677	29,835	13,410	14,380	1,375	64,678
		02326713	ASU SOM CURTIS ST INST RECLOSE	8,170	32,374	11,244	34,377	508	86,672
		02326714	ASU STN FRANKLIN ST 36/23 - IN	7,358	28,691	11,273	39,716	3,141	90,180
		02326715	ASU ARL EASTERN AVE INST NOVA	2,526	18,754	4,972	26,318	465	53,034
		02326717	ASU CHE SPRUCE ST INST NOVA RE	3,034	12,580	1,977	35,628	1,706	54,925
		02326719	ASU WIN CAMBRIDGE ST-POLE 26/	4,151	24,003	8,578	30,360	1,186	68,277
		02326720	ASU CHE BROADWAY NOVA RECLOSER	4,873	32,070	8,802	38,095	890	84,729
		02326721	ASU CHE EASTERN AVE NOVA RECL	2,322	18,875	3,942	34,428	570	60,137
		02326724	ASU CAM WALDEN ST P697/17- NST	2,630	38,238	13,422	47,752	742	102,783
		02326725	ASU CHE BELLINGHAM ST INST REC	2,544	20,640	5,142	33,264	603	62,193
		02326726	ASU CHE HIGHLAND AVE INST RECL	3,218	20,517	4,768	34,557	552	63,612
		02326738	ASU ARL WARREN ST 113/8 INST R	2,253	28,749	8,201	34,975	802	74,980
		02326739	ASU ARL BROADWAY 812/25 INST R	908	26,426	9,707	37,710	1,427	76,179
		02326740	ASU ARL WYMAN ST 890/2 REPL LB	1,440	22,768	5,542	34,270	604	64,625
		02326741	ASU STN MONTVALE AVE 64/38 INS	2,637	20,080	5,860	34,067	1,301	63,946
		02326742	ASU STN MARBLE ST 57/24 INST	4,863	35,665	13,608	38,096	1,738	93,970
		02327367	ASU DOR HARVARD ST 930/21 REP	969	13,975	5,032	23,753	479	44,208
		02328502	ASU STN WRIGHT ST INSTALL REC	991	21,190	9,743	(10,250)	1,471	23,146
		02328504	ASU STN WILSON ST INSTALL REC	3,721	32,845	15,340	36,861	2,837	91,604
		02328506	ASU WOB EASTERN AVE RECL P63/	8,316	17,566	5,063	12,351	815	44,110
		02329160	ASU NEW P120/22? DERBY ST. REP	5,720	26,545	7,637	55,953	1,126	96,981
		02331938	ASU NEB 278 NASH ROAD P482/25	4,412	16,510	2,905	33,885	415	58,128
		02332065	ASU NEB SUMMER ST P664/18 INS	2,640	25,372	9,823	36,130	149	74,115
		02332070	ASU NEB ROCKDALE AVE P590/6.5	1,760	18,212	5,061	36,870	112	62,015
		02332072	ASU NEB BONNEY ST P85/11 INST	12,305	31,528	5,757	37,588	522	87,700
		02332074	ASU NEB RIVER RD P582/9 INSTA	5,477	37,116	10,687	34,100	171	87,552
		02332075	ASU NEB BELLEVILLE AVE P4/39	5,664	36,893	10,845	34,355	123	87,880
		02332076	ASU NEB BELLEVILLE AVE P4/17	4,652	26,354	5,744	34,102	107	70,959
		02332164	ASU YAR ROUTE 6A P1/84 INSTAL	6,316	37,285	8,956	59,192	866	112,615
		02332165	ASU YAR UNION ST, P7/11 INSTA	4,139	19,269	2,419	12,284	199	38,310
		02332166	ASU FAL PALMER AVE P29/129 INS	1,412	21,282	4,962	17,840	524	46,020
		02332167	ASU YAR NO MAIN ST P9215/1 INS	1,828	28,145	7,839	39,238	455	77,504
		02332168	ASU FAL CENTRAL AVE P126/2 IN	4,476	24,233	6,097	38,012	3,463	76,280
		02332169	ASU FAL ACAPESKET RD P235/71	5,896	30,732	10,416	36,820	1,192	85,056
		02332170	ASU WAQ SEACOAST SHORE P352/1.	3,430	24,178	5,164	37,381	583	70,735
		02332171	ASU SAN OLD COUNTY RD P22/2 I	3,407	31,062	11,617	38,270	2,932	87,289
		02332172	ASU FAL PALMER AVE P29/45 INS	5,548	37,773	8,864	61,974	527	114,686
		02332173	ASU YAR SEAVIEW AVE P159/3 IN	4,603	29,595	9,580	39,592	550	83,920
		02332174	ASU EAS GREAT POND RD P14/1 IN	1,471	21,816	6,432	37,958	189	67,865
		02332176	ASU HAR LOWER COUNTY RD 49/70		16,565	4,460	39,405	2,010	62,439
		02332177	ASU MAS SHORE DR P101/26 INSTA	3,720	26,813	8,020	38,459	642	77,654
		02332178	ASU HYA OLD-MAIN ST P39/44A IN	2,726	20,403	7,481	27,136	160	57,907
		02332179	ASU EAS MASSASOIT RD P4/19 IN	2,262	25,564	6,648	37,883	729	73,086
		02332180	ASU CHM MAIN STREET P37/713 I	2,832	30,647	10,002	38,534	187	82,202
		02332181	ASU WLF RTE 6 P36/1247 REPL FU	2,594	20,765	6,250	40,303	700	70,612
		02332182	ASU PRO FRANKLIN ST P9/3 NEW	3,018	24,734	9,643	41,557	167	79,120
		02332183	ASU HYA SEA ST P7/11 INST NOVA	2,785	15,534	3,071	40,723	324	62,436
		02332184	ASU PLY WHITE HORSE RD 1065/1	4,240	34,132	13,963	37,069	1,213	90,617
		02332185	ASU MAR CARESWELL ST INT COOPE	3,347	34,264	12,971	36,515	1,091	88,189
		02332186	ASU WAR SWIFTS BEACH RD INST	4,425	29,763	3,385	35,511	865	73,950
		02332187	ASU WAR PLYMOUTH AVE INST COO	814	20,321	6,415	36,003	1,518	65,070
		02332188	ASU BUB RED BROOK RD P357/4 I	5,123	35,293	14,421	36,743	1,700	93,280
		02333893	ASU BAR OLD TOWN RD 217/1 INS	1,211	13,050	4,245	26,155	29,343	74,004
		02333896	ASU YAR RT 6A 1/135 INSTALL N	3,704	49,747	18,452	37,034	347	109,284
		02370059	ASU WOB SCHOOL ST INST 15 KV		3,042	1,559		14	4,615
		02370061	ASU STN MAIN ST 211-H12 INST N		5,325	2,985		18	8,328
				407,978	3,089,950	901,409	4,359,671	155,653	8,914,660
18326 Total WD00298	6A821670	GRID MOD; INSTALL RECLOSER 21C7-62R	(0)	0	0	(0)	(0)	0	
	6A821672	GRID MOD; INSTALL VS RECLOSER 21C7-	(0)	9	-	(135)		(125)	
	6A821673	GRID MOD; INSTALL TRIPLE SINGLE REC	(0)	3	-	1,854	(0)	1,858	
	6A821674	GRID MOD; INSTALL RECLOSER VS 22B7-		(315)	0	7,599		7,284	
	6A821675	GRID MOD; INSTALL RECLOSER AND FORM		(17)	0	3		(13)	
	6A821676	GRID MOD - NJC - Montague, N. Lever		(298)	(0)			(298)	
	6A822123	GRID MOD; INSTALL MR RECLOSER 22B1-	16,581	20,287	2,093	37,203	167	76,330	

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		6A822124	GRID MOD: INSTALL SR RECLOSER 18G5-	11,339	18,049	3,369	34,142	251	67,149
		6A822128	GRID MOD: INSTALL VS RECLOSER 18K2-	5,130	15,497	3,787	36,861	235	61,510
		6A822130	GRID MOD: INSTALL MR RECLOSER 18G6-	1,876	18,404	6,601	36,821	263	63,965
		6A822131	GRID MOD: INSTALL VS RECLOSER 17K5-	11,031	18,258	2,432	36,406	64	68,190
		6A822132	GRID MOD: INSTALL MR RECLOSER 18G7-	13,625	19,824	2,496	34,620	212	70,776
		6A822133	GRID MOD: INSTALL VS RECLOSER 15A5-	11,805	15,327	484	34,440	253	62,308
		6A822178	GRID MOD: INSTALL VS RECLOSER 21C4-	2,636	1,993	53	1,852		6,534
		6A822179	GRID MOD: INSTALL VS RECL 21C4-XXXX	2,899	2,359	54	2,481	0	7,794
		6A822181	GRID MOD: REM GOAB & INST RECLOSER	12,653	20,618	825	38,141	511	72,748
		6A822182	GRID MOD: INSTALL VS RECLOSER 19J1-	15,196	23,450	2,170	33,877	520	75,213
		6A822238	GRID MOD: INSTALL VS 15A3-4102 & IN	16,564	17,519	517	34,982	532	70,114
		6A822239	GRID MOD: INSTALL MR RECLOSER 15A3-	24,331	21,178	1,245	34,593	271	81,619
		6A822240	GRID MOD: INSTALL MR RECLOSER 15A3-	8,506	25,052	10,021	34,675	324	78,579
		6A822241	GRID MOD: INSTALL MR RECLOSER 21C8-	15,486	18,911	1,702	33,941	74	70,115
		6A822257	GRID MOD: INSTALL SR RECLOSER 22B7-	14,186	14,365	1,879	33,068	231	63,729
		6A822258	GRID MOD: INSTALL VS RECLOSER 22B7-	18,430	19,424	1,395	31,682	255	71,187
		6A822267	Grid Mod: Inst MR 17K5-74S and Form	17,050	21,110	2,064	34,574	96	74,894
		6A822273	GRID MOD: INSTALL TSR RECLOSER 21C1	17,584	19,484	1,165	30,905	256	69,394
		6B820910	GRID MOD; RM RECL 19A1-60R;RM SLD B	3,597	21,721	6,766	33,713	279	66,076
		6B820911	GRID MOD: RPL SOLID BLADES WITH RE	6,588	19,357	6,612	33,371	267	66,195
		6B820912	GRID MOD; INSTALL RECLOSER 19A1-81	2,097	1,419	157	(123)		3,550
		6B820913	GRID MOD; INSTALL TIE RECLOSER 19A	1,962	18,650	6,300	31,402	326	58,639
		6B820914	GRID MOD; NEW RECLOSER LOCATION SR	(0)	(17)	0	77		60
		6B821178	GRID MOD: INSTALL TSR RECLOSER 16B1	1,089	15,403	3,526	33,295	126	53,439
		6B821179	Grid Mod: Install MR on Form 6 Cntl	1,765	28,761	10,101	36,092	166	76,885
		6B821180	Grid Mod: Install VS 30B1-xxxx and	1,165	23,156	9,338	37,073	794	71,525
		6B821181	GRID MOD: REPLACE RR RECLOSER 16B5-	2,913	16,468	5,120	36,355	374	61,230
		6B821182	Grid Mod: rep GOAB with MR 30B5-xxx	699	14,517	4,244	34,636	39	54,135
		6B821183	GRID MOD: INSTALL XX RECLOSER 19J4-	2,330	12,950	3,760	36,943	405	56,388
		6B821184	GRID MOD: INSTALL MR RECLOSER 30B4-	1,944	20,351	8,845	39,383	361	70,885
		6B821185	GRID MOD: INSTALL MR RECLOSER 17G3-	966	17,973	5,447	36,083	344	60,813
		6B821243	GRID MOD: INST MR RECL 19J4-85M AND	1,478	12,725	3,106	33,343	232	50,884
		6B821245	GRID MOD: INSTALL RR RECLOSER 30B7-	6,513	21,657	9,174	35,700	577	73,620
		6B821247	Grid Mod: Rem 40T fuses P228/74, in	1,290	16,419	4,567	35,807	249	58,332
		6B821260	GRID MOD: INSTALL MR RECLOSER 30B7-	1,246	14,726	4,231	34,671	183	55,056
		6S821808	GRID MOD; INSTALL RECLOSER 16C17-92	(1,619)	3,842	460	7	1	2,691
		6S821809	GRID MOD; INSTALL SR RECLOSER 30A1-	980	196		7		1,183
		6S821810	GRID MOD; INSTALL SR RECLOSER 16C17	1,633	327		7		1,967
		6S822352	GRID MOD: INSTALL SR RECLOSER 16C17	28,314	35,140	5,344	35,598	199	104,596
		6S822353	GRID MOD: INSTALL MR RECLOSER 16C17	19,983	21,721	946	34,979	172	77,801
		6S822354	GRID MOD: INSTALL SR RECLOSER 16C17	18,330	26,511	5,559	35,666	165	86,231
		6S822355	GRID MOD: INSTALL MR RECLOSER 29A1-	7,618	22,873	4,201	40,887	218	75,797
		6S822356	GRID MOD: INSTALL MR RECL 20A33-XXM	3,957	13,524	1,901	38,132	161	57,675
		6S822357	GRID MOD: INSTALL MR RECLOSER 21N4-	9,394	18,124	7,144	33,183	302	68,147
		6S822358	GRID MOD: INSTALL MR RECLOSER 22H16	16,472	19,805	1,211	38,488	311	76,286
		6S822359	GRID MOD: INSTALL VS RECLOSER 22H16	10,943	17,637	1,531	37,430	308	67,850
		6S822361	GRID MOD: INSTALL VS RECLOSER 19S1-	7,850	17,059	3,913	34,821	611	64,255
		6S822362	GRID MOD: INSTALL MR RECLOSER 21N4-	24,144	21,163	5,844	33,889	372	85,412
		6S822364	GRID MOD: INSTALL MR RECLOSER 5J17-	13,336	12,900	1,489	34,997	1,937	64,658
		6S822365	GRID MOD: INSTALL VS RECLOSER 5J17-	23,427	17,967	3,246	34,632	142	79,414
		6S822367	GRID MOD: INSTALL MR RECLOSER 22H16	20,886	26,486	3,189	37,848	480	88,889
		6S822369	GRID MOD: INSTALL VS RECL 20A32-XXX	12,121	15,539	2,219	36,166	278	66,323
		6S822370	GRID MOD: INSTALL MR RECLOSER 30A1-	10,328	17,819	4,492	35,070	609	68,319
		6S822502	GRID MOD: INSTALL SR RECLOSER 30A5-	20,145	30,819	6,205	35,137	292	92,598
		6S822503	GRID MOD: INSTALL MR RECLOSER 30A5-	30,065	28,174	1,552	34,187	297	94,274
		6S822510	GRID MOD: INSTALL VS RECLOSER 16C18	20,844	22,852	2,456	33,065	152	79,370
		6S822511	GRID MOD: INSTALL VS RECLOSER 16C18	12,645	16,676	1,405	33,104	72	63,902
		6S822513	GRID MOD: INSTALL VS RECLOSER 27A13	30,086	16,861	1,223	36,362	149	84,681
		6S822531	GRID MOD: INSTALL MR RECLOSER 20A35	13,656	19,514	3,659	36,277	255	73,362
		6S921484	NJC - Agawam, Silver St - Install R	6,209	13,080	1,670	30,373	99	51,432
	WD00298 Total			639,216	1,063,339	206,506	1,912,718	13,897	3,835,676
	WD00301	6A920238	GRID MOD: INSTALL MR RECLOSER 17K7-	11,667	13,189	1,598	33,482	107	60,042
		6A920239	GRID MOD: INSTALL SR 17K7-70S AND F	11,100	13,106	2,130	30,374	163	56,873
		6A920240	GRID MOD: INSTALL TR 18G7-92T AND F	7,549	11,565	1,867	30,040	125	51,146
		6A920441	GRID MOD: INSTALL RECLOSER 21C5-400	5,861	9,906	970	33,372	54	50,163
		6A920730	GRID MOD: INSTALL SR RECLOSER 21C5-	5,139	18,631	1,245	30,526	155	55,697

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		6A920731	GRID MOD: INSTALL MR RECLOSER 21C5-	17,121	14,271	1,070	33,647	83	66,192
		6A920732	GRID MOD: INSTALL TR RECLOSER 21C5-	23,453	15,428	1,230	33,236	75	73,422
		6B920125	GRID MOD: INSTALL TR RECLOSER 30B4-	1,241	10,953	3,414	30,654	153	46,415
		6B920126	GRID MOD: INSTALL SR RECLOSER 30B5-	2,181	15,029	5,488	33,983	147	56,827
		6B920127	GRID MOD: INSTALL TR RECLOSER 16B3-	4,740	12,513	4,069	30,427	103	51,852
		6B920128	GRID MOD: INSTALL TR RECLOSER 30B4-	1,702	11,174	3,589	30,611	142	47,219
		6B920289	GRID MOD: INSTALL RR RECLOSER 15E2-	720	12,684	6,026	32,937	401	52,767
		6B920469	GRID MOD: INSTALL SR RECLOSER 16B5-	114	14,442	4,632	33,121	163	52,470
		6S920349	GRID MOD: INSTALL SR RECLOSER 21N4-	13,972	13,047	2,269	35,880	147	65,314
		6S920350	GRID MOD: INSTALL TR RECLOSER 16C18	17,740	17,389	1,005	30,371	570	67,075
		6S920351	GRID MOD: INSTALL SR RECLOSER 21N9-	16,312	13,993	1,071	32,120	281	63,777
		6S920352	GRID MOD: INSTALL TR RECLOSER 21N9-	16,842	17,800	2,364	29,894	312	67,212
		6S920353	GRID MOD: INSTALL SR RECLOSER 21N9-	11,702	14,105	1,386	32,399	210	59,802
		6S920354	GRID MOD: INSTALL SR RECLOSER 21N9-	26,656	23,700	2,288	33,484	272	86,400
		6S920359	GRID MOD: INSTALL SR RECLOSER 16C16	9,983	15,156	1,254	33,267	78	59,737
		6S920360	GRID MOD: INSTALL TR RECLOSER 30A5-	10,755	13,596	821	30,042	64	55,278
		6S920361	GRID MOD: INSTALL MR RECLOSER 16C16	18,000	18,450	1,030	32,742	348	70,571
		6S920362	GRID MOD: INSTALL SR RECLOSER 30A5-	16,832	18,939	2,553	33,126	94	71,544
		6S920363	GRID MOD: INSTALL TR RECLOSER 30A5-	7,319	11,822	878	29,992	62	50,073
		6S920364	GRID MOD: INSTALL SR RECLOSER 30A2-	7,191	14,896	2,842	33,288	128	58,344
		6S920365	GRID MOD: INSTALL TR RECLOSER 30A2-	9,812	14,955	2,726	30,049	112	57,654
		6S920366	GRID MOD: INSTALL SR RECLOSER 30A4-	10,364	15,261	2,278	31,065	530	59,497
		6S920367	GRID MOD: INSTALL TR RECLOSER 30A5-	14,816	16,287	945	30,853	535	63,436
		6S920368	GRID MOD: INSTALL SR RECLOSER 30A6-	10,053	13,921	1,269	31,350	139	56,732
		6S920369	GRID MOD: INSTALL TR RECLOSER 16C17	9,630	13,659	1,228	29,337	97	53,951
		6S920370	GRID MOD: INSTALL SR RECLOSER 20A21	10,870	13,783	1,935	30,934	97	57,620
		6S920371	GRID MOD: INSTALL TR RECLOSER 20A21	10,602	12,428	1,318	31,056	81	55,485
		6S920372	GRID MOD: INSTALL SR RECLOSER 20A33	23,022	18,134	2,496	32,184	321	76,157
		6S920373	GRID MOD: INSTALL TR RECLOSER 20A33	22,039	20,168	930	31,505	159	74,802
		6S920374	GRID MOD: INSTALL SR RECLOSER 27A4-	13,369	14,224	3,059	30,892	132	61,677
		6S920375	GRID MOD: INSTALL TR RECLOSER 19S2-	9,842	11,597	3,016	30,281	112	54,848
		6S920376	GRID MOD: INSTALL MR RECLOSER 27A4-	19,463	13,859	1,226	31,105	1,700	67,354
		6S920377	GRID MOD: INSTALL SR 27A4-72S AND F	12,346	11,243	961	30,726	71	55,347
		6S920378	GRID MOD: INSTALL SR RECLOSER 21N5-	12,811	14,452	1,764	30,447	261	59,735
		6S920379	GRID MOD: INSTALL TR RECLOSER 21N5-	19,002	19,645	1,546	30,026	56	70,275
		6S920380	GRID MOD: INSTALL SR RECLOSER 21N6-	11,640	10,983	1,344	30,337	222	54,526
		6S920381	GRID MOD: INSTALL TR RECLOSER 21N4-	22,364	12,776	1,871	29,717	222	66,951
		6S920382	GRID MOD: INSTALL SR 27A13-71S AND	26,681	16,935	1,354	31,567	149	76,687
		6S920466	GRID MOD: INSTALL TR 27A4-92T AND F	7,133	9,531	1,075	29,575	56	47,370
		6S920467	GRID MOD: INSTALL TR RECLOSER 27A13	16,824	12,283	1,237	29,563	117	60,024
		WD00301		558,572	651,907	90,667	1,415,589	9,605	2,726,341
		WD00301 Total		1,672,909	4,818,371	1,198,892	7,673,563	112,943	15,476,678
12170 Automated Feeder Reconfiguration Total									
12175 Urban Underground Automation	18328	02290637	IMPRV W-R HYDE PARK AVE OIL SW	-	-	(0)	-	-	-
		02291488	ASU ROX TREMONT ST-RPL OIL SW	4,145	(40,529)	(4,818)	(15,077)	(59)	(56,338)
		02291489	ASU ROX HUNTINGTON AVE-RPL OI	(2,023)	26,538	(5,862)	3,711	(49)	22,315
		02291492	ASU BOS CLARENDON ST-RPL OIL	13,488	(6,896)	28,275	131	464	35,463
		02291493	ASU BOS CHANDLER ST-RPL OIL S	1,200	1,721	643	-	-	3,564
		02291589	ASU BRI COMM AVE REPL 4KV OIL	13,695	18,806	23,945	39,498	839	96,783
		02291596	ASU H-P HYDE PARK AVE REPLACE	(1,201)	44,426	955	7,881	4	52,064
		02291598	ASU W-R CENTRE ST REPL OIL SW	16,097	56,241	22,408	68,489	2,520	165,755
		02291599	ASU W-R SOUTH ST REPL OIL SW	(2,005)	351	(1,447)	8,808	(18)	5,688
		02291604	ASU BKL HARVARD ST RPL 4KV SWT	19,260	30,676	8,038	44,527	2,007	104,509
		02291634	ASU DOR BIRD ST OIL SW REPL M	(11,964)	13,596	18,367	12,158	284	32,441
		02291640	ASU DOR RIVER ST OIL SW REPL	11,433	47,221	1,150	(0)	9	59,813
		02313487	ASU H-P RIVER ST OIL SWITCH R	22,554	80,370	42,790	49,144	6,092	200,950
		02319720	ASU DOR MORTON ST RPL 4KV SW W	43,545	132,347	59,229	4,816	1,937	241,874
		02319725	ASU W-R WASHINGTON STRPL OIL	2,704	30,136	8,367	54,793	844	96,844
		02319735	ASU DOR BLUE HILL AVE RPL 4KV	41,172	161,353	71,055	79,077	3,190	355,847
		02319739	ASU MIL RIVER ST RPL 4KV	13,008	60,788	28,445	46,988	4,951	154,181
		02319754	ASU BOS SHAWMUT AVE RPL 4KV O	42,986	101,067	31,569	47,170	1,505	224,297
		02319863	ASU BKL HARVARD ST RPL 4KV SW	26,392	115,405	60,016	34,947	1,559	238,318
		02319870	ASU DOR MORTON ST RPL 4KV SW	11,560	51,245	23,788	30,279	715	117,588
		02319884	ASU DOR MORTON ST RPL 4KV SW	4,447	41,367	17,500	20,862	715	84,891
		02319888	ASU W-R CENTRE ST RPL 4KV SW	3,715	29,896	12,905	33,100	1,392	81,009
		02319915	ASU W-R CENTRE ST RPL 4KV SW	16,104	92,314	48,458	50,656	2,493	210,026
		02319923	ASU W-R CHURCH ST RPL 4KV SW	11,910	33,882	11,701	32,358	1,698	91,549

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		02319932	ASU ROX TREMONT ST RPL 4KV SW	6,709	83,453	39,400	36,370	2,000	167,932
		02319959	ASU BOS MASSACHUSETTS AVE RPL	8,286	30,059	11,828	38,804	1,579	90,555
		02319967	ASU BOS COLUMBUS AVE RPL 4KV	20,298	87,296	39,219	55,950	2,851	205,614
		02319970	ASU BOS TREMONT ST RPL 4KV SW	43,869	75,549	30,737	36,886	4,136	191,177
		02320762	ASU WAL MAIN STREET RPL 4KV SW	23,386	81,319	34,244	89,486	1,334	229,769
		02320786	ASU WAL MOODY STREET RPL 4KV	6,427	67,364	36,569	70,087	852	181,299
		02320789	ASU WAL MOODY STREET RPL 4KV	3,911	18,292	5,151	32,162	558	60,075
		02320795	ASU WAT GALEN STREET RPL 4KV S	17,847	64,320	24,589	25,302	464	132,524
		02320805	ASU WAT GALEN STREET RPL 4KV S	14,193	85,295	32,667	48,613	807	181,575
		02320807	ASU WAT MT AUBURN ST RPL 4KV S	15,530	39,255	20,212	13,148	1,389	89,533
		02320813	ASU WAL MOODY STREET RPL 4KV	1,964	19,168	5,425	42,080	248	68,886
		02320819	ASU WAL MAIN STREET RPL 4KV S	16,261	41,189	15,773	34,349	488	108,059
		02320824	ASU WAL MOODY STREET RPL 4KV	8,616	76,849	45,246	51,203	855	182,770
		02320825	ASU WAT MAIN STREET RPL 4KV SW		42,213	16,488	55,471	950	115,122
		02320827	ASU WAT GALEN STREET RPL 4KV S	22,405	90,092	38,231	35,620	2,948	189,296
		02329178	ASU DOR BLUE HILL AVE REPL &I	8,537	32,207	12,364	44,262	693	98,062
		02330554	ASU S-B DORCHESTER ST REPL OI	22,407	76,276	31,395	61,734	7,063	198,875
		02330556	ASU S-B L ST REPL OIL SWITCH	4,611	36,193	13,080	52,602	3,000	109,487
		02332189	ASU S-B DORCHESTER ST REPLACE	5,954	54,744	23,734	83,585	10,214	178,231
		02332194	ASU BOS COLUMBUS AVE-RPL 4KV	6,730	31,095	12,057	34,329	2,411	86,622
		02332195	ASU S-B DORCHESTER AVE REPL &	7,208	71,763	27,122	95,492	5,271	206,855
		02332196	ASU S-B DORCHESTER AVE REPL O	20,357	119,264	55,088	53,964	5,539	254,212
		02332198	ASU BOS CAMDEN ST-RPL OIL SW	5,147	82,053	44,487	57,604	5,282	194,573
		02332200	ASU BOS ALBANY ST REPL & INST	11,637	31,577	10,984	17,717	447	72,363
		02336429	ASU W-R WASHINGTON ST RPLOIL S	66,918	81,893	13,110	37,336	1,462	200,719
		02337262	ASU S-B REPLACE OIL SWITCH IN	2,390	28,206	16,004	14,646	24,845	86,091
		02337264	ASU S-B REPLACE OIL SWITCH IN	5,052	21,704	6,747	32,624	2,096	68,223
		02340862	ASU DOR STOUGHTON ST MH1092 R	14,080	58,791	20,892	63,052	4,737	161,552
		02340863	ASU DOR BOSTON ST MH10126 REP	25,748	87,008	40,362	42,226	10,397	205,742
		02340874	ASU BOS HARRISON AVE REPL OIL	843	12,198	7,081	-	230	20,352
		02340877	ASU DOR DORCHESTER AVE MH1746	7,796	26,720	14,130	35,680	1,367	85,694
		02341417	ASU DOR DORCHESTER AVE MH1747	17,658	83,225	24,367	40,796	705	166,750
		02341439	ASU DOR BLUE HILL AVE MH7244	22,887	42,978	8,105	36,188	1,326	111,485
		02341468	ASU S-B MH2143 REPLACE OIL SW	2,781	14,573	5,516	27,220	577	50,668
		02341469	ASU S-B MH9598 REPLACE OIL SW	6,844	43,212	16,161	59,052	6,506	131,774
		02341470	ASU W-R WASHINGTON ST REPL &	1,683	32,244	14,884	32,959	1,307	83,077
		02341471	ASU ROX MH9149 REPL OIL S	30,030	139,044	58,158	53,773	2,121	283,126
		02341472	ASU W-R SOUTH ST REPL & INS	2,539	36,947	14,264	51,293	1,376	106,419
		02341473	ASU W-R SOUTH ST REPL & INS	30,147	86,779	33,895	48,606	2,200	201,627
		02343883	ASU BKL HARVARD ST RPL 4KV	28,932	140,514	53,243	110,953	3,265	336,907
		02348625	ASU BOS HARRISON AVE-REPL OIL	25,476	106,777	42,611	60,597	2,735	238,196
		02348633	ASU BOS HARRISON AVE-REPL OIL	28,141	101,834	40,093	37,871	1,808	209,746
		02348643	ASU BOS RUTLAND ST-MH20668-RE	39,457	136,299	52,136	56,962	2,478	287,332
		02349730	ASU W-R HYDE PARK AVE INST &	21,076	100,810	40,215	35,607	2,730	200,438
		02350766	ASU BRI BRIGHTON AVE REPL &	6,385	70,080	27,315	52,295	528	156,603
		02350769	ASU BRI BRIGHTON AVE REPL &	36,850	119,904	42,973	49,927	1,071	250,725
		02351101	ASU W-R SOUTH ST REPL & INST	2,004	28,247	10,693	44,818	1,028	86,790
		02351115	ASU BKL HARVARD ST REPL AND I	8,314	34,939	13,140	34,388	959	91,739
		02351144	ASU W-R WASHINGTON ST REPL	12,099	86,426	40,774	35,543	912	175,754
		02353738	ASU DOR BLUE HILL AVE MH7249	34,753	107,026	38,887	41,457	985	223,108
		02354744	ASU BKL HAMMOND ST REPL & INS	2,727	16,050	3,100	26,013	550	48,440
		02355898	ASU BOS P SULLIVAN WAY-MH1464	9,781	28,653	6,342	37,246	224	82,247
		02355913	ASU BOS PAUL SULLIVAN WAY-MH1	35,811	140,287	61,325	41,389	3,277	282,088
		02355923	ASU BOS ALBANY ST MH1883-R	12,187	62,127	18,376	48,836	1,080	142,606
		02355932	ASU BOS ALBANYST-MH20565-RPL	13,345	58,945	26,422	55,381	2,721	156,813
		02355936	ASU BOS ALBANY ST MH7130-RPL	449	24,909	9,986	38,315	633	74,293
		02355944	ASU BOS SHAWMUT AVE-MH8006-RP	16,778	92,602	38,355	60,844	3,595	212,175
		02356927	ASU NEW WASHINGTON ST MH7051	10,813	52,665	13,311	52,649	637	130,076
		02357134	ASU BKL BEACON ST REPL & INST	3,652	16,106	4,651	14,716	155	39,281
		02357138	ASU BKL ST PAUL ST REPL & INS	3,964	27,656	7,848	43,252	599	83,319
		02359097	ASU DOR MORTON ST REPL OS W G	8,902	36,789	10,029	34,773	931	91,423
		02359103	ASU ROX HARRISON AVE 318-07 R	169	21,568	8,632	36,154	593	67,117
		02361042	ASU BRI COMMONWEALTH AVE REPL	9,492	26,137	24,896	33,054	301	93,880
		02366617	ASU BOS AGUADILA ST-REPL OIL	37,145	126,235	47,332	38,124	774	249,610
		02373549	ASU NEW WASHINGTON ST MH3940 R		43,823	22,425	12,542	703	79,493
		02373552	ASU NEW WASHINGTON ST MH3457 R	5,822	47,993	8,264	41,896	517	104,493

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
	18328 Total			1,256,432	5,210,131	2,140,619	3,572,191	191,510	12,370,883
	19293	02333579	ASU BRI CAMBRIDGE ST INST RTU	161	9,634	2,832	12,170	-	24,798
		02333589	ASU BRI EVERETT ST INST RTU &	114	8,828	2,003	13,541	18	24,504
		02333599	ASU BRI COMMONWEALTH AVE RTU &	14,666	24,797	5,424	12,170	45	57,102
		02333605	ASU BRI COMMONWEALTH AVE RTU &	174	12,452	4,205	13,532	18	30,381
		02350748	ESPEC BRI VARIOUS STA36 LOCATIO	-	2,601	-	6,410	-	9,010
		02358841	ASU BKL HARVARD ST INST RTU &	5,027	11,773	2,806	11,262	45	30,914
		02358858	ASU BRI HARVARD ST REPL SW IN	1,873	13,926	2,155	22,577	-	40,531
	19293 Total			22,015	84,012	19,425	91,662	126	217,240
12175 Urban Underground Automation Total				1,308,845	5,295,611	2,163,658	3,699,638	120,371	12,588,123
12180 Communications	19286	02345493	FIBER1 DUXBURY STATION REPEATER/M	4,463	19,718	34,305	32,642	14,456	105,583
12180	19286 Total			4,463	19,718	34,305	32,642	14,456	105,583
12180	19288	02326792	ESPEC BAR SHOOT FLY HILL MASTER	6,797	16,344	8,249	12,139	1,276	44,805
12180	19288 Total			6,797	16,344	8,249	12,139	1,276	44,805
12180	19289	02333969	ESPEC PRUDENTIAL MASTER INSTALLA	558	5,524	3,125	2,221	140	11,569
12180	19289 Total			558	5,524	3,125	2,221	140	11,569
12180 Communications Total				139,319	62,812	75,926	136,123	1,398	161,957
12185 Distribution System Network Operator	WD00308	6A822162	VVO REGULATORS.INSTALL 3 - 7.6 548A	(5,182)	18,191	3,918	7,384	120	24,430
		6A822163	VVO REGULATORS.INSTALL 3 - 7.6 548A	14,227	14,884	510	95,651	674	125,946
		6A822165	VVO REGULATORS.INSTALL 3 - 7.6 548A	(3,256)	16,455	2,527	11,863	116	27,705
		6A920104	VVO REGULATORS.INSTALL 3 - 7.6 548A	11,758	7,590	840	11,335	49	31,572
		6A920106	VVO REGULATORS.INSTALL 3 - 7.6 219A	9,991	17,513	1,173	59,017	199	87,892
		6A920107	VVO REGULATORS. INSTALL 3 - 7.6 548	9,586	7,378	893	11,151	55	29,063
		6A920108	VVO REGULATORS INSTALL 3 - 7.6 219A	8,594	14,787	209	57,531	48	81,168
		6A920109	VVO REGULATORS. INSTALL 3 - 7.6 KV	15,247	16,122	899	56,624	218	89,109
		6A920110	VVO REGULATORS. INSTALL 2 - 4.8KV 1	12,794	13,382	701	33,736	276	60,888
		6A920111	VVO REGULATORS. INSTALL 3 - 7.6 548	16,104	17,298	707	98,343	189	132,640
		6A920112	VVO REGULATORS. INSTALL 3 - 7.6 548	13,905	4,266	771	9,102	58	28,102
		6A920113	VVO REGULATORS. INSTALL 1 - 100A R	3,367	3,766	185	17,700	67	25,085
		6A920114	VVO REGULATORS. INSTALL 1 - 4.8KV 1	3,813	3,982	237	18,229	39	26,300
		6A920115	VVO REGULATORS. INSTALL 1 - 100A R	3,517	3,863	137	18,376	39	25,933
		6A920119	VVO REGULATORS. INSTALL 1 - 100A R	2,842	4,101	204	16,900	84	24,132
		6A920120	VVO REGULATORS.INSTALL 1 - 4.8 100	7,729	4,787	252	17,283	90	30,141
		6A920121	VVO REGULATORS.INSTALL 1 - 4.8 100	5,969	3,645	239	15,021	93	24,967
		6A920153	VVO - INSTALL 13.8KV 600KVAR CAPACI	5,254	4,536	241	18,902	38	28,971
		6A920154	VVO - INSTALL 13.8KV 600KVAR CAPACI	4,388	5,709	360	19,265	31	29,753
		6A920155	VVO - INSTALL 13.8KV 600KVAR CAPACI	3,552	4,088	210	18,774	34	26,658
		6A920156	VVO - REPLACE CAPACITOR BANK ON 41/	6,862	4,907	291	18,828	40	30,928
		6A920157	VVO - INSTALL 13.8KV 1200KVAR CAPAC	8,230	6,821	672	19,395	67	35,185
		6A920158	VVO - INSTALL 13.8KV 600KVAR CAPACI	4,633	4,196	242	18,705	36	27,811
		6A920159	VVO - INSTALL 13.8KV 1200KVAR CAPAC	2,258	7,241	2,252	19,473	37	31,261
		6A920160	VVO - INSTALL 13.8KV 600KVAR CAPACI	7,047	4,769	282	18,740	38	30,877
		6A920161	VVO - INSTALL 13.8KV 600KVAR CAPACI	4,435	4,990	811	18,622	10	28,869
		6A920162	VVO - INSTALL 13.8KV 600KVAR CAPACI	7,540	6,731	1,182	18,782	33	34,268
		6A920163	VVO - INSTALL 13.8KV 600KVAR CAPACI	4,136	5,513	486	18,834	31	29,000
		6A920164	VVO - INSTALL 13.8KV 600KVAR CAPACI	4,603	5,939	454	19,177	31	30,204
		6A920165	VVO - INSTALL 13.8KV 600KVAR CAPACI	5,119	4,944	572	18,707	11	29,353
		6A920166	VVO - INSTALL 13.8KV 1200KVAR CAPAC	4,702	6,350	696	19,709	33	31,490
		6A920167	VVO - INSTALL CAPACITOR BANK 1200 K	3,261	5,360	338	18,896	31	27,886
		6A920168	VVO - INSTALL 13.8KV 600KVAR CAPACI	4,398	4,254	403	18,302	36	27,393
		6A920169	VVO - INSTALL 13.8KV 1200KVAR CAPA	4,898	6,115	703	18,896	81	30,693
		6A920170	VVO - INSTALL 13.8KV 600KVAR CAPACI	5,496	4,555	201	18,683	56	28,991
		6A920171	VVO - INSTALL 13.8KV 600KVAR CAPAC	3,756	4,410	272	18,739	37	27,214
		6A920172	VVO - INSTALL 13.8KV 1200KVAR CAPAC	533	3,670	93	18,974	130	23,401
		6A920820	VVO: INSTALL 3 LINE SENSORS FOR FEE	667	1,297	-	6,435	13	8,412
		6A920821	VVO: INSTALL 3 LINE SENSORS FOR FEE	667	1,297	-	6,435	13	8,412
		6A920822	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,214	1,433	-	6,435	13	9,095
		6A920823	VVO: INSTALL 3 LINE SENSORS FOR FEE	667	1,563	-	6,435	13	8,678
		6A920824	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,411	1,483	-	6,435	14	9,342
		6A920825	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,175	1,424	-	6,435	13	9,047
		6A920826	VVO: INSTALL 3 LINE SENSORS FOR FEE	3,515	1,872	-	6,435	14	11,837
		6A921600	VVO: INSTALL END OF LINE SENSORS IN	3,126	4,447	189	9,353	15	17,130
		6A921601	VVO: INSTALL END OF LINE SENSORS IN	590	5,223	114	8,667	28	14,623
		6A921602	VVO: INSTALL END OF LINE SENSORS IN	1,570	7,275	703	16,212	32	25,792
		6A921603	VVO: INSTALL END OF LINE SENSORS IN	2,139	10,212	79	22,900	46	35,377
		6A921604	VVO: INSTALL END OF LINE SENSORS IN	849	3,629	207	10,037	15	14,737

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		6A921606	VVO: INSTALL END OF LINE SENSORS IN	1,187	6,840	69	16,026	8	24,130
		6A921696	VVO: INSTALL END OF LINE SENSORS IN	608	3,326	80	7,986	20	12,020
		6A921841	VVO: INSTALL END OF LINE SENSORS IN	528	6,596		14,799	7	21,930
		6A921842	VVO: INSTALL END OF LINE SENSORS IN	342	3,573	414	7,209	11	11,549
		6S822406	VVO REGULATORS.INSTALL 3 - 7.6 548A	29,563	8,712	654	12,738	538	52,206
		6S822408	VVO REGULATORS. INSTALL 3 - 300A R	10,555	15,399	491	88,897	310	115,652
		6S920190	VVO REGULATORS. INSTALL 3 - 7.6 548	50,915	25,265	928	98,992	663	176,764
		6S920192	VVO REGULATORS. INSTALL 3 - 7.6 548	44,312	21,453	694	99,892	637	166,987
		6S920193	VVO REGULATORS. INSTALL 3 - 7.6 548	61,015	15,410	292	98,806	678	176,202
		6S920194	VVO REGULATORS. INSTALL 3 - 7.6 219	35,658	20,352	839	59,155	129	116,133
		6S920195	VVO REGULATORS. INSTALL 3 - 7.6 548	35,036	22,432	992	95,929	529	154,917
		6S920196	VVO REGULATORS. INSTALL 3 - 7.6 548	40,992	21,537	1,266	97,004	464	161,263
		6S920197	VVO REGULATORS. REPLACE 3 - 7.6 548	16,198	28,117	1,597	13,856	38	59,807
		6S920198	VVO REGULATORS. INSTALL 3 - 7.6 548	29,090	7,628	751	14,274	103	51,846
		6S920199	VVO REGULATORS. INSTALL 1 - 7.6 100	5,260	5,752	-	17,875	104	28,992
		6S920278	VVO - INSTALL CAPACITOR BANK 600 KV	15,299	5,946	209	19,283	46	40,782
		6S920279	VVO - INSTALL 13.8KV 1200KVAR CAPAC	14,062	5,890	212	19,724	80	39,968
		6S920280	VVO - INSTALL13.8KV 1200KVAR CAPACI	5,654	9,282	345	19,385	29	34,695
		6S920282	VVO - INSTALL CAPACITOR BANK 600 KV	5,621	4,297	179	18,750	37	28,884
		6S920283	VVO - INSTALL CAPACITOR BANK 600 KV	5,851	4,439	289	18,964	37	29,580
		6S920284	VVO - INSTALL 13.8KV 1200KVAR CAPAC	12,207	5,403	199	19,355	37	37,201
		6S920285	VVO - INSTALL 13.8KV 600KVAR CAPACI	5,153	8,775	206	18,903	50	33,086
		6S920286	VVO - INSTALL 13.8KV 600 KVAR CAPAC	12,256	6,295	201	18,987	169	37,908
		6S920287	VVO - INSTALL 13.8KV 600KVAR CAPACI	7,887	8,970	122	18,902	51	35,932
		6S920288	VVO INSTALL 13.8KV 600 KVAR CAP BAN	12,350	5,518	317	18,812	39	37,036
		6S920289	VVO - INSTALL 13.8KV 1200 KVAR CAPA	11,131	5,236	203	19,334	37	35,940
		6S920290	VVO - INSTALL 13.8KV 1200KVAR CAPAC	12,944	5,678	123	19,814	49	38,607
		6S920291	VVO - REPLACE EXISTING POLE & CAPACI	7,129	5,040	287	19,813	221	32,490
		6S920292	VVO - INSTALL CAPACITOR BANK ON P17	7,680	5,064	208	19,242	43	32,237
		6S920293	VVO - INSTALL 13.8KV 1200KVAR CAPAC	8,098	7,209	268	19,884	20	35,479
		6S920294	VVO - INSTALL 66 KVAR CAP BANK ON	8,578	6,155	350	18,767	64	33,913
		6S920295	VVO - INSTALL 13.8KV 1200 KVAR CAPA	6,134	5,628	225	19,455	65	31,507
		6S920296	VVO - INSTALL 13.8 KV 1200 KVAR CAP	5,848	5,826	411	19,359	32	31,475
		6S920297	VVO - INSTALL CAPACITOR BANK ON NEW	13,812	9,084	1,363	19,379	72	43,710
		6S920298	VVO - INSTALL 13.8KV 600KVAR CAPACI	5,335	5,875	486	19,287	33	31,017
		6S920299	VVO - INSTALL 600kVAR CAPACITOR B	5,568	5,682	493	18,878	48	30,670
		6S920300	VVO - INSTALL 13.8KV 600KVAR CAPACI	6,604	6,131	597	18,654	63	32,050
		6S920301	VVO - INSTALL 13.8KV 1200KVAR CAPAC	6,654	6,226	285	19,990	35	33,191
		6S920302	VVO - INSTALL CAPACITOR BANK ON NEW	11,473	7,550	687	19,315	35	39,060
		6S920303	VVO - INSTALL 13.8KV 1200KVAR CAPAC	10,882	5,562	395	19,319	120	36,278
		6S920304	VVO - INSTALL 13.8KV 1200KVAR CAPAC	6,770	5,967	306	19,431	67	32,542
		6S920305	VVO - REPLACE EXISTING CAPACITOR WI	5,812	5,809	248	19,449	33	31,350
		6S920306	VVO - INSTALL 13.8KV 1200 KVAR CAPA	9,564	6,396	265	19,431	66	35,722
		6S920307	VVO - INSTALL CAPACITOR BANK ON P15	6,830	5,819	367	18,846	62	31,924
		6S920308	VVO - INSTALL CAPACITOR BANK ON P14	7,976	5,999	181	19,130	65	33,352
		6S920309	VVO - INSTALL 600 KVAR CAP BANK ON	7,219	4,809	409	19,253	11	31,702
		6S920310	VVO - INSTALL 13.8KV 1200KVAR CAPAC	7,877	5,720	251	19,007	135	32,990
		6S920311	VVO - INSTALL CAPACITOR BANK 600 KV	13,896	10,712	352	19,340	31	44,331
		6S920312	VVO - INSTALL CAPACITOR BANK 1200 K	6,461	4,865	297	19,736	44	31,402
		6S920313	VVO - INSTALL CAPACITOR BANK ON P15	22,691	6,324	261	19,220	166	48,662
		6S920314	VVO - INSTALL 13.8KV 1200KVAR CAPA	7,161	5,230	479	20,103	46	33,019
		6S920315	VVO - INSTALL 13.8V 600KVAR CAPACIT	9,880	5,232	149	19,671	48	34,979
		6S920317	VVO - REPLACE EXISTING POLE & CAPACI	7,437	4,976	383	19,256	46	32,098
		6S920318	VVO - INSTALL 13.8KV 600KVAR CAPACI	8,430	5,052	294	19,192	43	33,011
		6S920319	VVO - INSTALL CAPACITOR BANK ON P20	7,223	9,446	543	18,789	2	36,003
		6S920320	VVO - REPLACE CAPACITOR BANK ON POL	9,541	5,224	228	19,191	16	34,199
		6S920321	VVO - INSTALL 13.8KV 600KVAR CAPACI	8,110	4,904	234	19,191	15	32,454
		6S920322	VVO - INSTALL 1-13.8KV 600KVAR CAPA	4,403	4,577	335	19,199	81	28,595
		6S920323	VVO - INSTALL 13.8KV 1200KVAR CAPAC	8,558	5,043	399	19,092	11	33,103
		6S920324	VVO - INSTALL 13.8KV 600KVAR CAPACI	11,854	6,784	480	19,900	60	39,078
		6S920325	VVO - INSTALL CAPACITOR BANK ON P19	9,837	5,195	397	19,159	175	34,762
		6S920326	VVO - INSTALL 13.8KV 1200KVAR CAPAC	6,170	4,738	248	19,931	42	31,128
		6S920327	VVO - INSTALL 600 KVA CAP BANK ON P	5,797	4,429	225	19,222	11	29,683
		6S920328	VVO - INSTALL CAPACITOR BANK ON P19	10,406	6,011	323	19,098	1,638	37,476
		6S920329	VVO - INSTALL CAPACITOR BANK 1200 K	5,805	4,486	269	19,305	1,613	31,478
		6S920330	VVO - INSTALL CAPACITOR BANK 600 KV	5,441	4,473	315	18,918	12	29,159

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		6S920331	VVO - INSTALL 13.8KV 1200KVAR CAPAC	10,705	5,664	179	19,832	23	36,403
		6S921221	VVO: INSTALL 3 LINE SENSORS FOR 21N	1,271	1,286	-	6,435	13	9,004
		6S921222	VVO: INSTALL 3 LINE SENSORS FOR 21N	2,380	1,399	-	6,435	13	10,226
		6S921223	VVO: INSTALL 3 LINE SENSORS FOR 21N	1,218	1,275	-	6,435	13	8,941
		6S921224	VVO: INSTALL 3 LINE SENSORS FOR 21N	1,218	1,275	-	6,435	13	8,941
		6S921225	VVO: INSTALL 3 LINE SENSORS FOR 21N	1,218	1,275	-	6,435	13	8,941
		6S921226	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,218	1,533	198	6,435	13	9,396
		6S921227	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,437	1,577	198	6,435	13	9,660
		6S921228	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,547	1,522	99	6,435	14	9,617
		6S921229	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,218	1,404	99	6,435	13	9,169
		6S921230	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,218	1,275	-	6,435	13	8,941
		6S921232	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,357	1,303	-	6,435	13	9,107
		6S921233	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,301	1,292	-	6,435	13	9,041
		6S921234	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,301	1,292	-	6,435	13	9,041
		6S921235	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,301	1,292	-	6,435	13	9,041
		6S921236	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,357	1,303	-	6,435	13	9,107
		6S921237	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,329	1,298	-	6,435	13	9,074
		6S921238	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,329	1,298	-	6,435	13	9,074
		6S921313	VVO: INSTALL 3 LINE SENSORS FOR FEE	-	1,141	-	6,435	25	7,601
		6S921339	VVO: INSTALL 3 LINE SENSORS FOR FEE	1,357	1,325	-	6,485	13	9,179
		6S922246	VVO: INSTALL END OF LINE SENSORS IN	707	269	140	1,696	5	2,818
		6S922247	VVO: INSTALL END OF LINE SENSORS IN	6,577	14,974	468	88,167	45	110,231
		6S922337	VVO: INSTALL END OF LINE SENSORS IN	4,351	34,581	971	103,914	129	143,947
	WD00308 Total			1,097,226	916,488	54,771	3,108,843	14,227	5,191,555
	WS00033	WS000331	LTC Control Replacement (VVO)	167,473	116,255	4,699	40,523	94	329,044
	WS00033 Total			167,473	116,255	4,699	40,523	94	329,044
	WS00034	WS000341	LTC Control Replacement (VVO)	72,920	162,910	71,924	35,703	2,604	346,061
	WS00034 Total			72,920	162,910	71,924	35,703	2,604	346,061
	WS00035	WS000351	LTC Control Replacement (VVO)	123,786	154,173	19,397	34,065	615	332,036
	WS00035 Total			123,786	154,173	19,397	34,065	615	332,036
	WS00036	WS000361	DSCADA LTC CONTROLS UPGRADE	125,481	88,783	54,626	45,614	4,226	318,730
	WS00036 Total			125,481	88,783	54,626	45,614	4,226	318,730
12185 Distribution System Network Operator Total				1,588,544	1,441,864	206,506	3,269,182	11,329	6,517,425
12190 Advanced Sensing Technology	18329	02290224	ASU H-P HYDE PARK AVE PMH-16	29	4,309	1,933	4,903	61	11,235
		02290226	ASU DOR RIVER ST PMH21047 4	277	18,360	6,505	34,367	1,867	61,376
		02290305	ASU BRI HARVARD ST AUTOMATE P	41	3,920	1,093	6,130	192	11,377
		02290366	ASU BKL SEWALL AVE AUTOMATE PM	(1)	5,838	3,108	5,702	339	14,987
		02290435	ASU ROX 2101-WASHINGTON ST-INS	119	5,577	2,211	7,201	34	15,142
		02316754	ASU BOS BROOKLINE AVE PMH1025	1,625	2,145	1,028	527	9	5,335
		02316762	ASU BRI BEACON STREET PMH2053	1,634	8,366	1,297	14,849	0	26,146
		02316767	ASU W-R CATBIRD CT PMH21713 4	1,704	3,847	2,478	268	36	8,311
		02316774	ASU DOR TAYLOR TERRACE PMH219	1,610	2,877	1,080	1,597	8,645	15,810
		02316778	ASU W-R CENTRE STREET PMH2203	1,677	8,237	2,311	12,301	78	24,604
		02316781	ASU BRI WESTERN AVE PMH22034	2,056	6,684	1,565	8,658	66	19,029
		02316790	ASU S-B KEMP STREET PMH22601	2,721	7,374	2,481	7,529	39	20,144
		02316794	ASU BOS LANSLOWNE STREET PMH2	1,669	3,153	2,002	64	31	6,919
		02316798	ASU DOR BLUE HILL AVE PMH2174	1,700	4,719	3,137	287	49	9,892
		02316803	ASU W-R BEECH STREET [MH22775	1,624	4,417	1,350	5,932	337	13,660
		02316807	ASU W-R WALK HILL STREET PMH2	1,576	1,998	148	2,369	4	6,094
		02316813	ASU H-P RIVER STREET PMH22876	1,570	6,304	2,528	9,575	120	20,097
		02316818	ASU DOR BLUE HILL AVE PMH2325	1,701	3,975	2,629	287	42	8,634
		02316825	ASU E-B MOORE STREET PMH23350	1,598	2,103	587	1,765	12	6,066
		02316828	ASU E-B HORACE STREET PMH2412	1,589	4,187	2,411	2,606	79	10,872
		02316831	ASU CHA BEACHAM STREET PMH-13	1,585	2,537	1,169	1,713	35	7,038
		02316851	ASU SOM FOLEY STREET PMH23335	2,310	2,499	897	287	14	6,007
		02316855	ASU SOM ARTISAN WAY PMH23490	1,573	2,663	860	2,369	18	7,483
		02316856	ASU SOM ASSEMBLY ROW PMH24133	1,573	5,886	1,842	6,271	28	15,599
		02316859	ASU CHA WEST SCHOOL STREET PM	1,573	3,545	1,459	(271)	113	6,419
		02316860	ASU SOM SHERMAN STREET PMH227	1,573	4,729	2,553	1,709	49	10,612
		02316863	ASU CHA RUTHERFORD AVE PMH328	1,597	6,303	1,350	13,967	83	23,299
		02316866	ASU CHA 1ST AVE PMH20755 250-	1,499	8,101	4,280	6,371	226	20,476
		02316875	ASU CHA 1ST AVE PMH24112 250-	1,420	11,189	7,353	2,046	192	22,200
		02316888	ASU CHE SPRUCE STREET PMH3209	1,573	1,835	914	64	34	4,421
		02316896	ASU E-B MAVERICK STREET PMH23	1,590	10,198	3,206	18,238	276	33,507
		02319158	ASU ROX PILGRAM STREET PMH-24	1,649	10,855	1,574	20,409	69	34,555
		02323629	ASU S-B 54 ZEIGLER ST	675	7,491	3,395	6,483	29	18,095

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		02323640	ASU BOS 50 NORTHAMPTON ST- NS	386	4,325	1,254	8,125	63	14,153
		02323647	ASU S-B BOSTON ST DSCADA PK	(38)	7,014	3,001	5,345	31	15,353
		02324677	ASU WAL PMH23942 TOWER RD. 282	44	3,312	1,840	2,885	21	8,101
		02324678	ASU WAL PMH23943 TOWER RD. 282	31	3,958	2,446	2,107	61	8,602
		02324680	ASU NEE PMH24258 A ST. 292-H10	(1)	1,753	1,342	64	5	3,163
		02324681	ASU NEE PMH24259 A ST. 292-H10	(1)	1,370	1,059	64	7	2,500
		02324691	ASU BUR PMH23832 3RD AVE. 391-	(1)	2,902	1,589	2,863	25	7,378
		02324697	ASU BUR PMH6968 WALL ST. 391-H	(1)	1,880	948	2,731	87	5,646
		02329170	ASU ROX ALBANY ST INSTALL AUT	(19)	6,394	1,941	11,254	78	19,648
		02329173	ASU ROX MASS AVE INSTALL AUT	2	6,775	1,274	16,397	33	24,481
		02329177	ASU E-B EAST PIER DR INST AUT	2	218	148	343	0	711
	18329 Total			47,111	226,122	89,576	258,750	13,620	635,180
	18350	02373446	STACONS STA 611 REPLACE 13.8KV REL	121,023	226,240	89,576	258,750	13,643	1,605,207
	18350 Total			121,023	792,272	439,193	247,000	5,719	1,605,207
	18351	02313517	STACONS STA 738 REPLACE 13.8KV REL	103,495	289,596	158,435	93,129	6,361	651,016
	18351 Total			103,495	289,596	158,435	93,129	6,361	651,016
	18352	02373456	STACONS STA 828 REPLACE 13.8KV REL	219,975	737,668	357,774	542,866	6,859	1,865,142
	18352 Total			219,975	737,668	357,774	542,866	6,859	1,865,142
	18354	02313520	STACONS STA 60 INSTALL NEW RTU & R	577,682	614,529	165,675	337,611	35,442	1,730,939
	18354 Total			577,682	614,529	165,675	337,611	35,442	1,730,939
	19182	02316865	STACONS STA 968 REPLACE 23.8KV REL	124,295	364,661	173,281	15,987	10,670	688,894
	19182 Total			124,295	364,661	173,281	15,987	10,670	688,894
	19245	02373467	STACONS STA 282 REPLACE RELAYS - G	99,135	127,975	37,067	38,191	512	302,880
	19245 Total			99,135	127,975	37,067	38,191	512	302,880
	19246	02375895	STACONS STA 455 REPLACE RELAYS - G	169,129	274,519	94,145	72,990	1,769	612,552
	19246 Total			169,129	274,519	94,145	72,990	1,769	612,552
	19247	02373475	STACONS STA 26 REPLACE RELAYS - GR	287,924	399,730	117,839	111,284	2,449	919,225
	19247 Total			287,924	399,730	117,839	111,284	2,449	919,225
	GMW10101	GMW10101	Grid Mod Feeder Relay Replacement	574,303	794,507	200,257	107,670	8,796	1,685,532
	GMW10101 Total			574,303	794,507	200,257	107,670	8,796	1,685,532
	GMW10301	GMW10301	Grid Mod Feeder Relay Replacement	311,397	289,472	104,689	119,428	8,364	833,350
	GMW10301 Total			311,397	289,472	104,689	119,428	8,364	833,350
	GMW10401	GMW10401	Grid Mod Feeder Relay Replacement	602,364	741,218	62,896	87,897	4,071	1,498,446
	GMW10401 Total			602,364	741,218	62,896	87,897	4,071	1,498,446
	WD00299	6S920500	GM: REPLACE NETWORK RELAY BANK N-13	3,147	3,395	1,166	5,036	29	12,773
		6S920501	GM: REPLACE NETWORK RELAY BANK N-13	2,101	3,310	1,318	4,721	25	11,475
		6S920502	GM: REPLACE NETWORK RELAY BANK N-23	2,101	3,181	1,161	4,587	25	11,055
		6S920503	GM: REPLACE NETWORK RELAY BANK N-33	2,101	2,960	879	4,587	24	10,551
		6S920504	GM: REPLACE NETWORK RELAY BANK N-13	2,101	3,667	1,802	4,587	25	12,182
		6S920505	GM: REPLACE NETWORK RELAY BANK N-20	111	832	839	762	7	2,551
		6S920506	GM: REPLACE NETWORK RELAY BANK N-14	2,077	1,874	924	4,522	32	9,429
		6S920507	GM: REPLACE NETWORK RELAY BANK N-38	2,077	1,184	908	762	10	4,942
		6S920508	GM: REPLACE NETWORK RELAY BANK N-72	111	1,680	1,048	7,123	32	9,994
		6S920512	GM: REPLACE NETWORK RELAY BANK N-82	370	3,271	1,588	4,606	23	9,858
		6S920513	GM: REPLACE NETWORK RELAY BANK N-71	135	2,568	773	4,706	20	8,201
		6S920514	GM: REPLACE NETWORK RELAY BANK N-10	135	2,830	1,133	4,587	30	8,715
		6S920515	GM: REPLACE NETWORK RELAY BANK N-19	135	2,584	788	4,587	20	8,115
		6S920516	GM: REPLACE NETWORK RELAY BANK N-75	135	2,408	582	4,587	19	7,731
		6S920517	GM: REPLACE NETWORK RELAY BANK N-42	135	3,651	3,048	4,587	77	11,498
		6S920518	GM: REPLACE NETWORK RELAY BANK N-14	135	3,469	2,442	5,854	31	11,930
		6S920519	GM: REPLACE NETWORK RELAY BANK N-67	135	2,639	878	4,587	19	8,259
		6S920520	GM: REPLACE NETWORK RELAY BANK N-34	111	1,579	952	4,587	27	7,256
		6S920521	GM: REPLACE NETWORK RELAY BANK N-28	83	2,399	588	4,587	19	7,676
		6S920523	GM: REPLACE NETWORK RELAY BANK N-86	2,101	2,997	933	4,587	24	10,642
		6S920524	GM: REPLACE NETWORK RELAY BANK N-16	2,101	3,075	932	4,587	23	10,717
		6S920525	GM: REPLACE NETWORK RELAY BANK N-15	2,269	3,430	1,491	4,587	44	11,820
		6S920526	GM: REPLACE NETWORK RELAY BANK N-18	135	2,765	1,056	4,587	19	8,562
		6S920528	GM: REPLACE NETWORK RELAY BANK N-68	2,049	1,880	950	4,587	31	9,497
		6S920529	GM: REPLACE NETWORK RELAY BANK N-55	2,049	1,906	993	4,587	30	9,566
		6S920530	GM: REPLACE NETWORK RELAY BANK N-3	83	1,734	1,224	4,587	53	7,682
		6S920535	GM: REPLACE NETWORK RELAY BANK N-12	135	3,037	1,353	4,587	22	9,134
		6S920536	GM: REPLACE NETWORK RELAY BANK N-10	135	3,020	1,333	5,390	23	9,900
		6S920537	GM: REPLACE NETWORK RELAY BANK N-11	135	2,876	1,153	4,587	21	8,773
		6S920538	GM: REPLACE NETWORK RELAY BANK N-7	111	1,639	1,004	4,587	28	7,370
		6S920539	GM: REPLACE NETWORK RELAY BANK N-37	83	2,075	1,598	4,587	36	8,380
		6S920540	GM: REPLACE NETWORK RELAY BANK N-78	83	2,058	1,576	4,587	27	8,332

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		6S920541	GM: REPLACE NETWORK RELAY BANK N-15	83	1,634	1,005	4,587	28	7,338
		6S920542	GM: REPLACE NETWORK RELAY BANK N-58	251	1,665	1,025	4,587	27	7,555
		6S920543	GM: REPLACE NETWORK RELAY BANK N-13	83	1,605	968	4,587	28	7,272
		6S920544	GM: REPLACE NETWORK RELAY BANK N-69	83	820	835	762	7	2,506
		6S920545	GM: REPLACE NETWORK RELAY BANK N-73	56	1,517	865	4,587	28	7,052
		6S920546	GM: REPLACE NETWORK RELAY BANK N-61	7,808	3,951	1,063	4,751	33	17,606
		6S920548	GM: REPLACE NETWORK RELAY BANK N-47	2,264	3,205	1,162	4,587	24	11,243
		6S920549	GM: REPLACE NETWORK RELAY BANK N-43	2,320	3,073	990	4,660	24	11,066
		6S920550	GM: REPLACE NETWORK RELAY BANK N-12	2,101	2,947	877	4,587	23	10,535
		6S920551	GM: REPLACE NETWORK RELAY BANK N-11	135	2,292	438	4,587	19	7,471
		6S920552	GM: REPLACE NETWORK RELAY BANK N-12	83	1,468	824	4,587	26	6,989
		6S920553	GM: REPLACE NETWORK RELAY BANK N-57	2,021	1,984	1,092	4,828	31	9,956
		6S920554	GM: REPLACE NETWORK RELAY BANK N-54	2,021	2,306	1,474	4,587	33	10,421
		6S920555	GM: REPLACE NETWORK RELAY BANK N-50	2,021	2,163	1,308	4,587	32	10,111
		6S920556	GM: REPLACE NETWORK RELAY BANK N-16	2,021	1,261	1,028	933	10	5,254
		6S920557	GM: REPLACE NETWORK RELAY BANK N-66	2,021	3,552	1,680	4,587	24	11,864
		6S920558	GM: REPLACE NETWORK RELAY BANK N-49	-	-	-	-	9	9
		6S920559	GM: REPLACE NETWORK RELAY BANK N-11	83	2,022	1,525	4,768	28	8,426
		6S920560	GM: REPLACE NETWORK RELAY BANK N-11	83	1,635	1,027	4,587	27	7,359
		6S920561	GM: REPLACE NETWORK RELAY BANK N-26	83	1,926	1,406	4,587	27	8,030
		6S920562	GM: REPLACE NETWORK RELAY BANK N-11	56	825	-	4,587	26	5,493
		6S920563	GM: REPLACE NETWORK RELAY BANK N-13	-	1,880	1,370	4,639	27	7,916
		6S920565	GM: REPLACE NETWORK RELAY BANK N-14	83	2,134	1,695	4,587	58	8,557
		6S920567	GM: REPLACE NETWORK RELAY BANK N-36	83	1,978	1,501	4,587	57	8,207
		6S920568	GM: REPLACE NETWORK RELAY BANK N-74	83	1,611	997	4,587	27	7,305
		6S920571	GM: REPLACE NETWORK RELAY BANK N-45	139	1,694	1,092	4,625	27	7,576
		6S920572	GM: REPLACE NETWORK RELAY BANK N-39	139	2,027	1,500	4,774	29	8,469
		6S920573	GM: REPLACE NETWORK RELAY BANK N-14	83	1,328	677	4,587	26	6,702
		6S920574	GM: REPLACE NETWORK RELAY BANK N-22	309	1,949	1,342	4,587	30	8,216
		6S920575	GM: REPLACE NETWORK RELAY BANK N-16	83	1,513	946	4,805	27	7,374
		6S920576	GM: REPLACE NETWORK RELAY BANK N-12	83	1,916	1,357	4,587	29	7,972
		6S920577	GM: REPLACE NETWORK RELAY BANK N-13	83	1,316	662	4,587	26	6,675
		6S920578	GM: REPLACE NETWORK RELAY BANK N-85	7,835	2,639	807	4,601	40	15,923
		6S920579	GM: REPLACE NETWORK RELAY BANK N-27	83	1,336	701	4,587	26	6,734
		6S920580	GM: REPLACE NETWORK RELAY BANK N-10	251	1,586	1,005	4,587	27	7,456
		6S920581	GM: REPLACE NETWORK RELAY BANK N-16	7,161	2,176	355	4,609	38	14,340
		6S920582	GM: REPLACE NETWORK RELAY BANK N-13	2,105	1,752	830	4,587	31	9,304
		6S920584	GM: REPLACE NETWORK RELAY BANK N-48	1,994	1,881	966	4,587	31	9,459
		6S920585	GM: REPLACE NETWORK RELAY BANK N-35	7,780	2,643	880	4,587	39	15,929
		6S920586	GM: REPLACE NETWORK RELAY BANK N-52	1,994	2,097	1,287	4,587	31	9,995
		6S920587	GM: REPLACE NETWORK RELAY BANK N-59	2,049	2,001	752	5,439	30	10,272
		6S920588	GM: REPLACE NETWORK RELAY BANK N-15	83	1,209	489	4,587	26	6,395
		6S920589	GM: REPLACE NETWORK RELAY BANK N-17	1,994	1,848	923	4,656	31	9,451
		6S920590	GM: REPLACE NETWORK RELAY BANK N-5	1,966	2,329	1,506	4,792	34	10,626
	WD00299 Total			91,051	166,663	82,649	336,477	2,137	678,977
	WD00300	6A821475	RPL 3 SGL HYDROLIC RECLOSERS ON PO	0	(9)	0	7	0	(2)
		6A821563	French King HWY @ Wunsch Rd; INST 2	-	-	-	5	-	5
		6A821564	W Gill Rd @ Main Rd; INST 200 Cal A	-	-	-	5	-	5
		6A821565	Greenfield Rd @ Childs Cross Rd; IN	1,152	793	-	-	-	1,945
		6A822180	GRD MOD: REPLACE SR RECLOSER 21C4-7	7,009	5,202	151	595	-	12,958
		6A822183	GRID MOD: REPLACE SR RECLOSER 19J1-	11,605	10,747	-	33,896	554	56,802
		6A822184	GRID MOD: REPLACE SR RECLOSER 19J1-	23,564	26,290	2,186	34,341	509	86,891
		6A822185	GRID MOD: INSTALL TR RECLOSER 19J1-	(685)	(460)	(2)	1,897	-	750
		6A822186	GRID MOD: INSTALL TR RECLOSER 19J1-	(1,604)	(1,070)	(2)	73	-	(2,604)
		6A822188	GRID MOD: REMOVE 19J1-71S P21/2 INS	3,966	18,535	3,706	67,741	279	94,227
		6A822236	GRID MOD: INSTALL RR RECLOSER 18G7-	12,601	17,899	1,685	34,283	244	66,712
		6A822237	GRID MOD: REPLACE RR RECLOSER 18G7-	8,004	11,680	1,598	24,704	341	46,328
		6A822256	GRID MOD: REPLACE RR RECLOSER 21C8-	8,609	15,069	1,629	33,579	73	58,959
		6A822261	GRID MOD: REPLACE SR RECLOSER 22B1-	5,658	13,484	1,687	34,355	25	55,210
		6A822262	GRID MOD: REPLACE SR RECLOSER 22B1-	5,806	12,721	1,395	33,833	74	53,829
		6A822268	GRID MOD: INSTALL SR RECLOSER 17K5-	9,154	16,039	2,030	34,296	72	61,592
		6A822269	GRID MOD: REPLACE TR RECLOSER 17K5-	6,987	14,909	2,574	30,901	83	55,453
		6A822362	S. Maple St @ Russell St; Add radio	1,578	8	-	-	-	1,586
		6B820766	GRID MOD; RPL OIL RECLOSER 18C2-70S	-	(70)	-	20	-	(51)
		6B820767	GRID MOD; RPL OIL RECLOSER 18C2-90T	-	0	-	7	-	7
		6B820768	GRID MOD; RPL OIL RECLOSER 19A505 W	-	78	77	20	-	175

2019 Total Additions and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total 2019 Additions
		6B820769	GRID MOD; RPL OIL RECLOSER 19A525 W	-	247	178	5	-	431
		6B820830	Berkshire Trl @ Back Dalton Rd; Add	100	1,532	692	62	14	2,399
		6B820831	Maple Rd @ Creamery Rd; Add radio t	100	297	89	62	3	551
		6B820832	Main St @ Jericho Rd; Add Radio to	123	263	67	62	3	517
		6B820833	S. Mountain Rd @Tamarak Rd; INST 17	89	354	108	94	3	648
		6B820834	S Mountain Rd @ Tamarak Rd; INST 17	89	924	509	84	10	1,617
		6B821238	Grid Mod: Rep SR 30B-72S on P514/44	1,483	15,697	4,464	36,177	94	57,915
		6B821239	Grid Mod: Rep MR30B-81M and Install	1,311	15,160	3,986	33,718	123	54,298
		6B821241	Grid Mod: Rep RR recloser 30B117 w	292	13,770	3,802	36,999	315	55,178
		6B821242	Grid Mod: Rep RR Recl 30B4-60R inst	583	12,832	3,536	32,931	129	50,012
		6B821244	GRID MOD: INSTALL TR RECLOSER 19J4-	873	11,170	3,627	30,546	158	46,374
		6B821246	GRID MOD: REP RR 16B503 W/ 16B5-71S	940	12,291	3,473	33,813	67	50,584
		6B821248	Grid Mod: Rep SR 30B4-72S & install	811	13,155	3,745	32,966	110	50,786
		6B920271	GRID MOD: INSTALL RR RECLOSER 30B3-	1,088	11,958	4,267	33,609	266	51,188
		6S821675	Kings HWY @ Pine St; Add radio to 2	-	-	-	-	-	-
		6S822290	REPLACE TIE RECLOSER; NEW NOMENCLAT	211	(141)	26	3	(0)	99
	WD00300 Total			111,499	271,354	51,283	635,688	3,548	1,073,371
12190 Advanced Sensing Technology Total				3,475,780	6,101,800	2,135,826	2,992,379	74,928	14,780,712
Total 2019 Additions				15,805,746	18,039,991	6,190,316	17,853,636	320,970	57,962,062

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
12165 Electric Vehicle Infrastructure	18294	02299104	EVL2NEJC NAT 280 CARCHARGER ELIOT	(0)	(0)	-			(0)
	18294 Total			(0)	(0)	-			(0)
	18295	02338310	EVL2-EJC HYA (EV) 600 CAPE1 BARNSTA	-	-	-		(0)	(0)
		02338314	EVL2-EJC HYA (EV) 660 CAPE2 BARNSTA	-	-	-			-
		02339845	EVL2-EJC HYA (EV) 215 CCRT2 IYANOUG	-	(0)	-			(0)
		02359227	EVL2NEJC NEE 250 FIRST AVE FIRST	-	(0)	-		-	(0)
		02359230	EVL2NEJC NEE 117 CHARGER KENDRICK	(0)	11	-		-	11
		02359232	EVL2NEJC NEE 75 CHARGER SECOND AV	-	0	-	-	-	0
		02359233	EVL2NEJC NEE 15 CHARGER CRAWFORD	0	1	-		0	1
	18295 Total			0	12	-	-	0	12
	18296	02288353	EVL2NEJC BED 125 EV MIDDLESEX TPK	-	0	-		-	0
		02288360	EVL2NEJC WIN EV LARAWAY RD WINCHES	-	(0)	-		-	(0)
		02288454	EVL2NEJC WLF 300 EV MAIN ST (96100	-	0	(0)		-	0
		02288493	EVL2NEJC WTD 247 EV-1 STATION DR	-	(0)	-		-	(0)
		02288673	EVL2NEJC LIN 208 S GREAT RD MASS	-	(0)	0		-	0
		02293085	EVL2NEJC LEX 300 EV CHARGER SHIR	-	0	0		-	0
		02294023	EVL2NEJC NEW EV MELROSE AVE CITY O	-	0	0		(0)	0
		02294136	EVL2NEJC NEW 1000 COMM AVE. C OF NE	-	0	0		-	0
		02296613	EVL2NEJC NEW 26 RICHARDSON ST . C.	-	(0)	0		-	0
		02298508	EVL2NEJC MAT 500 WALK-HILL ST MAS	-	0	(0)			(0)
		02300157	EVL2NEJC MIL 525 EV CHARGER CANT	-	(0)	(0)			(0)
		02305344	EVL2NEJC CAM 420 EV CHARGE GREEN	(0)	0	0		(0)	(0)
		02305358	EVL2NEJC CAM 375 EV CHARGER GREEN	-	(0)	0		0	0
		02311288	EVL2NEJC BED 99 MCMAHON RD BEDFORD	0	(0)	(0)		-	0
		02311346	EVL2NEJC BED 66 SWEETWATER AVE E	(0)	-	-			(0)
		02311474	EVL2NEJC BED 10 MUDGE WAY EV-TH	-	(0)	(0)		-	(0)
		02311845	EVL2NEJC BED 410 DAVIS RD EV B	-	(0)	0		-	0
		02319199	EVL2NEJC WAL 170 TRACER LN. EV CHAR	-	(0)	-		-	(0)
		02324941	EVL2NEJC WTD 392 UNIVERSITY AVE EV	(0)	0	(0)		-	(0)
		02325189	EVL2NEJC LEX 450 BEDFORD ST EV BE	(0)	0	-			(0)
		02325192	EVL2NEJC LEX 785 MARRETT RD EV C	0	(0)	(0)		(0)	0
		02325193	EVL2NEJC WTD 60 GLACIER DR EV G	-	18	(0)			18
		02325349	EVL2NEJC FRA 1 EV SPEEN ST ONE SP	0	(0)	-	-	-	0
		02325448	EVL2NEJC FRA 3 EV SPEEN ST THREE	0	3	(0)	-	-	3
		02325464	EVL2NEJC FRA 5 EV SPEEN ST FIVE S	0	0	(0)	-	-	0
		02326959	EVL2NEJC 22 FLUTIE PASS FRA EV CHAR	-	(0)	(0)		-	(0)
		02329194	EVFCNEJC SOM, 449 CANAL ST/ELECTRIF	(0)	0	-		-	0
		02329484	EVL2NEJC FRA 1 WORCESTER RD 203-1	0	0	(0)		(0)	0
		02330222	EVL2NEJC FRA 500 EV OLD-CONN PTH	0	0	-		(0)	0
		02331264	EVL2NEJC MIL 325 EV RANDOLPH AVE	-	(0)	-		-	(0)
		02332078	EVL2NEJC BUR 20 SOUTH AVE (200A	(0)	(0)	-		-	(0)
		02333754	EVL2NEJC HOP 77 MAIN ST HOPKINTON	(0)	0	0		-	(0)
		02335180	EVL2NEJC BOS CHARLES ST BOSTON COMM	0	(0)	-		-	0
		02335678	EVL2NEJC WOB 477 EV1 MAIN ST WOBU	-	(0)	-		-	(0)
		02336026	EVL2NEJC 36 KNOX TRAIL ACT CONCORD	-	0	-		-	0
		02339838	EVL2NEJC WAL 14R PINE ST EV WALTHA	(0)	423	(0)		0	423
		02340604	EVL2NEJC ACU 800 EV MIDDLE RD ACUSH	-	(0)	-		-	(0)
		02340628	EVL2NEJC ACU 708 EV MIDDLE RD ACU	-	(0)	-		-	(0)
		02340690	EVL2NEJC ACU 64 EV MIDDLE RD ACU	-	(0)	-		-	(0)
		02340891	EVL2NEJC ACU 232 EV MIDDLE RD ACU	-	-	-		-	-
		02340910	EVL2NEJC ARL 85 EV PARK AVE ARLIN	(0)	9	(0)		-	9
		02341001	EVL2NEJC EAS (EV) 3800 RTE-6 EASTHA	-	0	(0)		-	-
		02343716	EVL2NEJC MAR 2000 EV MAIN ST MASS	(0)	(0)	(0)		-	(0)
		02345708	EVL2NEJC LIN 208 SOUTH GREAT RD (PO	-	-	-			-
		02347714	EVL2NEJC ARL 11 WATER ST ARLINGTON	-	1	-		-	1
		02348397	EVL2NEJC NEW 90 EV CRAFTS ST NEWT	-	1	-		-	1
		02349142	EVL2NEJC LEX 13 DEPOT SQUARE	-	(0)	-		-	(0)
		02349164	EVL2NEJC LEX 17 GRANT ST EV LEXI	-	(0)	-		-	(0)
		02351931	EVL2NEJC CAN 963 EV-3 WASHINGTON	-	0	-		-	0
		02352027	EVL2NEJC MIL 98 EV WHARF ST MILTO	-	(0)	-		-	(0)
		02353605	EVL2NEJC WOB 200 EV CHARGR PRESID	-	(0)	-		-	(0)
		02353695	EVL2NEJC WOB 200 EV PRESIDENTIAL	-	-	-		(0)	(0)
		02354146	EVL2NEJC NAT 179 BODEN LN TOWN OF	71	5	8		-	85
		02355784	EVL2NEJC BUB 25 EV PERRY AVE BOUR	-	(0)	-		-	(0)

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
		02356314	EVL2NEJC STN 101 MONTVALE AVE TOWN	-	0	-	-	-	0
		02356546	EVL2NEJC ACT 177 MAIN ST DISCOVER	150	15	22	-	0	186
		02356605	EVL2NEJC LEX 110 EV-1 HARTWELL AV	-	(0)	-	-	-	(0)
		02358746	EVL2NEJC YAR 484 EV CHARGR WILLOW	6,889	2,770	3,735	-	45	13,439
		02358779	EVL2NEJC WAL 1560 EV-1 TRAPELO RD	-	-	-	-	-	-
		02358782	EVL2NEJC PLY 273 EV CHARGR SUMMER S	0	(0)	-	-	-	0
		02358990	EVL2NEJC WAL 271 WAVERLEY-OAKS RD.	(0)	0	0	-	(0)	0
		02358993	EVL2NEJC WAL 307 WAVERLEY-OAKS RD	-	0	0	-	-	0
		02359600	EVL2NEJC NEE 168 GARDEN ST (EV NEED	0	0	-	-	-	0
		02359821	EVL2NEJC LEX 33 EV CHARGR HAYDEN	(0)	7	(0)	-	(0)	7
		02361259	EVL2NEJC FRA 400 EV CHARGR WORCES	(0)	26	-	-	-	26
	18296 Total			7,110	3,278	3,765	-	45	14,198
	EV41L2EJ	6A921137	NJC - Amherst, Kellogg Ave - # 33 -		0	-	-	-	0
		6A921139	NJC - Amherst, Pray St - EV Charger		5	-	-	-	5
		6B821194	ETB - PITTSFIELD, KENT AVE; Elec Ve		(2)	-	-	-	(2)
		6B920519	ETB - PITTSFIELD, MCKAY ST; Elec	(0)	(0)	0	-	-	(0)
		6S822707	***MUNI IN*** Elec Vehicle Make Rea	(10,487)	(181)	(355)	-	-	(11,023)
		6S921875	MGF - Springfield, Hickory St - #10	-	0	-	-	-	0
	EV41L2EJ Total			(10,487)	(178)	(355)		-	(11,019)
	EV41L2NE	6B920708	WOODJA- 45 WOODLAWN AVE, PITTSFIELD		1	(0)	-	(0)	1
		6S921909	MGF - Agawam, River Rd - #254. New	0	(0)	0	-	0	0
	EV41L2NE Total			0	1	0		0	1
12165 Electric Vehicle Infrastructure Total				(3,370)	3,112	3,410	-	38	3,192
12170 Automated Feeder Reconfiguration	18326	02242383	ASU MAS 218/1 GREAT OAK RD REP		512	362	(63)	(7,575)	(6,764)
		02313947	ASU MAY PARKER ST P73/33 NOVA		(5,640)	(1,030)	(5,284)	-	(11,955)
		02313949	ASU ACT MAIN ST P31/139 GRID	-	(5,129)	(599)	(5,447)	(1)	(11,177)
		02313955	ASU MLS PLAIN ST P13/48 INSTA		(3,851)	(784)	(3,491)	-	(8,127)
		02313959	ASU WTD BURGESS AVE P 85/1 IN		(4,262)	(873)	(3,921)	-	(9,057)
		02313979	ASU WES WINTER ST P411/18 433	(71)	(4,402)	(832)	(4,035)	-	(9,340)
		02313980	ASU FRA PLEASANT ST P179/107	(16)	(7,089)	(821)	(8,270)	(1)	(16,197)
		02313982	ASU ACT CENTRAL ST P6/47 416-	(137)	(6,496)	(769)	(6,678)	-	(14,080)
		02313984	ASU NAT CIRCULAR AVE P29/1 24	(59)	(5,614)	(827)	(5,433)	(1)	(11,934)
		02313985	ASU ASH HIGH ST P5/5 274-1429	(66)	(3,954)	(607)	(3,715)	-	(8,342)
		02316296	ASU FAL DAVISVILLE RD 22/1 IN	385	2,315	947	2,767	7	6,420
		02316305	ASU MAR CANAL ST 79/4 INSTALL	533	2,671	1,376	-	4,531	9,111
		02316310	ASU YAR OLD MAIN ST 37/183	379	3,284	1,216	4,463	2	9,344
		02316312	ASU FAL W FALMOUTH HWY 29/202	70	948	462	(0)	(1,480)	(0)
		02316315	ASU DEN RT 6A 36/448 INSTALL	200	1,695	993	0	(2,887)	0
		02316710	ASU LEX P42/59 WOBURN ST. INST	(140)	(2,201)	(426)	(2,774)	(4,624)	(10,165)
		02316714	ASU MLS P34/48 FOREST RD GRID		(3,543)	(1,218)	(3,895)	-	(8,657)
		02316719	ASU MDF P1/26 NORTH ST GRIDMO		(2,957)	(499)	(4,943)	-	(8,399)
		02316782	ASU DEN RT 6A 36/450 INSTALL	289	587	297	-	(1,174)	(0)
		02316789	ASU SAN PIMILICO POND RD 83/1	239	1,834	792	1,878	4	4,748
		02316799	ASU PLY HERRING POND RD 90/91	42	358	227	-	0	627
		02316816	ASU YAR N DENNIS RD 9215/12 R	85	241	133	-	(460)	0
		02316836	ASU NEB DURFEE ST 207/13 INST	157	497	261	-	-	915
		02316838	ASU NEW P9/22A WAVERLY AVE RE	-	895	363	1,798	(18,943)	(15,887)
		02316844	ASU NEW P450/5 WATERTOWN ST. R	164	676	216	1,430	(13,873)	(11,387)
		02316852	ASU NEB SUMMER ST 664/28 INST	-	-	(0)	-	-	(0)
		02316861	ASU NEB SUMMER ST 664/11 4 KV	-	-	0	-	(0)	0
		02316862	ASU NEB BLACKMER ST 645/7 INS	-	43	30	-	(73)	-
		02316867	ASU NEB FIRST ST 644/21 INSTA	1,023	2,929	1,924	-	1	5,877
		02316871	ASU NEB RIVET ST 585/16 INSTA	286	1,122	672	-	(2,080)	(0)
		02316873	ASU NEB BONNEY ST 85/11 INSTA	-	-	-	-	-	-
		02316876	ASU NEB CEDAR ST 132/5 INSTAL	445	1,452	722	-	5	2,624
		02316878	ASU NEB CEDAR ST 132/35 INSTA	1,212	3,765	1,642	-	4	6,623
		02316880	ASU NEB BULLOCK ST 116/5 INST	561	1,869	871	-	4	3,305
		02316882	ASU NEB MILL ST 462/41 INSTAL	618	2,782	1,478	-	8	4,886
		02316883	ASU NEB MILL ST 462/21 INSTAL	615	1,670	794	0	3	3,082
		02316885	ASU NEB MILL ST 462/6 INSTALL	-	88	0	(0)	-	88
		02316890	ASU NEB HEMLOCK ST 311/17 INS	0	(0)	-	-	-	(0)
		02316892	ASU NEB ORCHARD ST 517/21 INS	65	335	207	-	-	607
		02316895	ASU NEB CHURCH ST 3/13 INSTAL	-	-	-	-	-	-
		02316903	ASU NEB ₂ BELLEVILLE RD P64/22	908	1,674	589	(0)	3	3,173

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
		02316911	ASU BAR SCHOOL ST 313/2 INSTA	-	-	-	-	-	-
		02316915	ASU CVR PURCHASE ST 95/35 INS	115	1,588	1,017	-	-	2,720
		02316918	ASU SAN RT 6A 14/214 INSTALL	-	-	-	-	-	-
		02319076	ASU FRA 1106 EDGELL RD 74/128	90	448	309	-	2	850
		02319078	ASU NAT MILL ST 279/15 INSTAL	-	-	-	-	-	-
		02319080	ASU NAT 182 W. CENTRAL ST 19	-	1,078	270	1,902	(3,250)	(0)
		02319084	ASU FRA 368 BROOK ST 21/43 I	265	640	468	-	1	1,373
		02319087	ASU NAT 19 E. EVERGREEN RD 4	265	1,286	786	-	3	2,340
		02319088	ASU ACT 212 MAIN ST 31/77 IN	349	714	303	-	-	1,366
		02319091	ASU ASH 153 PROSPECT ST 8/24	143	1,067	410	0	(1,620)	0
		02319093	ASU WTD 845 HIGH ST 19/91 IN	-	-	-	(0)	-	(0)
		02319094	ASU BEL 370 HARTFORD AVE 2/6	-	(0)	-	-	-	(0)
		02319099	ASU LEX CLIFF AVE 120/2 INSTA	402	817	472	0	2	1,694
		02319101	ASU NEW 8 NEWTONVILLE AVE 24	620	1,196	716	(0)	(2,533)	0
		02319102	ASU LEX 91 GROVE ST 40/26 IN	283	808	587	0	1	1,678
		02319103	ASU NEW 89 FLORENCE ST 158/1	382	2,032	886	1,900	2	5,202
		02319105	ASU WAT 259 LEXINGTON ST 85/	-	(0)	-	-	-	(0)
		02319107	ASU WAT 187 LEXINGTON ST 85/	-	(0)	0	(0)	-	(0)
		02319108	ASU WAL 337 WARREN ST 284/40	582	1,657	1,053	-	2	3,295
		02320169	ASU W-R PATTEN ST INSTALL RCE	(0)	0	-	-	0	0
		02320170	ASU DOR WALK HILL ST INSTALL	-	(0)	0	0	-	0
		02320171	ASU DOR GREENDALE RD INSTALL	109	1,292	791	-	2	2,194
		02320172	ASU DED SPRAGUE ST REPL & INS	93	748	398	-	0	1,239
		02320174	ASU DED GREENLODGE ST REPL & I	128	558	280	0	-	966
		02320175	ASU BKL TAPPAN ST INSTALL RECL	-	-	-	-	-	-
		02320178	ASU BKL WINTHROP RD INSTALL R	327	863	418	-	1	1,609
		02320190	ASU H-P RESERVATION RD -RPL L	738	2,008	998	0	2	3,746
		02320191	ASU H-P AUSTIN ST INSTALL REC	684	1,733	815	-	-	3,231
		02320193	ASU MIL THACHER ST INSTALL RE	994	2,805	1,239	-	-	5,038
		02320194	ASU MIL THACHER ST INSTALL RE	762	1,809	721	-	-	3,292
		02320197	ASU MIL ROBBINS ST INSTALL RE	-	-	0	-	-	0
		02320201	ASU BKL NAPLES ST INSTALL REC	0	0	(0)	-	-	0
		02320204	ASU DOR ELDON ST INSTALL RECL	1,052	3,914	1,723	0	241	6,931
		02320206	ASU DOR GREENWOOD ST INSTALL	(0)	0	-	0	-	0
		02320207	ASU DOR HARVARD ST INSTALL RE	-	(0)	-	0	-	0
		02326712	ASU WOB BEDFORD RD NOVA RECL	156	720	368	-	1	1,245
		02326714	ASU STN FRANKLIN ST 36/23 - IN	534	1,343	818	-	0	2,695
		02326717	ASU CHE SPRUCE ST INST NOVA RE	39	49	25	-	-	114
		02326719	ASU WIN CAMBRIDGE ST-POLE 26/	196	811	405	-	2	1,414
		02326720	ASU CHE BROADWAY NOVA RECLOSER	360	1,390	682	-	5	2,437
		02326721	ASU CHE EASTERN AVE NOVA RECL	57	180	97	-	-	334
		02326724	ASU CAM WALDEN ST P697/17- NST	172	1,517	877	-	-	2,566
		02326725	ASU CHE BELLINGHAM ST INST REC	62	209	134	-	1	405
		02326740	ASU ARL WYMAN ST 890/2 REPL LB	122	956	468	-	-	1,546
		02326741	ASU STN MONTVALE AVE 64/38 INS	155	728	344	-	-	1,227
		02326742	ASU STN MARBLE ST 57/24 INST	588	3,255	1,644	-	7	5,493
		02327367	ASU DOR HARVARD ST 930/21 REP	204	1,652	1,057	-	6	2,920
		02328502	ASU STN WRIGHT ST INSTALL REC	71	882	695	-	3	1,650
		02328504	ASU STN WILSON ST INSTALL REC	150	1,030	619	-	3	1,802
		02328506	ASU WOB EASTERN AVE RECL P63/	206	365	126	-	-	696
		02332072	ASU NEB BONNEY ST P85/11 INST	5,455	8,440	2,552	-	(16,447)	-
		02332074	ASU NEB RIVER RD P582/9 INSTA	899	2,586	1,754	-	4	5,242
		02332075	ASU NEB BELLEVILLE AVE P4/39	2,511	9,517	4,808	-	6	16,842
		02332076	ASU NEB BELLEVILLE AVE P4/17	2,062	6,442	2,546	-	6	11,056
		02332164	ASU YAR ROUTE 6A P1/84 INSTAL	405	1,376	574	-	7	2,361
		02332167	ASU YAR NO MAIN ST P9215/1 INS	47	352	200	-	1	599
		02332168	ASU FAL CENTRAL AVE P126/2 IN	128	431	174	-	71	805
		02332169	ASU FAL ACAPESKET RD P235/71	248	937	438	-	4	1,627
		02332170	ASU WAQ SEACOAST SHORE P352/1.	64	213	97	-	1	375
		02332172	ASU FAL PALMER AVE P29/45 INS	406	1,151	648	-	4	2,209
		02332173	ASU YAR SEAVIEW AVE P159/3 IN	604	2,547	1,257	-	5	4,413
		02332174	ASU EAS GREAT POND RD P14/1 IN	173	1,414	757	-	2	2,346
		02332176	ASU HAR LOWER COUNTY RD 49/70	-	63	36	-	11	110
		02332177	ASU MAS SHORE DR P101/26 INSTA	164	759	353	-	2	1,276

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
		02332181	ASU WLF RTE 6 P36/1247 REPL FU	321	1,540	773		6	2,640
		02332183	ASU HYA SEA ST P7/11 INST NOVA	344	846	380		3	1,573
		02332184	ASU PLY WHITE HORSE RD 1065/1	211	1,220	693		2	2,126
		02332186	ASU WAR SWIFTS BEACH RD INST	165	397	126		14	703
		02332188	ASU BUB RED BROOK RD P357/4 I	133	631	373		0	1,137
		02333893	ASU BAR OLD TOWN RD 217/1 INS		1,126	635		248	2,008
		02370059	ASU WOB SCHOOL ST INST 15 KV			87		0	88
		02370061	ASU STN MAIN ST 211-H12 INST N		255	172			427
		02333893	ASU BAR OLD TOWN RD 217/1 INS	181	120			3,962	4,264
	18326 Total WD00298			33,761	65,611	49,747	(41,812)	(67,809)	39,498
		6A821670	GRID MOD; INSTALL RECLOSER 21C7-62R	-	-	-	-	(1,371)	(1,371)
		6A821672	GRID MOD; INSTALL VS RECLOSER 21C7-	-	7	(0)	-	(1,070)	(1,070)
		6A821673	GRID MOD; INSTALL TRIPLE SINGLE REC	-	6	-	-	(745)	(745)
		6A821674	GRID MOD; INSTALL RECLOSER VS 22B7-	-	(4)	(0)	-	(321)	(321)
		6A821675	GRID MOD; INSTALL RECLOSER AND FORM	-	5	(0)	-	(426)	(426)
		6A821676	GRID MOD - NJC - Montague, N. Lever	-	(57)	0	-	(57)	(57)
		6A822123	GRID MOD: INSTALL MR RECLOSER 22B1-	323	224	47	-	595	595
		6A822124	GRID MOD: INSTALL SR RECLOSER 18G5-	227	(46)	(0)	-	(101)	(101)
		6A822128	GRID MOD: INSTALL VS RECLOSER 18K2-	102	204	133	-	(143)	(143)
		6A822130	GRID MOD: INSTALL MR RECLOSER 18G6-	2,020	150	93	-	-	-
		6A822131	GRID MOD: INSTALL VS RECLOSER 17K5-	140	135	31	-	0	0
		6A822132	GRID MOD: INSTALL MR RECLOSER 18G7-	621	564	114	-	1,301	1,301
		6A822133	GRID MOD: INSTALL VS RECLOSER 15A5-	193	122	12	-	(180)	(180)
		6A822178	GRID MOD: INSTALL VS RECLOSER 21C4-	57	43	1	-	101	101
		6A822179	GRID MOD: INSTALL VS RECL 21C4-XXXX	57	37	(1)	-	(483)	(483)
		6A822181	GRID MOD: REM GOAB & INST RECLOSER	606	454	40	-	1,100	1,100
		6A822182	GRID MOD: INSTALL VS RECLOSER 19J1-	647	(86)	0	-	(190)	(190)
		6A822238	GRID MOD: INSTALL VS 15A3-4102 & IN	733	-	-	-	733	733
		6A822239	GRID MOD: INSTALL MR RECLOSER 15A3-	202	118	-	-	320	320
		6A822240	GRID MOD: INSTALL MR RECLOSER 15A3-	379	791	447	-	1,618	1,618
		6A822241	GRID MOD: INSTALL MR RECLOSER 21C8-	346	244	36	-	626	626
		6A822257	GRID MOD: INSTALL SR RECLOSER 22B7-	605	309	80	-	994	994
		6A822258	GRID MOD: INSTALL VS RECLOSER 22B7-	510	380	39	-	929	929
		6A822267	Grid Mod: Inst MR 17K5-74S and Form	311	248	43	-	602	602
		6A822273	GRID MOD: INSTALL TSR RECLOSER 21C1	2,725	1,878	181	-	4,784	4,784
		6B820910	GRID MOD; RM RECL 19A1-60R;RM SLD B	17	125	73	-	(1,054)	(1,054)
		6B820911	GRID MOD: RPL SOLID BLADES WITH RE	123	106	61	-	(352)	(352)
		6B820912	GRID MOD; INSTALL RECLOSER 19A1-81	90	62	7	-	(911)	(911)
		6B820913	GRID MOD; INSTALL TIE RECLOSER 19A	0	89	71	-	(1,726)	(1,726)
		6B820914	GRID MOD; NEW RECLOSER LOCATION SR	0	2	(0)	-	(212)	(212)
		6B821178	GRID MOD: INSTALL TSR RECLOSER 16B1	34	149	108	-	291	291
		6B821179	Grid Mod: Install MR on Form 6 Cntl	112	1,139	639	-	1,892	1,892
		6B821180	Grid Mod: Install VS 30B1-xxxx and	54	778	435	-	1,278	1,278
		6B821181	GRID MOD: REPLACE RR RECLOSER 16B5-	193	582	340	-	(0)	(0)
		6B821182	Grid Mod: rep GOAB with MR 30B5-xxx	27	293	166	-	0	0
		6B821183	GRID MOD: INSTALL XX RECLOSER 19J4-	89	196	143	-	427	427
		6B821184	GRID MOD: INSTALL MR RECLOSER 30B4-	45	279	205	-	-	-
		6B821185	GRID MOD: INSTALL MR RECLOSER 17G3-	32	294	178	-	0	0
		6B821243	GRID MOD: INST MR RECL 19J4-85M AND	14	52	30	-	-	-
		6B821245	GRID MOD: INSTALL RR RECLOSER 30B7-	240	532	339	-	1,111	1,111
		6B821247	Grid Mod: Rem 40T fuses P228/74, in	26	177	91	-	0	0
		6B821260	GRID MOD: INSTALL MR RECLOSER 30B7-	76	435	258	-	(0)	(0)
		6S821808	GRID MOD: INSTALL RECLOSER 16C17-92	1,492	(3,562)	(273)	-	(7,590)	(7,590)
		6S821809	GRID MOD; INSTALL SR RECLOSER 30A1-	250	50	-	-	(5,617)	(5,617)
		6S821810	GRID MOD; INSTALL SR RECLOSER 16C17	206	41	-	-	(5,710)	(5,710)
		6S822352	GRID MOD: INSTALL SR RECLOSER 16C17	849	0	(0)	-	849	849
		6S822353	GRID MOD: INSTALL MR RECLOSER 16C17	890	0	(0)	-	(0)	(0)
		6S822354	GRID MOD: INSTALL SR RECLOSER 16C17	371	(0)	-	-	(0)	(0)
		6S822355	GRID MOD: INSTALL MR RECLOSER 29A1-	187	0	-	-	(0)	(0)
		6S822356	GRID MOD: INSTALL MR RECL 20A33-XXM	228	330	109	-	-	-
		6S822357	GRID MOD: INSTALL MR RECLOSER 21N4-	167	208	167	-	542	542
		6S822358	GRID MOD: INSTALL MR RECLOSER 22H16	979	676	72	-	1,727	1,727
		6S822359	GRID MOD: INSTALL VS RECLOSER 22H16	239	240	33	-	512	512
		6S822361	GRID MOD: INSTALL VS RECLOSER 19S1-	403	569	201	-	1,174	1,174

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
		6S822362	GRID MOD: INSTALL MR RECLOSER 21N4-	366	193	98	-	657	657
		6S822365	GRID MOD: INSTALL VS RECLOSER 5J17-	350	159	48	-	-	-
		6S822367	GRID MOD: INSTALL MR RECLOSER 22H16	1,547	1,316	236	-	3,101	3,101
		6S822369	GRID MOD: INSTALL VS RECL 20A32-XXX	442	299	81	-	(0)	(0)
		6S822370	GRID MOD: INSTALL MR RECLOSER 30A1-	914	935	398	-	2,247	2,247
		6S822502	GRID MOD: INSTALL SR RECLOSER 30A5-	1,406	(0)	(0)	-	-	-
		6S822503	GRID MOD: INSTALL MR RECLOSER 30A5-	611	(0)	(0)	-	(0)	(0)
		6S822510	GRID MOD: INSTALL VS RECLOSER 16C18	579	437	68	-	1,087	1,087
		6S822511	GRID MOD: INSTALL VS RECLOSER 16C18	115	0	0	-	-	-
		6S822513	GRID MOD: INSTALL VS RECLOSER 27A13	1,900	549	77	-	2,527	2,527
		6S822531	GRID MOD: INSTALL MR RECLOSER 20A35	538	474	144	-	1,158	1,158
	WD00298 Total			27,005	13,926	5,897	-	(40,804)	6,025
	WD00301	6A920238	GRID MOD: INSTALL MR RECLOSER 17K7-	1,567	760	215	-	2	2,544
		6A920239	GRID MOD: INSTALL SR 17K7-70S AND F	182	99	35	-	0	316
		6A920240	GRID MOD: INSTALL TR 18G7-92T AND F	973	622	241	-	2	1,839
		6A920441	GRID MOD: INSTALL RECLOSER 21C5-400	626	287	104	-	(1,017)	(0)
		6A920730	GRID MOD: INSTALL SR RECLOSER 21C5-	687	1,578	166	-	-	2,431
		6A920731	GRID MOD: INSTALL MR RECLOSER 21C5-	2,297	900	144	-	-	3,340
		6A920732	GRID MOD: INSTALL TR RECLOSER 21C5-	1,381	460	72	-	-	1,914
		6B920125	GRID MOD: INSTALL TR RECLOSER 30B4-	90	329	247	-	(665)	0
		6B920126	GRID MOD: INSTALL SR RECLOSER 30B5-	175	539	441	-	-	1,154
		6B920127	GRID MOD: INSTALL TR RECLOSER 16B3-	424	523	364	-	-	1,311
		6B920128	GRID MOD: INSTALL TR RECLOSER 30B4-	111	312	234	-	(657)	(0)
		6B920289	GRID MOD: INSTALL RR RECLOSER 15E2-	57	414	474	-	-	944
		6B920469	GRID MOD: INSTALL SR RECLOSER 16B5-	11	695	460	-	8	1,175
		6S920349	GRID MOD: INSTALL SR RECLOSER 21N4-	864	324	140	-	-	1,327
		6S920350	GRID MOD: INSTALL TR RECLOSER 16C18	1,925	1,159	109	-	-	3,193
		6S920351	GRID MOD: INSTALL SR RECLOSER 21N9-	1,520	621	100	-	-	2,240
		6S920352	GRID MOD: INSTALL TR RECLOSER 21N9-	1,314	856	184	-	-	2,355
		6S920353	GRID MOD: INSTALL SR RECLOSER 21N9-	400	242	47	-	-	689
		6S920354	GRID MOD: INSTALL SR RECLOSER 21N9-	1,790	1,112	154	-	-	3,056
		6S920359	GRID MOD: INSTALL SR RECLOSER 16C16	481	0	(0)	-	(481)	(0)
		6S920360	GRID MOD: INSTALL TR RECLOSER 30A5-	829	545	63	-	(1,438)	-
		6S920361	GRID MOD: INSTALL MR RECLOSER 16C16	1,284	828	74	-	(2,186)	(0)
		6S920362	GRID MOD: INSTALL SR RECLOSER 30A5-	1,018	710	154	-	(1,883)	(0)
		6S920363	GRID MOD: INSTALL TR RECLOSER 30A5-	670	465	80	-	-	1,215
		6S920364	GRID MOD: INSTALL SR RECLOSER 30A2-	137	148	54	-	(339)	-
		6S920365	GRID MOD: INSTALL TR RECLOSER 30A2-	131	116	36	-	(283)	-
		6S920366	GRID MOD: INSTALL SR RECLOSER 30A4-	494	404	108	-	1	1,007
		6S920367	GRID MOD: INSTALL TR RECLOSER 30A5-	1,485	937	95	-	-	2,517
		6S920368	GRID MOD: INSTALL SR RECLOSER 30A6-	229	156	29	-	-	414
		6S920369	GRID MOD: INSTALL TR RECLOSER 16C17	825	530	105	-	2	1,461
		6S920370	GRID MOD: INSTALL SR RECLOSER 20A21	629	408	112	-	(1,149)	-
		6S920371	GRID MOD: INSTALL TR RECLOSER 20A21	1,077	569	134	-	1	1,782
		6S920372	GRID MOD: INSTALL SR RECLOSER 20A33	525	(0)	(0)	-	-	525
		6S920373	GRID MOD: INSTALL TR RECLOSER 20A33	1,925	1,132	740	-	-	3,796
		6S920374	GRID MOD: INSTALL SR RECLOSER 27A4-	1,029	56	0	-	(1,085)	-
		6S920375	GRID MOD: INSTALL TR RECLOSER 19S2-	821	411	252	-	-	1,484
		6S920376	GRID MOD: INSTALL MR RECLOSER 27A4-	1,093	0	0	-	-	1,093
		6S920377	GRID MOD: INSTALL SR 27A4-72S AND F	573	189	45	-	1	807
		6S920378	GRID MOD: INSTALL SR RECLOSER 21N5-	117	51	-	-	-	168
		6S920379	GRID MOD: INSTALL TR RECLOSER 21N5-	2,892	1,790	114	-	-	4,796
		6S920380	GRID MOD: INSTALL SR RECLOSER 21N6-	257	91	30	-	-	378
		6S920381	GRID MOD: INSTALL TR RECLOSER 21N4-	2,359	642	197	-	-	3,198
		6S920382	GRID MOD: INSTALL SR 27A13-71S AND	2,319	846	122	-	-	3,287
		6S920466	GRID MOD: INSTALL TR 27A4-92T AND F	522	212	79	-	-	813
		6S920467	GRID MOD: INSTALL TR RECLOSER 27A13	1,154	380	85	-	-	1,619
	WD00301 Total			41,271	23,449	6,639	-	(11,168)	60,191
12170 Automated Feeder Reconfiguration Total				102,037	102,986	62,283	(41,812)	(119,781)	105,714
12175 Urban Underground Automation T	18328	02291488	ASU ROX TREMONT ST-RPL OIL SW	(8,541)	(20,925)	(6,222)	(13,104)	(19)	(48,812)
		02291489	ASU ROX HUNTINGTON AVE-RPL OI	(992)	(4,494)	(2,707)	394	(336)	(8,136)
		02291492	ASU BOS CLARENDON ST-RPL OIL	57	(786)	132	549	13	(34)
		02291493	ASU BOS CHANDLER ST-RPL OIL S	24	161	28	544	10	767
		02291589	ASU BRI COMM AVE REPL 4KV OIL	248	353	463	788	33	1,885

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
		02291596	ASU H-P HYDE PARK AVE REPLACE	(924)	402	(169)	450	46	(195)
		02291598	ASU W-R CENTRE ST REPL OIL SW	22	907	743	1,370	98	3,140
		02291599	ASU W-R SOUTH ST REPL OIL SW	(1,657)	(5,624)	(1,853)	(2,916)	(256)	(12,305)
		02291604	ASU BKL HARVARD ST RPL 4KV SWT	453	363	3	891	42	1,752
		02291634	ASU DOR BIRD ST OIL SW REPL M	(739)	(10,324)	(10,849)	(8,205)	(472)	(30,589)
		02291640	ASU DOR RIVER ST OIL SW REPL	125	322	382	-	89	917
		02313487	ASU H-P RIVER ST OIL SWITCH R	1,709	6,424	4,242	-	567	12,941
		02319720	ASU DOR MORTON ST RPL 4KV SW W	654	2,200	998	-	96	3,948
		02319725	ASU W-R WASHINGTON STRPL OIL	30	275	150	-	20	475
		02319735	ASU DOR BLUE HILL AVE RPL 4KV	548	4,740	1,113	(0)	112	6,514
		02319739	ASU MIL RIVER ST RPL 4KV	167	828	478	0	57	1,530
		02319754	ASU BOS SHAWMUT AVE RPL 4KV O	913	1,858	700	-	49	3,520
		02319772	ASU BOS CAMDEN STREET RPL 5KV		0	-	-	-	0
		02319863	ASU BKL HARVARD ST RPL 4KV SW	120	625	1,067	-	362	2,174
		02319870	ASU DOR MORTON ST RPL 4KV SW	225	1,743	504	-	25	2,497
		02319884	ASU DOR MORTON ST RPL 4KV SW	35	682	368	-	64	1,149
		02319888	ASU W-R CENTRE ST RPL 4KV SW	65	1,358	781	-	171	2,376
		02319915	ASU W-R CENTRE ST RPL 4KV SW	239	1,682	1,023	0	113	3,056
		02319923	ASU W-R CHURCH ST RPL 4KV SW	179	442	202	-	29	853
		02319932	ASU ROX TREMONT ST RPL 4KV SW	112	1,563	853	-	45	2,572
		02319959	ASU BOS MASSACHUSETTS AVE RPL	266	814	480	-	73	1,633
		02319967	ASU BOS COLUMBUS AVE RPL 4KV		(0)	(0)	-	-	(0)
		02319970	ASU BOS TREMONT ST RPL 4KV SW	1,545	2,549	1,186	-	161	5,442
		02319977	ASU BOS TREMONT ST RPL 4KV SW		(0)	0	-	-	(0)
		02320762	ASU WAL MAIN STREET RPL 4KV SW	0	0	(0)	-	0	0
		02320786	ASU WAL MOODY STREET RPL 4KV		0	-	-	(0)	0
		02320789	ASU WAL MOODY STREET RPL 4KV		82	-	-	14	96
		02320795	ASU WAT GALEN STREET RPL 4KV S		0	-	-	-	0
		02320805	ASU WAT GALEN STREET RPL 4KV S	420	2,966	1,472	-	236	5,095
		02320807	ASU WAT MT AUBURN ST RPL 4KV S	0	(0)	(0)	-	0	0
		02320813	ASU WAL MOODY STREET RPL 4KV		(0)	-	0	(0)	0
		02320819	ASU WAL MAIN STREET RPL 4KV S	-	(0)	(0)	0	0	(0)
		02320824	ASU WAL MOODY STREET RPL 4KV	-	(0)	0	0	(0)	(0)
		02320825	ASU WAT MAIN STREET RPL 4KV SW		1,237	(0)	-	0	1,237
		02320827	ASU WAT GALEN STREET RPL 4KV S		0	(0)	-	(0)	0
		02329178	ASU DOR BLUE HILL AVE REPL &I	317	804	408	885	52	2,466
		02330554	ASU S-B DORCHESTER ST REPL OI	545	1,739	888	-	101	3,274
		02330556	ASU S-B L ST REPL OIL SWITCH	104	597	347	-	21	1,069
		02332189	ASU S-B DORCHESTER ST REPLACE	224	1,475	1,164	1,650	268	4,781
		02332194	ASU BOS COLUMBUS AVE-RPL 4KV	844	3,322	1,813	-	180	6,159
		02332195	ASU S-B DORCHESTER AVE REPL &	267	2,739	1,576	-	164	4,746
		02332196	ASU S-B DORCHESTER AVE REPL O	3,052	17,623	9,188	-	482	30,346
		02332198	ASU BOS CAMDEN ST-RPL OIL SW	332	5,155	3,411	-	110	9,009
		02332200	ASU BOS ALBANY ST REPL & INST	612	1,748	737	-	173	3,271
		02336429	ASU W-R WASHINGTON ST RPLOIL S	1,259	1,402	266	-	100	3,026
		02337262	ASU S-B REPLACE OIL SWITCH IN	62	576	327	299	6	1,269
		02337264	ASU S-B REPLACE OIL SWITCH IN	89	443	138	666	16	1,351
		02340862	ASU DOR STOUGHTON ST MH1092 R	540	1,388	729	1,261	16	3,935
		02340863	ASU DOR BOSTON ST MH10126 REP	405	1,321	700	-	49	2,474
		02340874	ASU BOS HARRISON AVE REPL OIL	7	394	229	-	25	654
		02340877	ASU DOR DORCHESTER AVE MH1746	276	674	542	714	29	2,235
		02341417	ASU DOR DORCHESTER AVE MH1747	699	2,033	895	816	72	4,515
		02341439	ASU DOR BLUE HILL AVE MH7244	481	623	174	-	11	1,288
		02341468	ASU S-B MH2143 REPLACE OIL SW	70	337	189	544	26	1,166
		02341469	ASU S-B MH9598 REPLACE OIL SW	299	1,072	635	1,181	91	3,278
		02341470	ASU W-R WASHINGTON ST REPL &	257	5,271	3,196	-	132	8,856
		02341471	ASU ROX MH9149 REPL OIL S	613	2,679	1,313	-	85	4,690
		02341472	ASU W-R SOUTH ST REPL & INS	73	1,089	619	-	48	1,829
		02341473	ASU W-R SOUTH ST REPL & INS	1,333	3,316	1,483	-	(4)	6,128
		02343883	ASU BKL HARVARD ST RPL 4KV	2,616	13,147	6,413	-	945	23,120
		02348625	ASU BOS HARRISON AVE-REPL OIL	418	1,642	773	-	54	2,887
		02348633	ASU BOS HARRISON AVE-REPL OIL	564	1,978	905	-	87	3,534
		02348643	ASU BOS RUTLAND ST-MH20668-RE	1,556	6,032	2,743	-	558	10,890
		02349730	ASU W-R HYDE PARK AVE INST &	351	1,409	720	-	36	2,516

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
		02350766	ASU BRI BRIGHTON AVE REPL &	302	2,806	1,526		73	4,707
		02350769	ASU BRI BRIGHTON AVE REPL &	2,429	5,769	3,055		223	11,476
		02351101	ASU W-R SOUTH ST REPL & INST	61	717	257	896	42	1,973
		02351115	ASU BKL HARVARD ST REPL AND I	1,175	4,859	2,328		313	8,674
		02351144	ASU W-R WASHINGTON ST REPL &	533	4,352	2,316		182	7,384
		02353738	ASU DOR BLUE HILL AVE MH7249	672	1,848	846		80	3,446
		02354744	ASU BKL HAMMOND ST REPL & INS	220	1,068	402		133	1,823
		02355898	ASU BOS P SULLIVAN WAY-MH1464	166	337	116		13	631
		02355913	ASU BOS PAUL SULLIVAN WAY-MH1	740	2,955	1,385		90	5,170
		02355923	ASU BOS ALBANY ST MH1883 -R	251	1,063	419		30	1,763
		02355932	ASU BOS ALBANYST-MH20565-RPL	514	1,602	1,090	1,108	129	4,442
		02355936	ASU BOS ALBANY ST MH7130-RPL	32	656	430	766	23	1,908
		02355944	ASU BOS SHAWMUT AVE-MH8006-RP	287	1,455	728		42	2,512
		02356927	ASU NEW WASHINGTON ST MH7051	2,282	6,782	3,011		208	12,283
		02357134	ASU BKL BEACON ST REPL & INST	188	612	270		26	1,096
		02357138	ASU BKL ST PAUL ST REPL & INS	290	1,221	574		6	2,092
		02359097	ASU DOR MORTON ST REPL OS W G	476	1,678	657		110	2,922
		02359103	ASU ROX HARRISON AVE 318-07 R	29	580	354	723	16	1,702
		02361042	ASU BRI COMMONWEALTH AVE REPL	2,512	7,840	7,468	9,915	426	28,159
		02366617	ASU BOS AGUADILA ST-REPL OIL	588	2,123	802	646	50	4,210
		02373549	ASU NEW WASHINGTON ST MH3940 R		8,949	5,174	2,894	88	17,105
		02291488	ASU ROX TREMONT ST-RPL OIL SW	0	(343)	(205)		(12)	(560)
		02291489	ASU ROX HUNTINGTON AVE-RPL OI		(1,984)	(584)	(3,710)	(84)	(6,361)
		02291492	ASU BOS CLARENDON ST-RPL OIL		(122)	(73)	-	(5)	(200)
		02291493	ASU BOS CHANDLER ST-RPL OIL S		(16)	(10)		(2)	(28)
		02291589	ASU BRI COMM AVE REPL 4KV OIL		(95)	(58)		(3)	(156)
		02291595	ASU H-P RIVER ST REPL OIL SW		(5,268)	(2,642)	(1,022)	(163)	(9,096)
		02291596	ASU H-P HYDE PARK AVE REPLACE		(1,012)	(76)	(3,377)	(9)	(4,474)
		02291599	ASU W-R SOUTH ST REPL OIL SW		(446)	(212)	(356)	(18)	(1,031)
		02291634	ASU DOR BIRD ST OIL SW REPL M	0	(1,901)	(1,017)	0	(49)	(2,968)
		02291640	ASU DOR RIVER ST OIL SW REPL		(673)	(383)		(70)	(1,125)
		02373552	ASU NEW WASHINGTON ST MH3457 R	1,044	5,714	1,482	7,511	21	15,771
	18328 Total			27,982	139,066	72,778	13,235	7,637	235,509
	19293	02358858	ASU BRI HARVARD ST REPL SW IN	60	167	69		-	297
	19293 Total			60	167	69		-	297
12175 Urban Underground Automation Total				28,026	139,233	72,847	13,235	7,653	235,806
12185	Distribution System Network Operator ' WD00308	6A822162	VVO REGULATORS.INSTALL 3 - 7.6 548A	(1,593)	1,871	1,204	-	24	1,507
		6A822163	VVO REGULATORS.INSTALL 3 - 7.6 548A	1,488	368	73	-	-	1,929
		6A822165	VVO REGULATORS.INSTALL 3 - 7.6 548A	(550)	761	427	-	13	651
		6A920104	VVO REGULATORS.INSTALL 3 - 7.6 548A	261	59	19	-	-	340
		6A920106	VVO REGULATORS.INSTALL 3 - 7.6 219A	421	107	49	-	-	578
		6A920108	VVO REGULATORS INSTALL 3 - 7.6 219A	1,316	247	32	-	2	1,597
		6A920109	VVO REGULATORS. INSTALL 3 - 7.6 KV	1,478	355	87	-	1	1,922
		6A920110	VVO REGULATORS. INSTALL 2 - 4.8KV 1	1,091	322	169	-	-	1,582
		6A920111	VVO REGULATORS. INSTALL 3 - 7.6 548	1,002	258	44	-	1	1,304
		6A920112	VVO REGULATORS. INSTALL 3 - 7.6 548	1,195	256	66	-	3	1,519
		6A920113	VVO REGULATORS. INSTALL 1 - 100A R	1,263	277	69	-	-	1,609
		6A920114	VVO REGULATORS. INSTALL 1 - 4.8KV 1	1,800	405	112	-	-	2,317
		6A920115	VVO REGULATORS. INSTALL 1 - 100A R	2,006	407	78	-	-	2,491
		6A920119	VVO REGULATORS. INSTALL 1 - 100A R	351	85	25	-	-	461
		6A920120	VVO REGULATORS.INSTALL 1 - 4.8 100	1,311	208	43	-	-	1,562
		6A920121	VVO REGULATORS.INSTALL 1 - 4.8 100	1,022	189	41	-	-	1,252
		6A920153	VVO - INSTALL 13.8KV 600KVAR CAPACI	124	33	6	-	-	164
		6A920154	VVO - INSTALL 13.8KV 600KVAR CAPACI	743	256	61	-	-	1,060
		6A920155	VVO - INSTALL 13.8KV 600KVAR CAPACI	1,247	278	74	-	-	1,598
		6A920156	VVO - REPLACE CAPACITOR BANK ON 41/	792	195	34	-	-	1,021
		6A920157	VVO - INSTALL 13.8KV 1200KVAR CAPAC	794	248	65	-	-	1,107
		6A920158	VVO - INSTALL 13.8KV 600KVAR CAPACI	683	148	36	-	-	866
		6A920159	VVO - INSTALL 13.8KV 1200KVAR CAPAC	236	307	235	-	-	779
		6A920160	VVO - INSTALL 13.8KV 600KVAR CAPACI	409	91	16	-	-	517
		6A920161	VVO - INSTALL 13.8KV 600KVAR CAPACI	96	38	18	-	-	151
		6A920162	VVO - INSTALL 13.8KV 600KVAR CAPACI	1,221	425	191	-	-	1,837
		6A920163	VVO - INSTALL 13.8KV 600KVAR CAPACI	656	223	77	-	-	956
		6A920164	VVO - INSTALL 13.8KV 600KVAR CAPACI	1,001	383	99	-	-	1,482

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
		6A920165	VVO - INSTALL 13.8KV 600KVAR CAPACI	218	75	24	-	-	317
		6A920166	VVO - INSTALL 13.8KV 1200KVAR CAPAC	891	386	132	-	-	1,408
		6A920167	VVO - INSTALL CAPACITOR BANK 1200 K	474	173	49	-	-	696
		6A920168	VVO - INSTALL 13.8KV 600KVAR CAPACI	670	172	61	-	-	903
		6A920169	VVO - INSTALL 13.8KV 1200KVAR CAPA	691	274	99	-	2	1,067
		6A920170	VVO - INSTALL 13.8KV 600KVAR CAPACI	354	88	13	-	1	456
		6A920171	VVO - INSTALL 13.8KV 600KVAR CAPAC	219	71	16	-	-	306
		6A920172	VVO - INSTALL 13.8KV 1200KVAR CAPAC	100	35	17	-	-	152
		6A921600	VVO: INSTALL END OF LINE SENSORS IN			0	-	-	0
		6A921601	VVO: INSTALL END OF LINE SENSORS IN	83	10	16	-	-	109
		6A921602	VVO: INSTALL END OF LINE SENSORS IN	198	102	89	-	-	388
		6A921603	VVO: INSTALL END OF LINE SENSORS IN	590	68	22	-	-	679
		6A921604	VVO: INSTALL END OF LINE SENSORS IN	232	105	57	-	1	395
		6A921606	VVO: INSTALL END OF LINE SENSORS IN	290	34	17	-	-	342
		6A921696	VVO: INSTALL END OF LINE SENSORS IN	166	17		-	-	183
		6A921841	VVO: INSTALL END OF LINE SENSORS IN	138	14		-	-	152
		6A921842	VVO: INSTALL END OF LINE SENSORS IN	66	75	80	-	1	223
		6S822406	VVO REGULATORS.INSTALL 3 - 7.6 548A	1,520	204	34	-	-	1,758
		6S822408	VVO REGULATORS. INSTALL 3 - 300A R	8,717	1,588	406	-	6	10,717
		6S920190	VVO REGULATORS. INSTALL 3 - 7.6 548	8,246	1,380	150	-	2	9,779
		6S920192	VVO REGULATORS. INSTALL 3 - 7.6 548	3,616	615	59	-	80	4,369
		6S920193	VVO REGULATORS. INSTALL 3 - 7.6 548	9,903	189	35	-	-	10,126
		6S920194	VVO REGULATORS. INSTALL 3 - 7.6 219	2,300	394	54	-	-	2,748
		6S920195	VVO REGULATORS. INSTALL 3 - 7.6 548	3,972	992	112	-	-	5,076
		6S920196	VVO REGULATORS. INSTALL 3 - 7.6 548	6,883	1,306	213	-	-	8,401
		6S920197	VVO REGULATORS. REPLACE 3 - 7.6 548	2,886	2,114	219	-	(669)	4,549
		6S920198	VVO REGULATORS. INSTALL 3 - 7.6 548	4,406	772	114	-	-	5,291
		6S920199	VVO REGULATORS. INSTALL 1 - 7.6 100	2,299	732	-	-	-	3,031
		6S920278	VVO - INSTALL CAPACITOR BANK 600 KV		18	17	-	-	35
		6S920279	VVO - INSTALL 13.8KV 1200KVAR CAPAC	1,022	184	15	-	-	1,221
		6S920280	VVO - INSTALL13.8KV 1200KVAR CAPACI	295	63	18	-	-	376
		6S920282	VVO - INSTALL CAPACITOR BANK 600 KV	9,524	1,578	18	-	-	11,120
		6S920283	VVO - INSTALL CAPACITOR BANK 600 KV	4,458	756	38	-	-	5,251
		6S920284	VVO - INSTALL 13.8KV 1200KVAR CAPAC	1,443	249	24	-	-	1,716
		6S920285	VVO - INSTALL 13.8KV 600KVAR CAPACI	437	78	18	-	5	538
		6S920286	VVO - INSTALL 13.8KV 600 KVAR CAPAC	1,642	284	27	-	-	1,953
		6S920287	VVO - INSTALL 13.8KV 600KVAR CAPACI	321	45	5	-	-	370
		6S920288	VVO INSTALL 13.8KV 600 KVAR CAP BAN	420	79	11	-	-	509
		6S920289	VVO - INSTALL 13.8KV 1200 KVAR CAPA	2,692	470	49	-	-	3,211
		6S920290	VVO - INSTALL 13.8KV 1200KVAR CAPAC	1,430	251	14	-	-	1,695
		6S920291	VVO- REPLACE EXISTING POLE & CAPACI	1,365	318	55	-	-	1,738
		6S920292	VVO - INSTALL CAPACITOR BANK ON P17	1,524	350	41	-	-	1,915
		6S920293	VVO - INSTALL 13.8KV 1200KVAR CAPAC	1,340	627	44	-	-	2,011
		6S920294	VVO - INSTALL 66 KVAR CAP BANK ON	208	50	8	-	-	266
		6S920295	VVO - INSTALL 13.8KV 1200 KVAR CAPA	571	129	21	-	-	722
		6S920296	VVO - INSTALL 13.8 KV 1200 KVAR CAP	566	153	40	-	-	759
		6S920297	VVO - INSTALL CAPACITOR BANK ON NEW	2,816	982	278	-	6	4,082
		6S920298	VVO - INSTALL 13.8KV 600KVAR CAPACI	589	196	54	-	-	838
		6S920299	VVO - INSTALL 600kVAR CAPACITOR B	235	66	21	-	1	323
		6S920300	VVO - INSTALL 13.8KV 600KVAR CAPACI	663	203	60	-	-	926
		6S920301	VVO - INSTALL 13.8KV 1200KVAR CAPAC	701	196	30	-	-	927
		6S920302	VVO - INSTALL CAPACITOR BANK ON NEW	1,258	366	75	-	-	1,699
		6S920303	VVO - INSTALL 13.8KV 1200KVAR CAPAC	1,001	210	36	-	-	1,247
		6S920304	VVO - INSTALL 13.8KV 1200KVAR CAPAC	696	178	31	-	-	905
		6S920305	VVO - REPLACE EXISTING CAPACITOR WI	481	132	21	-	-	634
		6S920306	VVO - INSTALL 13.8KV 1200 KVAR CAPA	966	218	27	-	-	1,210
		6S920307	VVO - INSTALL CAPACITOR BANK ON P15	540	136	29	-	-	705
		6S920308	VVO - INSTALL CAPACITOR BANK ON P14	1,434	326	33	-	-	1,793
		6S920309	VVO - INSTALL 600 KVAR CAP BANK ON	815	173	46	-	-	1,034
		6S920310	VVO - INSTALL 13.8KV 1200KVAR CAPAC	593	117	19	-	-	728
		6S920311	VVO - INSTALL CAPACITOR BANK 600 KV	1,466	297	37	-	-	1,800
		6S920312	VVO - INSTALL CAPACITOR BANK 1200 K	1,611	365	74	-	-	2,050
		6S920313	VVO - INSTALL CAPACITOR BANK ON P15	1,609	213	18	-	-	1,841
		6S920314	VVO - INSTALL 13.8KV 1200KVAR CAPA	1,215	299	81	-	-	1,596

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
		6S920315	VVO - INSTALL 13.8V 600KVAR CAPACIT	890	174	13	-	-	1,078
		6S920317	VVO- REPLACE EXISTING POLE & CAPACI	1,275	286	66	-	-	1,627
		6S920318	VVO - INSTALL 13.8KV 600KVAR CAPACI	796	166	28	-	-	989
		6S920319	VVO - INSTALL CAPACITOR BANK ON P20	312	70	23	-	-	405
		6S920320	VVO - REPLACE CAPACITOR BANK ON POL	2,072	418	50	-	-	2,540
		6S920321	VVO - INSTALL 13.8KV 600KVAR CAPACI	889	176	26	-	-	1,090
		6S920322	VVO - INSTALL 1-13.8KV 600KVAR CAPA	418	121	32	-	-	571
		6S920323	VVO - INSTALL 13.8KV 1200KVAR CAPAC	467	99	22	-	-	588
		6S920324	VVO - INSTALL 13.8KV 600KVAR CAPACI	1,903	535	77	-	3	2,517
		6S920325	VVO - INSTALL CAPACITOR BANK ON P19	740	139	30	-	1	910
		6S920326	VVO - INSTALL 13.8KV 1200KVAR CAPAC	666	144	27	-	-	837
		6S920327	VVO - INSTALL 600 KVA CAP BANK ON P	630	125	24	-	-	779
		6S920328	VVO - INSTALL CAPACITOR BANK ON P19	1,187	312	37	-	-	1,535
		6S920329	VVO - INSTALL CAPACITOR BANK 1200 K	97	20	4	-	-	121
		6S920330	VVO - INSTALL CAPACITOR BANK 600 KV	816	187	47	-	-	1,050
		6S920331	VVO - INSTALL 13.8KV 1200KVAR CAPAC	2,276	478	38	-	-	2,793
		6S922246	VVO: INSTALL END OF LINE SENSORS IN	131	48	26	-	-	206
		6S922247	VVO: INSTALL END OF LINE SENSORS IN	1,774	201	126	-	1	2,102
		6S922337	VVO: INSTALL END OF LINE SENSORS IN	1,167	160	38	-	1	1,365
		6A921696	VVO: INSTALL END OF LINE SENSORS IN	-	25	22	-	1	48
		6S922337	VVO: INSTALL END OF LINE SENSORS IN	-	159	223	-	2	383
	WD00308 Total			148,449	35,173	7,949	-	(511)	191,060
	WS00033	WS000331	LTC Control Replacement (VVO)	16,355	9,669	165		(27,866)	(1,677)
	WS00033 Total			16,355	9,669	165		(27,866)	(1,677)
	WS00034	WS000341	LTC Control Replacement (VVO)	5,864	8,404	4,103	3,105	(29,911)	(8,435)
	WS00034 Total			5,864	8,404	4,103	3,105	(29,911)	(8,435)
	WS00035	WS000351	LTC Control Replacement (VVO)	6,356	4,319	259		(32,719)	(21,785)
	WS00035 Total			6,356	4,319	259		(32,719)	(21,785)
	WS00036	WS000361	DSCADA LTC CONTROLS UPGRADE	2,561	1,745	1,115		79	5,500
	WS00036 Total			2,561	1,745	1,115		79	5,500
12185 Distribution System Network Operator Total				179,585	59,311	13,590	3,105	(90,928)	164,663
12190	Advanced Sensing Technology	18329	02290224	ASU H-P HYDE PARK AVE PMH-16		-	-	-	-
			02290226	ASU DOR RIVER ST PMH21047 4	(4)	(64)			(68)
			02290366	ASU BKL SEWALL AVE AUTOMATE PM		(209)	(58)	(434)	(700)
			02316754	ASU BOS BROOKLINE AVE PMH1025	-	0	-	-	0
			02316762	ASU BRI BEACON STREET PMH2053		-	-	-	-
			02316767	ASU W-R CATBIRD CT PMH21713 4	-	-	-	0	0
			02316774	ASU DOR TAYLOR TERRACE PMH219	-	(0)	(0)	0	(0)
			02316778	ASU W-R CENTRE STREET PMH2203	-	-	-	0	0
			02316790	ASU S-B KEMP STREET PMH22601	-	(0)	(0)	(0)	(0)
			02316794	ASU BOS LANSLOWNE STREET PMH2	-	-	-	-	-
			02316798	ASU DOR BLUE HILL AVE PMH2174	-	0	-	-	0
			02316803	ASU W-R BEECH STREET [MH22775	-	(0)	0	-	0
			02316813	ASU H-P RIVER STREET PMH22876	-	-	(0)	(0)	(0)
			02316818	ASU DOR BLUE HILL AVE PMH2325	-	-	-	-	-
			02316825	ASU E-B MOORE STREET PMH23350	-	-	-	0	0
			02316828	ASU E-B HORACE STREET PMH2412	-	-	-	-	-
			02316831	ASU CHA BEACHAM STREET PMH-13	-	(0)	-	-	(0)
			02316851	ASU SOM FOLEY STREET PMH23335	-	-	-	-	-
			02316855	ASU SOM ARTISAN WAY PMH23490	-	-	-	(0)	(0)
			02316856	ASU SOM ASSEMBLY ROW PMH24133	-	-	-	-	-
			02316859	ASU CHA WEST SCHOOL STREET PM	-	-	-	-	-
			02316860	ASU SOM SHERMAN STREET PMH227	-	-	-	-	-
			02316863	ASU CHA RUTHERFORD AVE PMH328	-	-	-	-	-
			02316866	ASU CHA 1ST AVE PMH20755 250-	-	-	-	(0)	(0)
			02316875	ASU CHA 1ST AVE PMH24112 250-	-	51	-	0	51
			02316888	ASU CHE SPRUCE STREET PMH3209	-	-	-	-	-
			02316896	ASU E-B MAVERICK STREET PMH23	-	0	-	(0)	(0)
	18329 Total			(4)	(222)	(58)	(434)	-	(718)
	18350	02373446	STACONS STA 611 REPLACE 13.8KV REL	6,370	41,699	23,116	13,000	187	84,371
	18350 Total			6,370	41,699	23,116	13,000	187	84,371
	18351	02313517	STACONS STA 738 REPLACE 13.8KV REL	2,239	13,322	8,339	4,698	89	28,686
	18351 Total			2,239	13,322	8,339	4,698	89	28,686
	18352	02373456	STACONS STA 828 REPLACE 13.8KV REL	11,578	38,825	18,831	28,572	228	98,034

2019 Total Cost of Removal and Carry Over by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/ Overheads	Labor	Material	Other	Total 2019 Cost of Removal
	18352 Total			11,578	38,825	18,831	28,572	228	98,034
	18354	02313520	STACONS STA 60 INSTALL NEW RTU & R	27,864	30,710	8,720	17,769	99	85,162
	18354 Total			27,864	30,710	8,720	17,769	99	85,162
	19182	02316865	STACONS STA 968 REPLACE 23.8KV REL	6,542	19,193	9,120	841	182	35,878
	19182 Total			6,542	19,193	9,120	841	182	35,878
	19245	02373467	STACONS STA 282 REPLACE RELAYS - G	5,218	6,736	1,951	2,010	5	15,920
	19245 Total			5,218	6,736	1,951	2,010	5	15,920
	19246	02375895	STACONS STA 455 REPLACE RELAYS - G	11,663	14,449	4,955	8,110	50	39,226
	19246 Total			11,663	14,449	4,955	8,110	50	39,226
	19247	02373475	STACONS STA 26 REPLACE RELAYS - GR	15,154	21,038	6,202	5,857	64	48,315
	19247 Total			15,154	21,038	6,202	5,857	64	48,315
	GMW10101	GMW10101	Grid Mod Feeder Relay Replacement	27,352	38,004	9,741		(188,148)	(113,051)
	GMW10101 Total			27,352	38,004	9,741		(188,148)	(113,051)
	GMW10301	GMW10301	Grid Mod Feeder Relay Replacement	28,876	21,555	10,265		532	61,227
	GMW10301 Total			28,876	21,555	10,265		532	61,227
	GMW10401	GMW10401	Grid Mod Feeder Relay Replacement	2,857	6,878	1,691		(171,801)	(160,375)
	GMW10401 Total			2,857	6,878	1,691		(171,801)	(160,375)
	WD00300	6A821475	RPL 3 SGL HYDROLIC RECLOSERS ON PO	-	9	(0)	-	(817)	(809)
		6A822180	GRD MOD: REPLACE SR RECLOSER 21C4-7	342	248	7	-	-	597
		6A822183	GRID MOD: REPLACE SR RECLOSER 19J1-	478	8,045	2,038	-	20	10,581
		6A822184	GRID MOD: REPLACE SR RECLOSER 19J1-	1,131	729	105	-	-	1,965
		6A822185	GRID MOD: INSTALL TR RECLOSER 19J1-	(41)	(5)	2	-	(1,315)	(1,360)
		6A822186	GRID MOD: INSTALL TR RECLOSER 19J1-	(200)	(134)	2	-	-	(332)
		6A822188	GRID MOD: REMOVE 19J1-71S P21/2 INS	190	131	(0)	-	-	320
		6A822236	GRID MOD: INSTALL RR RECLOSER 18G7-	2,835	2,417	379	-	(5,631)	-
		6A822237	GRID MOD: REPLACE RR RECLOSER 18G7-	716	571	143	-	-	1,429
		6A822256	GRID MOD: REPLACE RR RECLOSER 21C8-	922	863	174	-	(1,960)	-
		6A822261	GRID MOD: REPLACE SR RECLOSER 22B1-	485	510	145	-	-	1,140
		6A822262	GRID MOD: REPLACE SR RECLOSER 22B1-	414	395	99	-	(908)	0
		6A822268	GRID MOD: INSTALL SR RECLOSER 17K5-	746	692	165	-	-	1,604
		6A822269	GRID MOD: REPLACE TR RECLOSER 17K5-	421	497	155	-	-	1,073
		6B820766	GRID MOD; RPL OIL RECLOSER 18C2-70S	-	55	(0)	-	(804)	(749)
		6B820768	GRID MOD; RPL OIL RECLOSER 19A505 W	-	23	5	-	(1,022)	(995)
		6B820769	GRID MOD; RPL OIL RECLOSER 19A525 W	-	18	13	-	(1,135)	(1,104)
		6B821238	Grid Mod: Rep SR 30B-72S on P514/44	268	1,345	807	-	-	2,420
		6B821239	Grid Mod: Rep MR30B-81M and Install	225	1,187	683	-	5	2,101
		6B821242	Grid Mod: Rep RR Recl 30B4-60R inst	66	640	400	-	(1,106)	-
		6B821244	GRID MOD: INSTALL TR RECLOSER 19J4-	14	74	60	-	(149)	-
		6B821246	GRID MOD: REP RR 16B503 W/ 16B5-71S	63	329	232	-	(623)	-
		6B821248	Grid Mod: Rep SR 30B4-72S & install	53	409	247	-	(710)	-
		6B920271	GRID MOD: INSTALL RR RECLOSER 30B3-	74	322	289	-	1	686
		6S822290	REPLACE TIE RECLOSER; NEW NOMENCLAT	21	(28)	(18)	-	(1,347)	(1,372)
	WD00300 Total			9,221	19,343	6,133	-	(17,502)	17,194
12190 Advanced Sensing Technology Total				154,930	271,528	109,005	80,423	(376,016)	239,870
Total 2019 Cost of Removal				453,415	564,240	255,877	44,112	(569,491)	749,244

**2019 Grid Modernization Investment
Summary of Retirements**

Line #	Grid Modernization Description	Plant Account	Line of Business	Line of Business Description	Actual Jan	Actual Feb	Actual Mar	Actual Apr	Actual May	Actual Jun	Actual Jul	Actual Aug	Actual Sep	Actual Oct	Actual Nov	Actual Dec	Total 2019
	Retirements																
1	Grid Modernization - 2019 Projects	362	12185	Distribution System Network Operator	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (123,249)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (123,249)
2			12190	Advanced Sensing Technology	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (49,447)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (49,447)
3					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (172,697)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (172,697)
4	Grid Modernization - 2019 Projects	364	12170	Automated Feeder Reconfiguration	\$ (328)	\$ (933)	\$ (291)	\$ (1,395)	\$ (1,842)	\$ (799)	\$ -	\$ (7,158)	\$ (4,475)	\$ (1,522)	\$ (4,401)	\$ (14,129)	\$ (37,272)
5			12190	Advanced Sensing Technology	\$ (94)	\$ -	\$ -	\$ -	\$ -	\$ (2,291)	\$ -	\$ (1,352)	\$ (99)	\$ -	\$ -	\$ -	\$ (710)
6					\$ (423)	\$ (933)	\$ (291)	\$ (1,395)	\$ (1,842)	\$ (3,089)	\$ -	\$ (8,510)	\$ (4,574)	\$ (1,522)	\$ (4,401)	\$ (14,839)	\$ (41,818)
7	Grid Modernization - 2019 Projects	365	12170	Automated Feeder Reconfiguration	\$ 92	\$ (9,683)	\$ (21,574)	\$ (9,339)	\$ (6,404)	\$ (2,551)	\$ (31,460)	\$ (81,311)	\$ (63,465)	\$ (1,096)	\$ (13,404)	\$ (98,885)	\$ (339,080)
8			12175	Urban Underground Automation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (175)	\$ (20,468)	\$ (20,643)
9			12190	Advanced Sensing Technology	\$ (65,517)	\$ -	\$ (34,993)	\$ -	\$ -	\$ (79,739)	\$ -	\$ (179,401)	\$ (35,913)	\$ -	\$ (496)	\$ (63,486)	\$ (459,545)
10					\$ (65,425)	\$ (9,683)	\$ (56,567)	\$ (9,339)	\$ (6,404)	\$ (82,290)	\$ (31,460)	\$ (260,712)	\$ (99,378)	\$ (1,096)	\$ (14,074)	\$ (182,839)	\$ (819,268)
11	Grid Modernization - 2019 Projects	367	12165	Electric Vehicle Infrastructure	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (348)	\$ -	\$ -	\$ -	\$ (230)	\$ (578)
12			12175	Urban Underground Automation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (20,697)	\$ (3,399)	\$ (24,096)
13					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (348)	\$ -	\$ -	\$ (20,697)	\$ (3,629)	\$ (24,674)
14	Grid Modernization - Subtotal Retirements - 2019 Projects				\$ (65,848)	\$ (10,615)	\$ (56,858)	\$ (10,734)	\$ (8,246)	\$ (85,380)	\$ (204,157)	\$ (269,570)	\$ (103,953)	\$ (2,618)	\$ (39,172)	\$ (201,308)	\$ (1,058,457)
15																	
16	Grid Modernization - Total Retirements in 2019				\$ (65,848)	\$ (10,615)	\$ (56,858)	\$ (10,734)	\$ (8,246)	\$ (85,380)	\$ (204,157)	\$ (269,570)	\$ (103,953)	\$ (2,618)	\$ (39,172)	\$ (201,308)	\$ (1,058,457)

2019 Retirements by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total Retirements
12165 Electric Vehicle Infrastructure	EV41L2EJ	6S822707	***MUNI IN*** Elec Vehicle Make Rea	(561)	(10)	(2)	(4)	(1)	(578)
	EV41L2EJ Total			(561)	(10)	(2)	(4)	(1)	(578)
12165 Electric Vehicle Infrastructure Total				(561)	(10)	(2)	(4)	(1)	(578)
12170 Automated Feeder Reconfiguration	18326	02316296	ASU FAL DAVISVILLE RD 22/1 IN	(6)	(321)	(168)	(36)	123	(407)
		02316305	ASU MAR CANAL ST 79/4 INSTALL	(1,120)	(236)	-	-	(0)	(1,356)
		02316312	ASU FAL W FALMOUTH HWY 29/202	(367)	-	-	-	-	(367)
		02316315	ASU DEN RT 6A 36/448 INSTALL	(785)	-	-	-	-	(785)
		02316782	ASU DEN RT 6A 36/450 INSTALL	(696)	(98)	-	-	(0)	(794)
		02316816	ASU YAR N DENNIS RD 9215/12 R	(869)	(405)	-	-	-	(1,274)
		02316838	ASU NEW P9/22A WAVERLY AVE RE	(3,931)	(2,189)	-	-	(0)	(6,120)
		02316844	ASU NEW P450/5 WATERTOWN ST. R	(4,908)	(2,874)	-	-	(42)	(7,824)
		02316871	ASU NEB RIVET ST 585/16 INSTA	(4,988)	-	-	-	-	(4,988)
		02316876	ASU NEB CEDAR ST 132/5 INSTAL	(17)	-	-	-	-	(17)
		02316880	ASU NEB BULLOCK ST 116/5 INST	(548)	-	-	-	-	(548)
		02316882	ASU NEB MILL ST 462/41 INSTAL	(4,143)	(1,712)	-	-	(33)	(5,888)
		02316903	ASU NEB BELLEVILLE RD P64/22	(207)	-	-	-	-	(207)
		02316911	ASU BAR SCHOOL ST 313/2 INSTA	(1,561)	(2,451)	-	-	(5)	(4,017)
		02316918	ASU SAN RT 6A 14/214 INSTALL	(394)	-	-	-	-	(394)
		02319084	ASU FRA 368 BROOK ST 21/43 I	(5,579)	(4,419)	-	-	-	(9,998)
		02319087	ASU NAT 19 E. EVERGREEN RD 4	(5,103)	(5,919)	-	-	-	(11,021)
		02319091	ASU ASH 153 PROSPECT ST 8/24	(991)	(2)	(1)	-	-	(994)
		02319101	ASU NEW 8 NEWTONVILLE AVE 24	(22,620)	(8,840)	-	-	-	(31,460)
		02319108	ASU WAL 337 WARREN ST 284/40	(5,063)	(1,769)	-	-	(1)	(6,833)
		02320172	ASU DED SPRAGUE ST REPL & INS	(165)	-	-	-	-	(165)
		02320174	ASU DED GREENLODGE ST REPL & I	(274)	-	-	-	-	(274)
		02320190	ASU H-P RESERVATION RD -RPL L	(4,153)	(2,361)	-	-	-	(6,514)
		02320191	ASU H-P AUSTIN ST INSTALL REC	(8)	(71)	(30)	(66)	(0)	(175)
		02326700	ASU CHE WEBSTER AVE NOVA RECL	(165)	-	-	-	-	(165)
		02326702	ASU E-B GLENDON ST-INSTALL RE	(409)	-	-	-	-	(409)
		02326712	ASU WOB BEDFORD RD NOVA RECL	(53)	0	-	-	-	(53)
		02326714	ASU STN FRANKLIN ST 36/23 - IN	(1,155)	-	-	-	-	(1,155)
		02326717	ASU CHE SPRUCE ST INST NOVA RE	(312)	(1)	-	-	-	(313)
		02326738	ASU ARL WARREN ST 113/8 INST R	(63)	-	-	-	-	(63)
		02326740	ASU ARL WYMAN ST 890/2 REPL LB	(340)	(284)	(165)	(287)	(1)	(1,076)
		02331938	ASU NEB 278 NASH ROAD P482/25	(80)	-	-	-	-	(80)
		02332072	ASU NEB BONNEY ST P85/11 INST	(10,397)	(4,314)	-	-	(6)	(14,716)
		02332075	ASU NEB BELLEVILLE AVE P4/39	(12,669)	(1)	(1)	-	-	(12,670)
		02332164	ASU YAR ROUTE 6A P1/84 INSTAL	(241)	-	-	-	-	(241)
		02332169	ASU FAL ACAPESKET RD P235/71	(216)	-	-	-	-	(216)
		02332171	ASU SAN OLD COUNTY RD P22/2 I	(51)	-	-	-	-	(51)
		02332184	ASU PLY WHITE HORSE RD 1065/1	(35)	-	-	-	-	(35)
		02332185	ASU MAR CARESWELL ST INT COOPE	(770)	(453)	-	-	(0)	(1,224)
		02332188	ASU BUB RED BROOK RD P357/4 I	(946)	(629)	(146)	(78)	16	(1,783)
	18326 Total			(96,398)	(39,346)	(511)	(467)	50	(136,672)
	WD00298	6A821670	GRID MOD; INSTALL RECLOSER 21C7-62R	17	214	69	392	1	693
		6A821672	GRID MOD; INSTALL VS RECLOSER 21C7-	(1,134)	(143)	(60)	(72)	50	(1,358)
		6A821673	GRID MOD; INSTALL TRIPLE SINGLE REC	(825)	-	-	-	(6)	(831)
		6A821674	GRID MOD; INSTALL RECLOSER VS 22B7-	(1,072)	(25)	(8)	(12)	12	(1,106)
		6A821675	GRID MOD; INSTALL RECLOSER AND FORM	(371)	-	-	-	-	(371)
		6A821676	GRID MOD - NJC - Montague, N. Lever	(12,294)	-	-	-	(64)	(12,358)
		6A822124	GRID MOD; INSTALL SR RECLOSER 18G5-	(1,292)	(353)	(130)	(67)	56	(1,785)
		6A822128	GRID MOD; INSTALL VS RECLOSER 18K2-	(1,117)	-	-	-	(9)	(1,127)

2019 Retirements by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total Retirements
		6A822130	GRID MOD: INSTALL MR RECLOSER 18G6-	(61)	-	-	-	2	(59)
		6A822131	GRID MOD: INSTALL VS RECLOSER 17K5-	(892)	(400)	(137)	(96)	117	(1,408)
		6A822133	GRID MOD: INSTALL VS RECLOSER 15A5-	(1,534)	-	-	-	(21)	(1,555)
		6A822178	GRID MOD: INSTALL VS RECLOSER 21C4-	(493)	-	-	-	(2)	(495)
		6A822179	GRID MOD: INSTALL VS RECL 21C4-XXXX	(313)	-	-	-	(0)	(313)
		6A822182	GRID MOD: INSTALL VS RECLOSER 19J1-	(493)	(371)	(125)	(66)	(9)	(1,064)
		6A822238	GRID MOD: INSTALL VS 15A3-4102 & IN	(310)	(319)	(123)	(52)	2	(802)
		6A822239	GRID MOD: INSTALL MR RECLOSER 15A3-	(1,281)	-	-	-	3	(1,277)
		6A822240	GRID MOD: INSTALL MR RECLOSER 15A3-	(1,217)	-	-	-	1	(1,215)
		6A822257	GRID MOD: INSTALL SR RECLOSER 22B7-	(1,767)	(6,109)	(2,767)	(2,918)	(9)	(13,569)
		6A822273	GRID MOD: INSTALL TSR RECLOSER 21C1	(1,870)	(843)	(200)	(1,090)	(35)	(4,038)
		6B820910	GRID MOD; RM RECL 19A1-60R;RM SLD B	(7,578)	(396)	(264)	(149)	292	(8,096)
		6B820911	GRID MOD: RPL SOLID BLADES WITH RE	(198)	(423)	(214)	(95)	(2)	(931)
		6B820912	GRID MOD: INSTALL RECLOSER 19A1-81	(205)	(600)	(286)	(375)	(5)	(1,472)
		6B820913	GRID MOD; INSTALL TIE RECLOSER 19A	(907)	(3,792)	(2,110)	(2,932)	(49)	(9,790)
		6B820914	GRID MOD; NEW RECLOSER LOCATION SR	(126)	(182)	(101)	(114)	177	(345)
		6B821179	Grid Mod: Install MR on Form 6 Cntl	(2,141)	-	-	-	(13)	(2,154)
		6B821181	GRID MOD: REPLACE RR RECLOSER 16B5-	(4,518)	-	-	-	18	(4,499)
		6B821182	Grid Mod: rep GOAB with MR 30B5-xxx	(531)	(3,231)	(1,324)	(2,933)	(21)	(8,040)
		6B821183	GRID MOD: INSTALL XX RECLOSER 19J4-	(559)	(27)	(31)	(9)	3	(623)
		6B821184	GRID MOD: INSTALL MR RECLOSER 30B4-	56	-	-	-	(0)	56
		6B821185	GRID MOD: INSTALL MR RECLOSER 17G3-	(223)	(26)	(11)	(9)	(1)	(269)
		6B821243	GRID MOD: INST MR RECL 19J4-85M AND	(214)	(13)	(11)	(4)	(3)	(245)
		6B821247	Grid Mod: Rem 40T fuses P228/74, in	(565)	(371)	(273)	(86)	(2)	(1,297)
		6B821260	GRID MOD: INSTALL MR RECLOSER 30B7-	(2,126)	-	-	-	(71)	(2,197)
		6S821808	GRID MOD; INSTALL RECLOSER 16C17-92	244	(123)	(235)	93	(0)	(21)
		6S821809	GRID MOD; INSTALL SR RECLOSER 30A1-	371	585	44	577	1	1,578
		6S821810	GRID MOD; INSTALL SR RECLOSER 16C17	(18)	(120)	(83)	(42)	(0)	(264)
		6S822352	GRID MOD: INSTALL SR RECLOSER 16C17	(1,227)	(117)	(32)	(33)	(6)	(1,415)
		6S822353	GRID MOD: INSTALL MR RECLOSER 16C17	(1,442)	-	-	-	13	(1,430)
		6S822354	GRID MOD: INSTALL SR RECLOSER 16C17	(507)	-	-	-	1	(507)
		6S822355	GRID MOD: INSTALL MR RECLOSER 29A1-	(774)	-	-	-	4	(770)
		6S822356	GRID MOD: INSTALL MR RECL 20A33-XXM	(2,985)	(0)	-	-	35	(2,950)
		6S822365	GRID MOD: INSTALL VS RECLOSER 5J17-	(476)	(257)	(149)	(46)	6	(921)
		6S822369	GRID MOD: INSTALL VS RECL 20A32-XXX	(1,913)	-	-	-	(2)	(1,915)
		6S822502	GRID MOD: INSTALL SR RECLOSER 30A5-	(2,992)	(0)	(0)	(0)	47	(2,945)
		6S822503	GRID MOD: INSTALL MR RECLOSER 30A5-	(1,820)	(232)	(67)	(313)	82	(2,350)
		6S822511	GRID MOD: INSTALL VS RECLOSER 16C18	(842)	(21)	(16)	(5)	69	(816)
		6S822531	GRID MOD: INSTALL MR RECLOSER 20A35	(298)	-	-	-	(2)	(300)
	WD00298 Total			(62,833)	(17,694)	(8,647)	(10,454)	662	(98,965)
	WD00301	6A920441	GRID MOD: INSTALL RECLOSER 21C5-400	(2,392)	(17,424)	(6,613)	(19,188)	(180)	(45,796)
		6B920125	GRID MOD: INSTALL TR RECLOSER 30B4-	(2,973)	(490)	(308)	(12)	31	(3,752)
		6B920126	GRID MOD: INSTALL SR RECLOSER 30B5-	(485)	(4,131)	(1,978)	(2,643)	(22)	(9,259)
		6B920128	GRID MOD: INSTALL TR RECLOSER 30B4-	(3,700)	(53)	(14)	(58)	(12)	(3,837)
		6S920353	GRID MOD: INSTALL SR RECLOSER 21N9-	(1,619)	(65)	(10)	(43)	3	(1,734)
		6S920354	GRID MOD: INSTALL SR RECLOSER 21N9-	(1,195)	(388)	(205)	(161)	267	(1,682)
		6S920359	GRID MOD: INSTALL SR RECLOSER 16C16	(12,404)	(1,601)	(622)	(1,854)	(21)	(16,502)
		6S920360	GRID MOD: INSTALL TR RECLOSER 30A5-	(11,495)	(7,440)	(74)	(2,656)	80	(21,584)
		6S920361	GRID MOD: INSTALL MR RECLOSER 16C16	(1,387)	-	-	-	(1)	(1,388)
		6S920362	GRID MOD: INSTALL SR RECLOSER 30A5-	(3,337)	(1)	(1)	(1)	(1)	(3,341)
		6S920364	GRID MOD: INSTALL SR RECLOSER 30A2-	(447)	(195)	(136)	(47)	(4)	(828)
		6S920365	GRID MOD: INSTALL TR RECLOSER 30A2-	(1,353)	-	-	-	(1)	(1,353)

2019 Retirements by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect/Overheads	Labor	Material	Other	Total Retirements
		6S920370	GRID MOD: INSTALL SR RECLOSER 20A21	(1,325)	(255)	(90)	(40)	5	(1,705)
		6S920371	GRID MOD: INSTALL TR RECLOSER 20A21	(2,711)	(377)	(133)	(80)	(36)	(3,336)
		6S920372	GRID MOD: INSTALL SR RECLOSER 20A33	(2,080)	(311)	(88)	(104)	2	(2,580)
		6S920373	GRID MOD: INSTALL TR RECLOSER 20A33	(2,989)	(1,546)	(511)	(192)	353	(4,885)
		6S920374	GRID MOD: INSTALL SR RECLOSER 27A4-	(4,628)	(4,024)	(1,557)	(2,546)	(33)	(12,788)
		6S920375	GRID MOD: INSTALL TR RECLOSER 19S2-	(12,706)	(341)	(200)	(64)	12,169	(1,142)
		6S920376	GRID MOD: INSTALL MR RECLOSER 27A4-	(1,951)	(193)	(90)	(51)	160	(2,124)
		6S920382	GRID MOD: INSTALL SR 27A13-71S AND	(846)	(157)	(56)	(33)	(7)	(1,099)
	WD00301 Total			(72,021)	(38,992)	(12,684)	(29,773)	12,754	(140,715)
12170 TotalAutomated Feeder Reconfiguration Total				(231,252)	(96,031)	(21,842)	(40,694)	13,467	(376,352)
12175Urban Underground Automation	18328	02291589	ASU BRI COMM AVE REPL 4KV OIL	(11)	-	-	-	-	(11)
		02319970	ASU BOS TREMONT ST RPL 4KV SW	(8)	(71)	(30)	(66)	(0)	(175)
		02320786	ASU WAL MOODY STREET RPL 4KV	(5,818)	(5,132)	-	-	-	(10,950)
		02320807	ASU WAT MT AUBURN ST RPL 4KV S	(204)	-	-	-	-	(204)
		02332198	ASU BOS CAMDEN ST-RPL OIL SW	(16,912)	3	(0)	-	(0)	(16,909)
		02340863	ASU DOR BOSTON ST MH10126 REP	(6,891)	(5,584)	(91)	(82)	(66)	(12,714)
		02341470	ASU W-R WASHINGTON ST REPL &	(3,777)	-	-	-	-	(3,777)
	18328 Total			(33,621)	(10,784)	(120)	(148)	(66)	(44,739)
12175Urban Underground Automation Total				(33,621)	(10,784)	(120)	(148)	(66)	(44,739)
12185Distribution System Network Operator	WS00033	WS000331	LTC Control Replacement (VVO)	(4,753)	-	-	-	-	(4,753)
	WS00033 Total			(4,753)	-	-	-	-	(4,753)
	WS00034	WS000341	LTC Control Replacement (VVO)	(86,959)	-	-	-	-	(86,959)
	WS00034 Total			(86,959)	-	-	-	-	(86,959)
	WS00035	WS000351	LTC Control Replacement (VVO)	(31,537)	-	-	-	-	(31,537)
	WS00035 Total			(31,537)	-	-	-	-	(31,537)
12185Distribution System Network Operator Total				(123,249)	-	-	-	-	(123,249)
12190Advanced Sensing Technology	18329	02316754	ASU BOS BROOKLINE AVE PMH1025	-	(30)	-	(218)	-	(248)
		02316790	ASU S-B KEMP STREET PMH22601	-	(30)	-	(218)	-	(248)
	18329 Total			-	(59)	-	(437)	-	(496)
	GMW10101	GMW10101	Grid Mod Feeder Relay Replacement	(7,024)	-	-	-	-	(7,024)
	GMW10101 Total			(7,024)	-	-	-	-	(7,024)
	GMW10401	GMW10401	Grid Mod Feeder Relay Replacement	(42,423)	-	-	-	-	(42,423)
	GMW10401 Total			(42,423)	-	-	-	-	(42,423)
	WD00300	6A821475	RPL 3 SGL HYDROLIC RECLOSERS ON PO	(24,803)	-	-	-	(315)	(25,118)
		6A822183	GRID MOD: REPLACE SR RECLOSER 19J1-	(36,426)	(24)	(1)	(3)	75	(36,378)
		6A822185	GRID MOD: INSTALL TR RECLOSER 19J1-	(4,813)	(18,039)	(6,898)	(15,037)	(200)	(44,988)
		6A822186	GRID MOD: INSTALL TR RECLOSER 19J1-	(27,829)	(10)	(3)	(4)	27	(27,818)
		6A822236	GRID MOD: INSTALL RR RECLOSER 18G7-	(41,580)	-	-	-	(253)	(41,833)
		6A822256	GRID MOD: REPLACE RR RECLOSER 21C8-	(1,344)	(10,982)	(3,528)	(20,126)	(33)	(36,012)
		6A822262	GRID MOD: REPLACE SR RECLOSER 22B1-	(29,172)	-	-	-	(1,065)	(30,238)
		6B820766	GRID MOD: RPL OIL RECLOSER 18C2-70S	(6,575)	(4,937)	(1,019)	(8,716)	(71)	(21,319)
		6B820768	GRID MOD: RPL OIL RECLOSER 19A505 W	(18,707)	(7,193)	(1,433)	(7,290)	(370)	(34,993)
		6B820769	GRID MOD: RPL OIL RECLOSER 19A525 W	(461)	-	-	-	-	(461)
		6B821242	Grid Mod: Rep RR Recl 30B4-60R inst	(18,580)	(7,196)	(1,434)	(7,291)	(371)	(34,874)
		6B821244	GRID MOD: INSTALL TR RECLOSER 19J4-	(931)	-	-	-	17	(914)
		6B821246	GRID MOD: REP RR 16B503 W/ 16B5-71S	(4,801)	(17,033)	(5,213)	(16,311)	48	(43,310)
		6B821248	Grid Mod: Rep SR 30B4-72S & install	(905)	(7,605)	(2,725)	(17,751)	(599)	(29,585)
		6S822290	REPLACE TIE RECLOSER; NEW NOMENCLAT	(1,291)	(18,883)	(5,917)	(29,286)	(379)	(55,756)
	WD00300 Total			(218,218)	(91,903)	(28,169)	(121,816)	(3,489)	(463,595)
12190Advanced Sensing Technology Total				(267,665)	(91,962)	(28,169)	(122,253)	(3,489)	(513,538)
Total Retirements				(656,348)	(198,787)	(50,134)	(163,099)	9,911	(1,058,457)

Line Number	Documentation Page Number	Project	Project Description	Line of Business	Line of Business Description	Parent Project	Parent Project Description	Direct Costs	Indirect Costs	Total Costs	PAF Directs	PAF Indirects	PAF Total	Additions	Cost of Removal	CWIP
1	1	18294	NSTAR EV Fast Chargers - NonEJC	12165	Electric Vehicle Infrastructure	EVL2FC01	EV Level 2 and Fast Chargers	\$ 379,303	\$ 5,324	\$ 384,627	\$ 39,481,950	\$ 8,668,221	\$ 48,150,171	\$ 61,968	\$ -	\$ 322,660
2	15	18295	NSTAR EV Level 2 Chargers - EJC	12165	Electric Vehicle Infrastructure	EVL2FC01	EV Level 2 and Fast Chargers	\$ 795,833	\$ 55,959	\$ 851,792	\$ 39,481,950	\$ 8,668,221	\$ 48,150,171	\$ 773,528	\$ 12	\$ 78,252
3	30	18296	NSTAR EV Level 2 Chargers - NonEJC	12165	Electric Vehicle Infrastructure	EVL2FC01	EV Level 2 and Fast Chargers	\$ 8,557,345	\$ 683,406	\$ 9,240,751	\$ 39,481,950	\$ 8,668,221	\$ 48,150,171	\$ 5,808,540	\$ 14,198	\$ 2,266,022
4	54	18326	MA Grid Modernization OH DA	12170	Automated Feeder Reconfiguration	18326	MA Grid Modernization OH DA	\$ 5,807,089	\$ 316,065	\$ 6,123,154	\$ 7,000,000	\$ 3,308,000	\$ 10,308,000	\$ 8,914,661	\$ 39,498	\$ 12,995
5	77	18328	Replace 4KV Oil Switches Grid Mod	12175	Urban Underground Automation	18328	Replace 4KV Oil Switches Grid Mod	\$ 8,573,656	\$ 6,331,771	\$ 14,905,427	\$ 8,340,000	\$ 5,325,027	\$ 13,665,027	\$ 12,370,883	\$ 235,508	\$ 1,244,340
6	112	18329	Automate Padmount Switches Grid Mod	12190	Advanced Sensing Technology	18329	Automate Padmount Switches Grid Mod	\$ 458,876	\$ 253,713	\$ 712,589	\$ 695,400	\$ 327,851	\$ 1,023,251	\$ 635,180	\$ (718)	\$ 78,128
7	125	18350	STA 611 EMA GM FEEDER RELAY REPLACE	12190	Advanced Sensing Technology	18350	STA 611 EMA GM FEEDER RELAY REPLACE	\$ 1,257,260	\$ 1,225,414	\$ 2,482,674	\$ 2,376,000	\$ 1,584,000	\$ 3,960,000	\$ 1,605,207	\$ 84,371	\$ 793,095
8	146	18351	STA 738 EMA GM FEEDER RELAY PROGRAM	12190	Advanced Sensing Technology	18351	STA 738 EMA GM FEEDER RELAY PROGRAM	\$ 378,213	\$ 301,489	\$ 679,702	\$ 430,000	\$ 341,000	\$ 771,000	\$ 651,016	\$ 28,686	\$ -
9	171	18352	STA 828 EMA GM FEEDER RELAY REPLACE	12190	Advanced Sensing Technology	18352	STA 828 EMA GM FEEDER RELAY REPLACE	\$ 1,650,125	\$ 1,079,707	\$ 2,729,832	\$ 2,170,000	\$ 1,519,000	\$ 3,689,000	\$ 1,865,142	\$ 98,034	\$ 766,656
10	195	18354	STA 60 EMA GRID MOD 4KV RTU INSTALL	12190	Advanced Sensing Technology	18354	STA 60 EMA GRID MOD 4KV RTU INSTALL	\$ 1,170,862	\$ 645,240	\$ 1,816,102	\$ 1,051,000	\$ 694,000	\$ 1,745,000	\$ 1,730,939	\$ 85,162	\$ -
11	224	19182	STA 968 EMA GM Feeder relay	12190	Advanced Sensing Technology	19182	STA 968 EMA GM Feeder relay	\$ 340,917	\$ 383,854	\$ 724,771	\$ 410,200	\$ 363,400	\$ 773,600	\$ 688,894	\$ 35,878	\$ -
12	252	19245	EMA Grid Mod STA 282 Feeder Relay	12190	Advanced Sensing Technology	19245	EMA Grid Mod STA 282 Feeder Relay	\$ 1,283,337	\$ 865,824	\$ 2,149,161	\$ 2,325,000	\$ 1,659,000	\$ 3,984,000	\$ 302,880	\$ 15,920	\$ 1,830,361
13	278	19246	STA 455 EMA GM Feeder Relay	12190	Advanced Sensing Technology	19246	STA 455 EMA GM Feeder Relay	\$ 720,397	\$ 579,364	\$ 1,299,761	\$ 1,373,000	\$ 1,043,000	\$ 2,416,000	\$ 612,552	\$ 39,226	\$ 647,983
14	306	19247	STA 26 EMA GM SCADA RTU	12190	Advanced Sensing Technology	19247	STA 26 EMA GM SCADA RTU	\$ 992,078	\$ 763,412	\$ 1,755,490	\$ 1,403,000	\$ 1,046,000	\$ 2,449,000	\$ 919,225	\$ 48,315	\$ 787,951
15	333	19286	EMA GM Duxbury DA Repeater Fiber	12180	Communications	19286	EMA GM Duxbury DA Repeater Fiber	\$ 85,865	\$ 19,718	\$ 105,583	\$ 39,000	\$ 29,000	\$ 68,000	\$ 105,583	\$ -	\$ -
16	346	19288	EMA GM Licensed Master Nodes	12180	Communications	19288	EMA GM Licensed Master Nodes	\$ 28,953	\$ 16,627	\$ 45,580	\$ 36,000	\$ 30,000	\$ 66,000	\$ 44,805	\$ -	\$ 775
17	357	19289	EMA GM Unlicensed Master Nodes	12180	Communications	19289	EMA GM Unlicensed Master Nodes	\$ 34,743	\$ 17,874	\$ 52,617	\$ 38,000	\$ 36,000	\$ 74,000	\$ 11,569	\$ -	\$ 41,048
18	369	19293	EMA GM 4KV retrofit for DA	12175	Urban Underground Automation	19293	EMA GM 4KV retrofit for DA	\$ 481,437	\$ 404,797	\$ 886,234	\$ 1,836,000	\$ 164,545	\$ 2,000,545	\$ 217,240	\$ 297	\$ 668,698
19	379	EV4112E1	WMECO EV Level 2 Chargers - EJC	12165	Electric Vehicle Infrastructure	EVL2FC01	EV Level 2 and Fast Chargers	\$ 1,831,581	\$ 63,886	\$ 1,895,467	\$ 39,481,951	\$ 8,668,221	\$ 48,150,172	\$ 1,140,951	\$ (11,019)	\$ 621,338
20	396	EV4112NE	WMECO EV Level 2 Chargers - NonEJC	12165	Electric Vehicle Infrastructure	EVL2FC01	EV Level 2 and Fast Chargers	\$ 693,440	\$ 28,624	\$ 722,064	\$ 39,481,952	\$ 8,668,221	\$ 48,150,173	\$ 652,181	\$ 1	\$ 69,882
21	411	GMW10101	WMASS GRID MOD RELAY REPL AGAWAM16C	12190	Advanced Sensing Technology	GMW10101	WMASS GRID MOD RELAY REPL AGAWAM16C	\$ 739,970	\$ 832,511	\$ 1,572,481	\$ 1,155,000	\$ 318,000	\$ 1,473,000	\$ 1,685,532	\$ (113,051)	\$ -
22	433	GMW10301	WMASS GRID MOD FEEDER RELAY OSWALD	12190	Advanced Sensing Technology	GMW10301	WMASS GRID MOD FEEDER RELAY OSWALD	\$ 583,551	\$ 311,027	\$ 894,578	\$ 1,062,000	\$ 287,000	\$ 1,349,000	\$ 833,350	\$ 61,227	\$ -
23	456	GMW10401	WMA GRID MOD FEEDER RELAY PIPER 21N	12190	Advanced Sensing Technology	GMW10401	WMA GRID MOD FEEDER RELAY PIPER 21N	\$ 589,975	\$ 748,096	\$ 1,338,071	\$ 985,000	\$ 268,000	\$ 1,253,000	\$ 1,498,446	\$ (160,375)	\$ -
24	476	WD00298	MA Grid Mod - OH Dist. Automation	12170	Automated Feeder Reconfiguration	WD00298	MA Grid Mod - OH Dist. Automation	\$ 3,481,266	\$ 1,441,484	\$ 4,922,750	\$ 4,071,600	\$ 659,800	\$ 4,731,400	\$ 3,835,676	\$ 6,022	\$ 121,124
25	499	WD00299	MA GM Network SCADA	12190	Advanced Sensing Technology	WD00299	MA GM Network SCADA	\$ 544,571	\$ 177,156	\$ 721,727	\$ 375,000	\$ 125,000	\$ 500,000	\$ 678,977	\$ -	\$ 42,750
26	508	WD00300	MA Grid Mod - Recloser SCADA	12190	Advanced Sensing Technology	WD00300	MA Grid Mod - Recloser SCADA	\$ 1,248,794	\$ 557,641	\$ 1,806,435	\$ 1,634,500	\$ 279,400	\$ 1,913,900	\$ 1,073,371	\$ 17,195	\$ -
27	520	WD00301	MA GM OH DA Circuit Ties	12170	Automated Feeder Reconfiguration	WD00301	MA GM OH DA Circuit Ties	\$ 2,111,175	\$ 675,356	\$ 2,786,531	\$ 840,000	\$ 160,000	\$ 1,000,000	\$ 2,726,341	\$ 60,191	\$ -
28	532	WD00308	Grid Mod VVO Device Installs	12185	Distribution System Network Operator	WD00308	Grid Mod VVO Device Installs	\$ 4,593,813	\$ 986,575	\$ 5,580,388	\$ 4,336,800	\$ 1,223,200	\$ 5,560,000	\$ 5,191,554	\$ 191,060	\$ 197,774
29	550	WS00033	GM VVO LTC Cont. Rep. Piper 21N	12185	Distribution System Network Operator	WS00033	GM VVO LTC Cont. Rep. Piper 21N	\$ 201,443	\$ 125,925	\$ 327,368	\$ 212,000	\$ 208,000	\$ 420,000	\$ 329,044	\$ (1,677)	\$ -
30	571	WS00034	GM VVO LTC Cont. Rep Agawam 16C	12185	Distribution System Network Operator	WS00034	GM VVO LTC Cont. Rep Agawam 16C	\$ 166,312	\$ 171,314	\$ 337,626	\$ 181,000	\$ 202,000	\$ 383,000	\$ 346,061	\$ (8,435)	\$ -
31	593	WS00035	GM VVO LTC Cont. Rep. Silver 30A	12185	Distribution System Network Operator	WS00035	GM VVO LTC Cont. Rep. Silver 30A	\$ 151,759	\$ 158,492	\$ 310,251	\$ 220,000	\$ 210,000	\$ 430,000	\$ 332,036	\$ (21,785)	\$ -
32	614	WS00036	WMA GM VVO LTC - Podick 18G	12185	Distribution System Network Operator	WS00036	WMA GM VVO LTC - Podick 18G	\$ 233,701	\$ 90,528	\$ 324,230	\$ 224,000	\$ 213,000	\$ 437,000	\$ 318,730	\$ 5,500	\$ -
33	Total							\$ 50,167,640	\$ 23,162,173	\$ 73,329,813	\$ 242,229,253	\$ 64,964,328	\$ 307,193,581	\$ 57,962,062	\$ 749,241	\$ 10,591,832

**COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES**

D.P.U. 20-54

JOINT DIRECT TESTIMONY OF

**GIUSEPPE A. PERNICIARO
KEVIN M. BOUGHAN**

EXHIBIT ES-GAP/KMB

**IN SUPPORT OF
NSTAR ELECTRIC COMPANY D/B/A EVERSOURCE ENERGY**

**2020 GRID MODERNIZATION
COST RECOVERY FILING**

May 15, 2020

1 **I. INTRODUCTION**

2 **Q. Mr. Perniciaro, please state your name and business address.**

3 A. My name is Giuseppe A. Perniciaro. My business address is 300 Cadwell Drive,
4 Springfield, Massachusetts, 01104.

5 **Q. By whom are you employed and in what position?**

6 A. I am employed by NSTAR Electric Company d/b/a Eversource Energy (“NSTAR
7 Electric,” “Eversource,” or the “Company”).¹ I am the Program Manager for the
8 Massachusetts Grid Modernization Plan (“GMP”). I am responsible for the delivery
9 of the approved Eversource grid modernization investment portfolio as it pertains to
10 scope, schedule and budget.

11 **Q. What is your educational background?**

12 A. I graduated from the University of New Hampshire in 2002 with a Bachelor of Science
13 in Mechanical Engineering.

14 **Q. Please describe your employment history.**

15 A. I am a former Civil Engineer Corps, US Naval Officer holding various positions, such
16 as Department of Public Works Operations Officer overseeing day-to-day public works
17 duties at Naval Station Mayport, Florida; Project Engineer overseeing multiple

¹ On December 31, 2017, Western Massachusetts Electric Company (“WMECO”) was merged with and into NSTAR Electric Company, with NSTAR Electric Company as the surviving entity pursuant to the Department of Public Utilities’ (the “Department”) approval in D.P.U. 17-05 under G.L. c. 164, § 96. D.P.U. NSTAR Electric Company and Western Massachusetts Electric Company d/b/a Eversource Energy, 17-05, at 36-44 (2017). Beginning January 1, 2018, the legal name of Eversource Energy’s electric distribution company in Massachusetts is NSTAR Electric Company d/b/a Eversource Energy.

1 renovation and new construction contractors for the Facility Engineering and
2 Acquisition Division in Norfolk, Virginia; and Design Branch Head providing
3 engineering and construction oversight support in Afghanistan, during Operation
4 Enduring Freedom.

5 After discharge from the Navy in 2008, I've held various positions within the
6 renewable and electrical transmission and distribution industry, such as Project
7 Manager for large-scale industrial wind turbine installations, Vice President of
8 Construction for commercial and industrial rooftop solar facilities, and Director of
9 Project development for large-scale ground mount solar facilities. I have also held
10 various positions within Eversource supervising Field Operations teams including
11 System Projects and overhead and underground line mechanics.

12 I assumed my current position as GMP Project Manager on October 9, 2018.

13 **Q. Have you previously testified before any regulatory bodies?**

14 A. Yes, I have previously provided testimony to the Department in NSTAR Electric
15 Company d/b/a Eversource Energy, D.P.U. 19-23, the Company's 2019 Grid
16 Modernization Cost Recovery Filing.

17 **Q. What is your involvement and responsibility with respect to the Company's Grid**
18 **Modernization portfolio?**

19
20 A. I am responsible for the overall delivery of the approved Massachusetts GMP portfolio
21 of projects and investments. In this role, I coordinate the efforts of multiple teams

1 within Eversource to ensure all planning, engineering, design, construction,
2 commissioning, tracking and reporting tasks are implemented such that internal and
3 external grid modernization portfolio commitments are met with respect to scope,
4 schedule and budget. I am responsible for the identification and mitigation of potential
5 risks to program execution. I also work closely with those responsible for planning and
6 execution of the overall Eversource distribution capital plan to support coordinated,
7 efficient and cost-effective execution of the Company's GMP.

8 **Q. Mr. Boughan, please state your name and business address.**

9 A. My name is Kevin M. Boughan. My business address is 107 Selden Street, Berlin,
10 Connecticut 06037.

11 **Q. By whom are you employed and in what position?**

12 A. I am employed by EES in the position of Manager, Research & Business Development,
13 responsible for managing the Company's electric vehicle ("EV") development
14 strategies including the development of specific EV charging development programs
15 across Eversource.

16 **Q. What is your educational background?**

17 A. I graduated from Davidson College in 1997 with a Bachelor of Arts degree in History.
18 In 2006 I earned a Master of Business Administration from Yale School of
19 Management with a concentration in marketing and strategy.

1 **Q. Please describe your employment history.**

2 A. From 2006 to 2017 I held several positions at Praxair, Inc., an industrial gases company
3 in Danbury, Connecticut, in strategy and energy business development, ending my
4 tenure in the position of Director, Global Market Strategy and Competitive Assessment.
5 My experience includes evaluating and commercializing new energy products, auditing
6 internal and project controls, evaluating management strategy and advising on
7 corporate acquisitions. In 2017, I left my position at Praxair, Inc. to join Eversource as
8 Manager, Research & Business Development in the Strategic Planning group.

9 **Q. Have you previously testified before any regulatory bodies?**

10 A. Yes. I have previously testified before the Connecticut Public Utilities Regulatory
11 Authority (“PURA”) in PURA 17-10-46 RE01 (Application of The Connecticut Light
12 and Power Company d/b/a Eversource Energy to Amend its Rate Schedules – EV Rate
13 Rider) and PURA 17-12-03 (PURA Investigation into System Distribution Planning of
14 the Electric Distribution Companies). I have also testified before the Department in
15 NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 19-23, the Company’s
16 2019 Grid Modernization Cost Recovery Filing.

17 **Q. What is your involvement and responsibility with respect to the Company’s GMP**
18 **portfolio?**

19
20 A. With respect to the Company’s GMP portfolio, I am responsible for the tracking,
21 reporting, stakeholder outreach, and strategic oversight for the EV infrastructure
22 program.

1 **Q. What is the purpose of your joint testimony in this docket?**

2 A. In this filing, the Company presents its Grid Modernization cost recovery filing in
3 accordance with the Department’s approval the Company’s 2018-2020 GMP. NSTAR
4 Electric Company d/b/a Eversource Energy, D.P.U. 15-122 (2018)(“D.P.U. 15-122”).
5 In D.P.U. 15-122, the Department required the Company, as well as the other electric
6 distribution companies (“EDCs”), to file annual Grid Modernization Factor (“GMF”)
7 rate adjustment and reconciliation filings comprised of: (1) actual, eligible
8 preauthorized expenditures from the prior GMP investment year; and (2) a
9 reconciliation component in the second year and beyond. D.P.U. 15-122, at 225. The
10 purpose of this testimony is to provide an overview of the processes the Company has
11 followed to ensure efficient and effective implementation of the GMP portfolio.

12 On April 1, 2020, the Company filed its 2019 Grid Modernization Annual Report
13 (“2019 Report”) consistent with the Department’s directives. Id. at 112; D.P.U. 15-
14 122 Memorandum at 2 (March 29, 2019). The 2019 Report provides a detailed
15 summary of the Company’s implementation of the GMP during 2019. The 2019 Report
16 also provides an overview of planned GMP work in 2020. The 2019 Report is being
17 provided as Exhibit ES-GAP/KMB-1.

18 **Q. Has the Company prepared other testimony to support this filing?**

19 A. Yes. Company witnesses Robert W. Frank and John G. Griffin are presenting testimony
20 regarding the Company’s revenue requirement associated with plant in service for

1 GMP investment year 2019, along with supporting project documentation and exhibits.

2 **Q. How is your testimony organized?**

3 A. Section I of this joint testimony presents the introduction. Section II discusses the
4 overview of the filing as well as a timeline of filings due. Section III discusses the
5 overall implementation of the GMP investment portfolio. Section IV discusses the
6 overall implementation of the EV infrastructure program. Section V presents the 2019
7 implementation activities associated with the Company's battery storage demonstration
8 projects. Section VI presents the conclusion.

9 **II. OVERVIEW**

10 **Q. Please provide a brief overview of the Department's Grid Modernization**
11 **proceedings.**

12
13 A. In October 2012, the Department initiated a wide-ranging and comprehensive
14 investigation into the modernization of the Massachusetts electric grid. Modernization
15 of the Electric Grid, D.P.U. 12-76 (2012). Eversource, which has always been at the
16 forefront of implementing technologies to further improve service to customers and
17 lessen/mitigate the impact of outages on customers, was an active and engaged partner
18 in the Department's long-running investigation.

19 Over the course of several orders incorporating Eversource and other stakeholder input,
20 the Department set out a Grid Modernization framework for Eversource, as well as the
21 other EDCs, to develop and invest in an innovative and comprehensive GMPs designed

1 to advance achievement in four grid modernization objectives, specifically to: (1)
2 reduce the effect of outages; (2) optimize demand, including reducing system and
3 customer costs; (3) integrate distributed resources; and (4) improve workforce and asset
4 management.²

5 Consistent with the directives set out in the Department's various D.P.U. 12-76 orders,
6 on August 19, 2015, Eversource filed its first GMP. On May 10, 2018, the Department
7 issued its order in D.P.U. 15-122 approving in part and modifying in part the
8 Company's GMP. In its order, the Department approved the Company's proposed
9 grid-facing grid modernization investments, as well as a three-year (2018-2020) budget
10 of \$133 million to undertake the approved investments. D.P.U. 15-122, at 172-173,
11 186-187. The Department also determined that it was appropriate for Eversource to
12 recover the costs of its energy storage demonstration projects and its EV infrastructure
13 program approved in the Company's 2017 base distribution rate case, D.P.U. 17-05,
14 through the GMF. Id. at 186-187.

15 On June 28, 2019, the Department issued an order requiring certain changes to the
16 calculation of the revenue requirement and GMF, as well as certain related changes to
17 the GMF tariff. NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 19-23

² The Department refined the grid modernization objectives in its order on the EDCs 2018-2020 GMPs, with the following established as the final objectives: (1) optimize system performance (by attaining optimal levels of grid visibility, command and control, and self-healing); (2) optimize system demand (by facilitating consumer price-responsiveness); and (3) interconnect and integrate distributed energy resources ("DER"). D.P.U. 15-122, at 106.

1 (2019). Those directives were initially incorporated into the Company's revised filing
2 in D.P.U. 19-23, which was approved by the Department on August 28, 2019, and are
3 also reflected in the calculation of the 2019 grid modernization revenue requirement
4 and 2020 GMF.

5 **Q. Please summarize the timeline of filings the Company has been directed to file**
6 **with respect to its 2018-2020 GMP.**

7
8 A. The Company's current GMP investment plan covers calendar years 2018, 2019 and
9 2020. The following filings will be made in compliance with the directives in D.P.U.
10 15-122.

- 11 • April 1, 2020 – Grid Modernization Annual Report (for plan year 2019)³
- 12 • May 15, 2020 – Annual GMF Filing (for plan year 2019)
- 13 • April 1, 2021 – Grid Modernization Annual Report (for plan year 2020)
- 14 • May 15, 2021 – Annual GMF Filing (for plan year 2020)

³ On December 6, 2019, following a stakeholder comment period and a comprehensive technical conference to discuss the form and content of the Grid Modernization Annual Reports, the Department issued its order on the templates and the information required for the Annual Reports. NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15-122-C (2019) ("D.P.U. 15-122-C"). Consistent with the Department's directives in the D.P.U. 15-122-C order, the Company submitted a supplemental 2018 Annual Report on January 31, 2020 to conform to the Annual Report template contemplated in the order. The Department also confirmed that each Distribution Company must file their Annual Report on or before April 1st of each year. D.P.U./15-122-C, at 13.

- July 1, 2021 – 2022-2024 GMP filing due⁴
 - April 1, 2022 – Grid Modernization Term Report (for the 2018-2021 GMP)
- May 15, 2022 – Annual GMF Filing (for plan year 2021) As described above, this filing presents the Company's second annual cost recovery request. In support of its request in this proceeding, the Company is providing a summary of the progress under the GMP for the 2019 plan year, as well as planned work to be undertaken in 2020.

III. GMP IMPLEMENTATION

Q. Please explain the steps that Eversource took to support its GMP implementation in calendar year 2019?

A. In 2019, the Company made substantial progress towards achievement of its GMP plan objectives. The GMP investments undertaken in 2019 utilized the organizational capacity and investment progress and cost tracking and monitoring processes developed in the lead up to the implementation of the 2018 GMP. Specifically, the Company continued its GMP implementation strategy based on the following key principles:

⁴ On May 12, 2020, the Department issued an order extending the Company's 2018-2020 GMP through 2021 at the company-specific budget caps authorized in D.P.U. 15-122. D.P.U. 15-120-D/15-121-D/15-122-D at 4-5. Specifically, the Department found that delaying in GMP implementation, including potential delays associated with the COVID-19 pandemic, warranted extension of the GMPs. *Id.* at 2-4. This extension of the Company's GMP encompassed Eversource's battery storage demonstration projects and electric vehicle charging infrastructure. *Id.* at 6-7. The Department noted that the Company is authorized to petition for an increase in the applicable budgets in the event it experiences budget constraints due to the extension of the GMP, battery storage demonstration projects and electric vehicle charging infrastructure. *Id.* at 5-7. Eversource will file for such a budget increase for the 2021 GMP year in the near term.

- 1 • **Maximize cost-effectiveness of GMP implementation** - the Company
2 prioritized equipment locations through the creation of a prioritization
3 methodology ranking potential locations to maximize value of the GMP
4 deployment in 2018 and developed deployment strategies to ensure
5 construction efficiency. In 2019, the Company was able to continue to
6 efficiently and effectively install the Grid Modernization investments
7 within those previously prioritized locations, with minimal changes. The
8 Company also followed the labor strategy developed in 2018 and focused
9 on the use of internal and external resources for engineering, construction
10 and project management. During 2019, many enhancements were made to
11 the GMP Portfolio Tracker, the Company's main data repository tool for
12 the GMP program, to enable additional checks and transparency as the
13 Company implements its grid modernization investments. Specifically, the
14 team created more granular tracking of the various elements of individual
15 work orders to enable the team to understand and communicate what open
16 tasks/requirements remain to be completed within a specific work order.
17 This adds another layer of quality control when closing out work orders.
18 The Company also added a more robust set of data to the recurring data
19 downloads from the various Company systems. Some of these additions
20 include the tracking to the circuit and substation for a given work order,
21 with a quality assurance process to ensure accuracy for reporting purposes.

1 On a recurring basis, the team also now tracks the number of customers
2 affected by the Overhead (“OH”) Distribution Automation (“DA”)
3 investments, which provides another quality assurance check on when a
4 specific work order is placed in-service. Additional checks such as these
5 ensure more accurate reporting.

6 Also, for 2019, the team developed several enhanced reporting elements to
7 assist in the monitoring and communication of the portfolio. Some of those
8 enhancements include: 1) the addition of “Workdown Curves” that
9 graphically communicate how the plan has been executed to date, and the
10 remaining planned trajectory through the year end; and 2) monthly financial
11 review meetings with key team members, to enable immediate and
12 comprehensive review, understanding and communication of the portfolio
13 financials to ensure alignment across the Company’s large organization.

- 14 • **Leverage proven, established processes** - the Company leveraged existing
15 processes and organizational capabilities, initially developed in advance of
16 the 2018 GMP, when implementing its 2019 GMP. The Company created
17 dedicated work orders for GMP projects; ordered standardized materials
18 based on the Company’s established competitive procurement policies; and
19 supported planning and scheduling of work to enable a robust and accurate
20 tracking of GMP investments. In 2019, the Company established recurring
21 meetings, chiefly at the project level, but also with individual and team

1 leadership meetings, to enhance the communication flow of the fast-paced
2 programs of the GMP throughout the Eversource organization.

- 3 • **Establish a dedicated team for portfolio management and financial**
4 **tracking** - Ensuring accurate and timely tracking and reporting of GMP
5 implementation is critical to ensure the appropriate actions are taken to
6 manage GMP scope, schedule and budget. Focus on tracking and reporting
7 also supports robust performance reporting and active engagement in the
8 measurement and verification (“M&V”) process. For the 2018-2020 GMP
9 program, the Company established three positions dedicated solely to GMP
10 program and financial management responsible for developing and
11 executing the integration plan for the GMP portfolio.
- 12 • **Engage senior Operations leadership to provide implementation**
13 **guidance and support** – the Company’s leadership recognizes the direct
14 customer benefit and importance in enabling the continued transition to the
15 grid of the future. The Company conducted numerous periodic meetings to
16 review progress, and leadership feedback via an executive steering
17 committee, continues to guide GMP implementation.

18 As described in greater detail in the 2019 Report, the Company utilized its
19 organizational structures, processes and operations to implement the 2019 GMP. The
20 Company took multiple different steps to prioritize, plan and implement the GMP
21 projects in 2019, which are described in more detail in Exhibit ES-GAP/KMB-1 at

1 pages 5 through 7, which included, but were not limited to:

- 2 • Utilizing the investment deployment locations that were identified in the
- 3 beginning of the plan to maximize the investment's value to customers;
- 4 • Selecting the appropriate technology relative to the 2019 GMP
- 5 investment portfolio;
- 6 • Ensuring that each 2019 GMP investment category had the requisite
- 7 spending authorization in accordance with the Company's Capital
- 8 Authorization Policy; and
- 9 • Applying specific and dedicated cost control processes to isolate and
- 10 monitor all costs associated with the GMP, including an accounting
- 11 process to specifically track 2019 GMP costs and expenditures
- 12 separately from other capital projects undertaken by the Company.

13 In order to utilize the process framework described above to efficiently and effectively
14 deploy its GMP investments, the Company continues to use a multi-disciplinary team
15 to oversee implementation. Section II of the 2019 Report contains further detail on the
16 GMP portfolio management team and processes. For the 2018-2020 GMP program,
17 the Company established three positions dedicated solely to GMP program and
18 financial management responsible for developing and executing the integration plan
19 for the GMP portfolio. Specifically, the positions consist of one Financial Analyst, one
20 Program Analyst, and one Program Manager. These key employees were hired in 2018
21 and continued to support and the GMP in 2019.

1 **Q. Please provide a summary of Eversource's progress in 2019 under the GMP.**

2 A. Table 1 below provides Eversource's GMP plan for 2019 and the progress made during
3 that timeframe. Exhibit ES-GAP/KMB-1 provides further detail regarding both
4 planned and actual 2019 unit deployment and associated expenditures.

5 **Table 1 2019 Unit Status**

Investment Categories	Preauthorized Device Types	2018 Unit Carry Over (2019)	Plan Units (2019)	Construction Complete Units (2019)	Commissioned Units (2019)	2019 Unit Carry Over (2020)
Monitoring & Control (SCADA)	Microprocessor Relays (SS)	3	100	87	87	16
	4kV Circuit Breaker SCADA (SS)	n/a	21	16	16	5
	Recloser SCADA	3	11	19	19	0
	Padmount Switch SCADA	18	24	41	41	1
	Network Protector SCADA	n/a	50	83	0	50
Distribution Automation	Overhead DA	4	100	165	148	0
	Overhead DA w/Ties	n/a	23	45	45	0
	4kV Oil Switch Replacement	10	57	89	89	0
	4kV AR Loops	n/a	16	17	17	0
Volt-Var Optimization	VVO - Regulators	15	80	69	69	26
	VVO - Capacitor Banks	n/a	76	71	71	3
	VVO - LTC Controls	0	6	4	4	0
	VVO - Line Sensors	n/a	125	189	189	0
	VVO - IT Work	n/a	n/a	n/a	n/a	n/a
Advanced Distribution Management System (ADMS)	Advanced Load Flow	n/a	n/a	n/a	n/a	n/a
	GIS Verification	n/a	n/a	n/a	n/a	n/a
	Distribution Management System	n/a	n/a	n/a	n/a	n/a
Communications	Communication - FAN	n/a	6	4	4	2
	Communication - Fiber	5	125	0	0	0

6 As can be seen in Table 1, the Company made significant strides in implementing the 2019
7 GMP due, in part, to the comprehensive tracking and monitoring processes and procedures
8 the Company has developed and deployed since 2018. Despite these accomplishments, at the
9 end of 2019, certain 2019 GMP targets were not met and were instead scheduled for

1 implementation in 2020 as carry-over work⁵. Exhibit ES-GAP/KMB-1 provides a
2 detailed narrative as to the Company's progress under each GMP investment category
3 and device type, including information on the work completed in 2019, lessons learned
4 and successes/challenges associated with each category, actual versus planned GMP
5 implementation and spending, the benefits realized as a result of the GMP investment
6 implementation, key milestones and projections for deployment under the remainder
7 of the 2018-2020 GMP.

8 **Q. Please describe how the Company classifies the status of GMP investments?**

9
10 A. The Company utilizes two classifications when categorizing the status of an
11 investment.

12 • **Construction Complete:** the Company classifies a GMP unit as "Construction
13 Complete" when a device is placed in-service, meaning that it is used and
14 useful. Due to the nature of the Company's GMP investment categories, it is
15 often the case, particularly in regards to line-equipment devices, that a piece of
16 equipment is installed and electrically placed into service, but has not yet gone
17 through its commissioning process, which, when complete, places that piece of

⁵ As of April 1, 2020, all carry-over work from the 2019 GMP has been constructed and commissioned, with the exception of the Miles of Fiber, VVO-Regulator/Capacitor Bank and Nodes (one location could not be commissioned due to the COVID-19 situation) programs. At the end of 2019, the Company established an internal target to complete all 2019 GMP carry-over work in the first quarter of 2020. The Company's ability to track the carry-over work along with concurrently maintaining focus on the 2020 GMP and base capital work is a reflection of the organizational emphasis placed on meeting GMP targets.

1 equipment into the Company's monitoring and control systems (i.e., the
2 Company's Supervisory Control and Data Acquisition ("SCADA") system).

- 3 • **Commissioned:** once a GMP unit is commissioned, the piece of equipment is
4 electrically connected to the system, classified as in-service, and has been
5 connected into the Company's monitoring and control systems, typically
6 SCADA, which allows authorized personnel control and/or visibility of that
7 device. The Company classifies the units that have completed the
8 commissioning step as communicating and functioning consistent with the
9 specifications set out in the GMP.

10 While a GMP investment is classified as in-service when it falls in the "Construction
11 Complete" category, the Company does not consider it to be operating and providing
12 benefits consistent with the GMP in such a manner that it helps to advance the
13 Department's grid modernization goals until the investment is "Commissioned." When
14 an investment is "Commissioned," it is complete within the GMP process and is
15 functioning to help advance the grid modernization goals. Section III of Exhibit ES-
16 GAP/KMB-1 provides both the Construction Complete and Commissioned status of
17 the 2019 GMP investment units in order to provide a complete and transparent
18 overview of the Company's progress during the 2019 GMP investment year.

19 As discussed in greater detail in Company Witnesses Frank and Griffin's testimony,
20 GMP investments that are classified as "Construction Complete" are eligible for cost

1 recovery through the GMF. It is at this point that the Company reviews the work orders
2 associated with that investment to ensure the costs charged to-date were appropriately
3 charged to the GMP work order and recoverable through the GMF. Costs will continue
4 to accrue on a work order until the work order is “Commissioned.” After the work
5 order is “Commissioned,” the Company will undertake the same review of the
6 additional costs incurred to move the investment into the “Commissioned” category.

7 **Q. How did the Company develop its cost estimates for the 2018-2020 GMP?**

8
9 A. The Company budget for the 2019 GMP was established in the Fiscal Year 2019 (FY
10 2019) capital budgeting process conducted at the end of 2018. Initially, the 2018-2020
11 GMP budget was based on the Company’s original five-year plan as filed in D.P.U. 15-
12 122. The Company revised the budget consistent with the Department’s approval of
13 the three-year GMP and the year-end projection for the total GMP budget was updated
14 throughout 2019 as more information became available. Following approval of the
15 Company’s GMP, the Company managed each pre-authorized device type budget
16 based on unit cost targets. Section III of Exhibit ES-GAP/KMB-1 contains additional
17 information regarding the Company’s actual spending in 2019 relative to these unit
18 cost targets for each GMP device. Company Witnesses Frank and Griffin’s testimony
19 and related exhibits provide the requisite support for the costs incurred during the 2019
20 GMP investment year.

1 **Q. How did the Company develop its unit deployment schedule for the 2019 GMP**
2 **investment year?**

3
4 A. The total quantity of units was derived from the authorized investment category
5 amounts in D.P.U. 15-122 and the engagement and coordination efforts with the
6 various Eversource departments discussed above. Section III of Exhibit ES-
7 GAP/KMB-1 contains additional information regarding the planned 2019 units for
8 investment, the 2019 Construction Complete units, the 2019 Commissioned units and
9 the 2019 units that were carried over for implementation as part of the 2020 GMP
10 investment year.

11 **Q. Please provide a summary of the Company's progress in relation to the**
12 **infrastructure and performance metrics.**

13 A. As part of its approval of the Company's GMP, the Department approved specific
14 statewide and company-specific infrastructure metrics. Regarding statewide
15 infrastructure metrics, the Department required Eversource, National Grid and Unitol
16 to report on the following: (1) system automation saturation; (2) percentage of circuits
17 with installed sensors; and (3) total number of grid-connected DG facilities, nameplate
18 capacity and estimate output of each unit and type of customer-owned or operated units.
19 D.P.U. 15-122, at 198-199. As for the Eversource-specific infrastructure metrics, the
20 Company is required to report on the following for each category of preauthorized grid-
21 facing investment: (1) the number of devices or other technologies deployed; (2) the
22 associated cost for deployment; (3) reasons for deviation between actual and planned
23 deployment for the GMP investment year; and (4) projected deployment for the

1 remainder of the GMP term.⁶ Id. at 200-201.

2 Section IV of Exhibit ES-GAP/KMB-1 provides the Company's performance under
3 the statewide and Company-specific infrastructure metrics. Regarding the statewide
4 infrastructure metrics, the Company's 2019 GMP investments resulted in it performing
5 over and above the established baseline for each metric.

6 In D.P.U. 12-76-B, the Department directed the Company and the other EDCs to
7 include in their respective GMPs performance metrics that measure progress towards
8 the objectives of grid modernization. D.P.U. 12-76-B, at 30. Following a series of
9 submissions and a technical conference, the Company, along with National Grid and
10 Unitil, revised proposed performance metrics were submitted on April 9, 2019. The
11 Department approved the performance metrics on July 25, 2019. The Company's
12 progress under the infrastructure and performance metrics is discussed in Section VI of
13 Exhibit ES-GAP/KMB-1.

14 **IV. EV INFRASTRUCTURE PROGRAM**

15 **Q. Please briefly describe the Eversource EV Infrastructure Program.**

16
17 A. On November 30, 2017, the Department approved the Company's proposal to spend

⁶ While the purpose of these infrastructure metrics is to determine how performance can be changed because of grid modernization activities, there are outside factors, over which the Company has no control, that can and will impact performance. Weather, customer behavior, economic conditions and other factors will have a significant influence on the parameters being measured under these metrics.

1 up to \$45 million over five years on an EV infrastructure program (the “Make-Ready
2 Program” or “Program”). D.P.U. 17-05, at 475-478, 501. In 2018, Eversource
3 launched the Make-Ready Program with the goals of helping accelerate EV charging
4 infrastructure development within its service territory, encouraging EV purchases, and
5 contributing to greenhouse gas (“GHG”) emissions reduction in the Commonwealth.
6 The Program is designed to help meet the Commonwealth’s goal contained in the
7 Global Warming Solutions Act (“GWSA”) and support the Executive Office of Energy
8 and Environmental Affairs (“EOEEA”) campaign to encourage zero emissions vehicles
9 (“ZEVs”) via a commitment for 300,000 ZEVs registered in Massachusetts by 2025.

10 The Make-Ready Program’s primary component is increased investment in long dwell-
11 time EV charging make-ready infrastructure in public and workplace settings and at
12 multi-unit dwellings (“MUDs”). Under the Program, Eversource is investing in
13 infrastructure beyond the meter up to the charging station. Eversource is supporting the
14 deployment of EV charging ports by installing electrical equipment and components
15 necessary to connect EV chargers to its distribution system. Eversource will install the
16 “Eversource-side Infrastructure,” and contract with third-party electrical contractors to
17 install behind the meter “Participant-side Infrastructure.”

18 The Make-Ready Program will be run in two phases: Phase I extended from January 1,
19 2018 through December 31, 2019; and Phase II will extend from January 1, 2020
20 through December 31, 2022. Over the course of five years, Eversource plans to support

1 the deployment of up to 72 direct charging (“DC”) fast charging ports at 36 charging
2 sites, and up to 3,500 Level II charging ports at 400 charging sites, throughout its
3 service territory in Massachusetts.

4 Eversource made great strides in 2019 utilizing the documentation, systems and
5 processes in place to continue the Make-Ready Program and expand on site hosts to
6 gain more customers ready to install charging infrastructure. Specifically, the
7 Company saw the following progress under the Program in 2019:

- 8 • ~500 applications received (vs. 150 in 2018)
- 9 • 219 site host agreements executed (vs. 57 in 2018)
- 10 • 113 charging station sites electrified (vs. 12 in 2018)
- 11 • 401 charging station ports installed (vs. 60 in 2018)
- 12 • 905 charging station ports enabled (vs. 85 in 2018).

13 Attached Exhibit ES-GAP/KMB-2 summarizes the investments in the 113 charging
14 station sites placed in service in 2019.

15 Section IX of Exhibit ES-GAP/KMB-1 contains additional detail on the Company’s
16 progress under the Program in 2019, including information on vendor and contractor
17 prequalification, stakeholder outreach, site host acquisition strategy, and
18 pilots/partnerships being pursued by the Company.

19 In D.P.U. 17-05, the Company proposed to track and report on six performance metrics
20 to evaluate the implementation and customer benefits of the Make Ready Program.
21 D.P.U. 17-05, at 474. In D.P.U. 15-122, the Department noted that it would develop

1 performance metrics for the Program through a separate EV metrics stakeholder
2 process.⁷ D.P.U. 15-122, at 187. In the interest of providing the Department and
3 stakeholders with a robust review of the Company's 2019 progress under the Make
4 Ready Program, the Company provided in Exhibit ES-GAP/KMB-1 its progress under
5 the six proposed performance metrics first introduced in D.P.U. 17-05. The specific
6 performance metrics include:

- 7 (1) total number of "make ready" sites developed;
- 8 (2) ten percent capital invested in DC fast charging sites;
- 9 (3) ten percent capital invested in Environmental Justice ("EJ")
10 communities;⁸
- 11 (4) utilization of EV charging stations separately for Level II chargers
12 and DC fast chargers (measured in annual kWh per port);
- 13 (5) the percentage of Eversource residential customers within the range
14 of an Eversource "make ready" site constructed as part of the EV
15 program (i.e., percentage within 20-mile range and within 40-mile
16 range); and
- 17 (6) available data on plug-in EV adoption and CO₂ emissions
18 reductions.

⁷ The stakeholder process has not yet been commenced.

⁸ Generally, EJ communities are defined in terms of demographic and socioeconomic characteristics, with certain environmental policy implementation practices aimed at these communities because of race/ethnicity/class-based environmental inequities. The Department directed the Company to select EJ communities that meet two of the following three criteria established by the Massachusetts Executive Office of Energy and Environmental Affairs ("EEA") in Eastern Massachusetts and one of the following in Western Massachusetts: (1) 25 percent or more of the population in the communities must earn 65 percent or less than the Massachusetts median household income; (2) 25 percent or more of the population in the communities must identify as a race other than white; and (3) 25 percent of households lack a person over the age of 14 who speaks only English or speaks English very well.

3 Table 2 Projects Completed

4

Table 3 Station Profiles

	Level 2		DC Fast Charger		Total	
	2018	2019	2018	2019	2018	2019
Charging Ports Installed	60	398	0	3	60	401
Charging ports Enabled	85	900	0	5	85	905
Avg. # Ports Installed Per Site	5	4	n/a	3	5	4
Public Sites	8	65	0	1	8	66
Workplace Sites	4	41	0	0	4	41
Multi-Unit Dwelling Sites	0	6	0	0	0	6
Environmental Justice Sites	2	23	0	0	2	23
Annual kWh/port	n/a	1,976	n/a	n/a	n/a	1,976

Table 4 Station Locations

	Level 2		DC Fast Charger		Total	
	2018	2019	2018	2019	2018	2019
Metro Boston	9	67	0	1	9	68
South Coast	1	7	0	0	1	7
Cape & Martha's Vineyard	0	12	0	0	0	12
Western MA	2	26	0	0	2	26
% of residential customers "within range" (40 miles)	100%	100%	n/a	~50%	100%	100%

Table 5 Environmental

	2018	2019	Total
ZEVs Enabled	372	2394	2766
CO2 Emissions Reductions (annualized MTCO2e)	1302	8379	9681

1 Following the Department's approval of final performance metrics, the Company will
2 report on its progress under those metrics in future Grid Modernization Annual Reports.

3 **V. BATTERY ENERGY STORAGE PROJECTS**

4 **Q. Please briefly describe the Eversource Battery Energy Storage ("BES") projects.**

5
6 A. In D.P.U. 17-05, the Department approved two BES demonstration projects proposed
7 by the Company. NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 17-05,

1 at 461-65 (2017). The Department also determined that it was appropriate for
2 Eversource to recover the costs of its BES demonstration projects through the GMF.

3 The Outer Cape BES will be a 24.9 MW / 38 MWh lithium ion battery on
4 approximately 1.4 acres at the Provincetown transfer station on land leased from the
5 Town of Provincetown. The Outer Cape BES's primary purpose will be to provide
6 back-up power during outages on Line 96, the single, three-phase distribution line that
7 serves as many as 11,000 customers from the Towns of Wellfleet, Truro, and
8 Provincetown. In 2019, the Company made significant strides in developing and
9 moving towards construction of the Outer Cape BES, including but not limited to
10 partnering with the Town of Provincetown regarding BES site location and permitting
11 level design of the project, as well as working to secure all necessary permits.

12 The Martha's Vineyard BES will be a 4.9 MW / 20 MWh lithium ion battery on just
13 over an acre of Eversource-owned land, adjacent to its Area Work Center in Oak Bluffs.
14 The Martha's Vineyard BES's primary purpose will enable significantly reduced
15 reliance on two out of five diesel-fired peakers that are used to supply power to
16 Martha's Vineyard during high load conditions. The Martha's Vineyard BES will also
17 enable the interconnection of additional solar photovoltaics ("PV") on Martha's
18 Vineyard. Similar to its progress on the Outer Cape BES, the Company has made
19 significant progress in partnering with the Town of Oak Bluffs regarding site selection
20 and securing necessary permits.

1 Exhibit ES-GAP/KMB-1 provides additional detail as to the Company's 2019 progress
2 on its BES projects.

3 **Q. Is the Company seeing to recovery any costs associated with the BES projects**
4 **through the 2020 GMF?**

5
6 A. No. Given the nature of the BES projects and the multitude of foundational steps that
7 need to be taken prior to the construction and commissioning of the projects, the BES
8 projects were not placed in service in 2019. Following these projects being placed in
9 service for the benefit of customers, the Company will include the costs associated with
10 the BES projects in a future GMF filing.

11 **VI. CONCLUSION**

12 **Q. Does this conclude your testimony?**

13 A. Yes, it does.

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April 1, 2020

Mark D. Marini, Secretary
Department of Public Utilities
One South Station, 5th Floor
Boston, MA 02110

Re: D.P.U. 15-122 - NSTAR Electric Company d/b/a Eversource Energy 2019 Annual Grid
Modernization Report

Dear Secretary Marini:

On behalf of NSTAR Electric Company d/b/a Eversource Energy (“Eversource” or the “Company”), enclosed is the Eversource-specific 2019 Annual Grid Modernization Report. Today’s filing is being made consistent with the directives issued by the Department of Public Utilities (the “Department”) in D.P.U. 15-120-C/15-121-C/15-122-C.

Thank you for your attention to this matter. Please contact me with any questions you may have.

Sincerely,



Danielle C. Winter, Esq.

Enclosures

cc: Tina Chin, Hearing Officer
Daniel Licata, Hearing Officer
Greggory Wade, Hearing Officer
D.P.U. 15-120, 15-121, and 15-122 Service Lists



NSTAR Electric Company
d/b/a Eversource Energy

Grid Modernization Plan 2019 Annual Report

D.P.U. 15-122

April 1, 2020

Submitted to:
Massachusetts Department of Public Utilities

I. Introduction

A. Background

In October 2012, the Department of Public Utilities (the “Department”) initiated a wide-ranging and comprehensive investigation into the modernization of the Massachusetts electric grid. Modernization of the Electric Grid, D.P.U. 12-76 (2012). NSTAR Electric Company d/b/a Eversource Energy (“Eversource” or the “Company”)¹ was an active and engaged partner in the Department’s long-running investigation, bringing its expertise and innovation to bear on the effort. Eversource had always been, and continues to be, at the forefront of implementing technologies to further improve service to customers and lessen/mitigate the impact of outages on customers. The Department’s Grid Modernization investigation enabled the Company to further expand its efforts on behalf of its customers and in making significant strides to achieve critical Massachusetts energy and environmental policies.

Over the course of several orders incorporating Eversource and other stakeholder input, the Department set out a Grid Modernization framework for Eversource, along with Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid (“National Grid”) and Fitchburg Gas and Electric Light Company d/b/a Unitil (“Unitil”)(collectively, the “Distribution Companies”), to develop and invest in an innovative and comprehensive Distribution Company-specific Grid Modernization Plans (“GMPs”) designed to advance achievement in four grid modernization objectives, specifically to: (1) reduce the effect of outages; (2) optimize demand, including reducing system and customer costs; (3) integrate distributed resources; and (4) improve workforce and asset management.²

Consistent with the directives set out in the Department’s various D.P.U. 12-76 orders, on August 19, 2015, Eversource filed its first GMP. The Department conducted a lengthy and thorough investigation of the Company’s GMP. On May 10, 2018, the Department issued an order approving in part and modifying in part the Company’s GMP. NSTAR Electric Company d/b/a Eversource Energy d/b/a Eversource Energy, D.P.U. 15-122 (2018) (“D.P.U. 15-122”). In its order, the Department approved the Company’s proposed grid-facing grid modernization investments, as well as a three-year (2018-2020) budget of \$133 million to undertake the approved investments. D.P.U. 15-122, at 172-173, 186-187. The Department also determined that it was appropriate for Eversource to recover the costs of its energy storage demonstration projects and its

¹ On December 31, 2017, Western Massachusetts Electric Company (“WMECO”) was merged with and into NSTAR Electric Company (“NSTAR Electric”), with NSTAR Electric as the surviving entity pursuant to the Department’s approval in D.P.U. 17-05 under G.L. c. 164, § 96. D.P.U. 17-05, at 36-44. Beginning January 1, 2018, the legal name of Eversource Energy’s electric distribution company in Massachusetts is NSTAR Electric Company d/b/a Eversource Energy.

² The Department refined the grid modernization objectives in its order on the Distribution Companies’ 2018-2020 GMPs, with the following established as the final objectives: (1) optimize system performance (by attaining optimal levels of grid visibility, command and control, and self-healing); (2) optimize system demand (by facilitating consumer price-responsiveness); and (3) interconnect and integrate distributed energy resources (“DER”). D.P.U. 15-122, at 106.

electric vehicle (“EV”) infrastructure program, approved in the Company’s 2017 base distribution rate case, D.P.U. 17-05, through its targeted grid modernization cost recovery mechanism (“Grid Modernization Factor” or “GMF”).

As part of its ongoing review of Eversource’s 2018-2020 and future GMPs, the Department required the Company to file annual GMP progress reports detailing its performance under the GMP during the relevant year (“Grid Modernization Annual Report” or “Report”). D.P.U. 15-122, at 112. The Company is required to report on its performance under the statewide and Eversource-specific infrastructure and performance metrics. The Department stamp approved the Company’s performance metrics on July 25, 2019. Following the completion of its 2018-2020 and future three-year GMPs, the Company will file a performance report covering the term of the GMP in question (“Grid Modernization Term Report”). *Id.* The Company’s first Grid Modernization Term Report, covering the 2018-2020 GMP, will be filed on April 1, 2021.

After the May 10, 2018 issuance of the D.P.U. 15-122 order, the Department conducted a sub-proceeding designed to formalize the contents and form of the Grid Modernization Annual Reports, including the development of templates to comprehensively and clearly provide data demonstrating the Company’s annual progress under its GMP. When the Company submitted its 2018 Annual Report, the Grid Modernization Annual Report Templates had not yet been finalized. Accordingly, the Department directed Eversource and the other Distribution Companies to file, by May 1, 2019, a narrative detailing their performance under their respective 2018 GMPs. D.P.U. 15-122, March 29, 2019 Memorandum, at 2. The Company filed this narrative on May 1, 2019.

On December 6, 2019, following a stakeholder comment period and a comprehensive technical conference to discuss the form and content of the Grid Modernization Annual Reports, the Department issued its order on the templates and the information required for the Annual Reports. NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15-122-C (2019) (“D.P.U. 15-122-C”). Consistent with the Department’s directives in the D.P.U. 15-122-C order, the Company submitted a supplemental 2018 Annual Report on January 31, 2020 to conform to the Annual Report template contemplated in the order. The Department also confirmed that each Distribution Company must file their Annual Report on or before April 1st of each year. D.P.U. 15-122-C, at 13.

Consistent with the Department’s directives in the D.P.U. 15-122-C Order, Eversource hereby files its 2019 Grid Modernization Annual Report.

B. 2019 Progress Toward Grid Modernization Objectives

1. 2019 Overview

At the beginning of 2019, the Company initiated execution of a work plan for the year designed to cost-effectively meet or exceed its GMP targets, while ensuring completion of its traditional capital plan. Guided by a Grid Modernization Executive Steering Committee and supported by a small team dedicated to tracking and risk management of program scope, schedule and budget, the Company established an aggressive 2019 schedule designed to bring the benefits of grid

modernization to customers as soon as possible. Leveraging the processes, controls and program management structure established in 2018, the Company was able to effectively scale up operations achieving an eight-fold increase in commissioning of GMP supervisory control and data acquisition (“SCADA”) and Distribution Automation (“DA”) devices relative to 2018.

In many respects, the Company exceeded expectations by establishing efficient work practices that enabled more work to be completed relative to targets, often at or below budgeted unit costs. In some cases, work expected to be completed in 2020 was advanced into 2019, accelerating customer benefits. In other cases, lower than expected unit cost enabled more work to be completed such that the Company is expecting to exceed target quantities by the end of 2020. For a few programs, including line sensors and DA with circuit ties, as of the end of 2019, the Company has completed its work for the 2018-2020 GMP term. With respect to electric vehicle (“EV”) make ready infrastructure, the Company continued to support the Commonwealth’s goal of decarbonization of the transportation sector by energizing 113 new EV charging station sites with over 400 ports. Of the 113 sites, 25 sites are located in Environmental Justice Communities (“EJC”). The EV program is expected to be fully subscribed by Summer 2020.

Additional milestones were achieved in 2019 related to investments that are not tracked on a unit basis. The Company completed its geographical information system (“GIS”) survey program, with all improvements in data related to customer-to-transformer connectivity updated in its GIS system. For the energy storage program, the Company completed the important milestone of selecting an engineering, procurement and construction (“EPC”) vendor to supply the battery systems for Martha’s Vineyard and Provincetown and completed procurement of associated services. Permitting for the Provincetown project is complete, and construction is scheduled to begin in April 2020. Permitting is underway for Martha’s Vineyard and project completion is scheduled for the first quarter of 2021. For the advanced load flow project, the Company achieved its first milestone target of implementing a software solution that allows engineers to build static models of the system based on information from GIS and supporting databases.

In some cases, the Company encountered unexpected barriers preventing completion of the work plan as expected. With respect to substation construction projects, the Company was challenged to execute its plan within established schedules and/or budgets. The level of complexity associated with the substation projects, including the need for planned outages requested well in advance of construction, proved difficult to manage as incremental to the existing substation work plan. Over the course of 2019, the Company established new work practices aimed at scaling up capacity for engineering, design, construction and commissioning of these projects. At this time, assuming limited disruption due to construction work stoppages associated with the Covid-19 pandemic, the Company expects these new practices will enable it to achieve GMP targets for substation projects for the GMP term.

As a part of the engineering and cost estimating process for all GMP investments, the Company maintains oversight and review of investment cost-effectiveness and value proposition for customers. Using its established capital project approval process described below, all projects are reviewed to confirm the project need, justification, scope, comparison to alternatives and budget.

In one instance, following completion of detailed engineering, the project review process determined that the project did not demonstrate a reasonable benefit relative to the cost to customers. In its initial GMP filing with respect to communications investments, the Company had originally planned to build out 250 miles of fiber to connect distribution substations across Massachusetts into the Company's existing fiber network. Based on the results of the engineering analysis, the Company determined the per mile cost of deploying fiber averaged approximately four times the original estimate. The needs assessment determined that, although this fiber build out would augment and reinforce the Company's communications infrastructure for future grid modernization investments, the additional fiber was not required to deliver any of the benefits associated with the 2018-2020 GMP. The decision not to move forward with the fiber program was reviewed and approved by the Company's Grid Modernization Executive Steering Committee. The Steering Committee also approved a reallocation of \$15 million from the communications budget to enable completion of substation projects and to add additional overhead ("OH") DA to the work plan.

In the beginning of 2020, the Company conducted multiple lessons learned sessions to review processes and outcomes from the prior year to identify opportunities to increase efficiency and improve operations going forward. The following is a summary of selected key findings. More specific lessons learned are detailed in Section III.

- Following disciplined planning and scheduling processes is essential to managing scope, schedule and budget. Ensuring engineering and procurement of long-lead materials well in advance of construction allows for optimal project execution. Good communication in departmental hand-offs for complex tasks such as commissioning supports more efficient deployments. Optimizing scheduling of internal and contracted field workforce creates cost-saving opportunities.
- Deployment of new technologies will inevitably involve unforeseen challenges that will stress schedule and budget. Setting detailed requirements and statements of work up-front with technology vendors enables more rapid issue resolution as concerns arise.
- Complexities associated with information technology / operational technology ("IT/OT") projects require sufficient lead time and planning. Implementation of real-time systems used by System Operations are particularly challenging and have far-reaching consequences outside the control room.

Efforts to stand up the GMP portfolio implementation capability reinforced the Company's ongoing efforts to build the workforce of the future required to continue to transition the distribution grid into a platform that enables higher penetration of distributed energy resources ("DER"). A grid characterized by widespread sensing, monitoring and control technology requires specialized and highly-trained resources in electrical and telecommunications engineering, field communications, field engineering, system operations, project management and information technology. Approval of the Company's GMP has further emphasized the importance of identifying near and long-term opportunities to build skills, attract talent and grow the execution efficiency of the Company's workforce. Many of the successes and lessons learned described in

this Report demonstrate the power of a motivated and well-organized workforce to scale up operations and identify creative solutions to technical challenges as well as the opportunities to augment technical capabilities required to build the grid of the future.

As the Company continued to implement its GMP in 2019, it has continued to experience increasing levels of DER penetration on the distribution system. In 2019, the Company interconnected an additional 5,000 solar generation facilities, for a total of 45,000 solar generation facilities interconnected to the system. These solar generation facilities represent over 112 MW of incremental capacity. Further, the number of facilities waiting to interconnect to the system increased to 1,400 MW in 2018 to over 1,600 MW in 2019. As described in Section V, many of the new solar projects are incorporating energy storage, increasing the complexity of the interconnection study process. High saturation of solar and energy storage in certain areas of the Company's system have resulted in increased need for substation upgrades and Independent System Operator ("ISO") studies. These factors support the fundamental need for grid modernization efforts that aid in the transparent, cost-effective and efficient planning and deployment of DER on the system.

2. Implementation Strategy

Following the Department's approval of the GMP, the Company initiated a GMP implementation strategy based on the following key principles:

- **Leverage proven, established processes to the extent possible.** As described above, the Company's ability to execute its 2019 GMP work plan was largely attributable to its ability to leverage existing processes and organizational capabilities. These efforts commenced in 2018 and continued in 2019. Using its existing project approval processes, the Company ensured consistency with its overall policies for capital budget spending authorization. In 2019, the Company continued to leverage its existing work management systems and processes to create dedicated work orders for grid modernization projects; order standardized materials based on the Company's established competitive procurement policies; support planning and scheduling of work and enable robust and accurate tracking of GMP investments. With respect to planning and scheduling, the Company created an integrated schedule for both 2019 GMP and base capital projects to ensure maximum execution efficiency and completion of the Company's full scope of work.
- **Dedicate effort to maximize cost-effectiveness of implementation.** Many of the decisions made in the first year of GMP implementation drove cost-effectiveness in achieving plan objectives in the second year of the plan. The Company prioritized equipment location in 2018 which lead to maximum value for the GMP deployment in 2019. =With the locations prioritized and ranked, the Company was able to continue to efficiently and effectively install grid modernization investments as planned. Having this prioritization step completed in 2018 helped to maximize customer benefits and minimize cost. Further, in 2019, the Company hired additional engineering resources to support the

Advanced Load Flow (“ALF”) and Volt VAR optimization (“VVO”) programs, minimizing the cost associated with external contracted engineering.

- **Establish a dedicated team for portfolio management and financial tracking.** The Company recognizes the critical importance of transparency and visibility in implementing its GMP portfolio. Ensuring accurate, timely tracking and reporting is a principal component required to ensure actions are taken to manage scope, schedule and budget. Focus on tracking and reporting will also support robust performance reporting and active engagement in the measurement and verification (“M&V”) process. For the 2018-2020 GMP program, the Company established three positions dedicated solely to GMP program and financial management responsible for developing and executing the integration plan for the GMP portfolio. These key employees were hired in 2018 and continued to support the GMP in 2019.
- **Engage senior Operations leadership to provide implementation guidance and support.** The Company’s senior Operations leadership has demonstrated a strong commitment to supporting implementation of GMP objectives. Leaders recognize the direct customer benefit and importance in enabling the continued transition to the grid of the future. Periodic meetings to review progress were held in 2019, and leadership feedback continued to provide critical guidance on the implementation of the 2019 GMP.

Develop an effective approach to implementation of new grid modernization technologies and capabilities. Many of the programs included in the Company’s GMP support deployment of existing monitoring and control, communication and automation technologies. These types of programs are relatively more amenable to leveraging existing processes and capabilities. Investments in VVO and Advanced Distribution Management System (“ADMS”) investment categories require more of an innovative approach. In order to implement these new programs, the Company established, beginning in 2018, organizational structures and assessed workforce needs. Additional work was also required relative to competitive procurement of new technologies. The Company utilized this structure and workforce and leveraged its existing competitive procurement processes for the 2018-2020 GMP and these processes continued to provide significant support in the deployment of grid modernization technologies in 2019. Through this process, the Company was able to competitively procure the resources needed to construct and implement the ALF and VVO projects in 2019.

The process framework described above provided the Company with concrete methods to undertake the necessary preparatory work prior to initiating investments under the 2018 GMP. The groundwork also provided a solid implementation framework for the 2019 GMP. First, using the established prioritization methodologies, the Company utilized investment deployment locations to maximize the investment’s value to customers. For example, the Company was able to install critical investments first on overhead customer isolation zones in order to further enhance historical reliability performance. This methodology was utilized by Engineering to develop

prioritized locations to deploy the overhead sectionalizing devices in locations that would provide the most benefit to customers.

In addition, Engineering teams continued to utilize multiple technology selection efforts to implement the 2019 GMP.

Similar to its practice under the 2018 GMP, the Engineering teams drafted Project Approval Forms (“PAFs”) for each investment category in accordance with the Company’s Capital Authorization Policy in order to ensure that all 2019 GMP investments had the requisite spending authorization. The PAFs describe the project need, justification, scope, budget and alternatives considered. The PAFs were approved through the Company’s delegation of authority consistent with the process used to authorize all capital expenditures.

Following the practice established under the 2018 GMP, the Planning and Scheduling team conducted an analysis to estimate the number of labor hours required to engineer, construct and commission the 2019 GMP work plan. This analysis supported the development of a labor resource strategy designed to maximize the efficiency of GMP execution by leveraging incremental internal resources where possible, particularly for highly technical tasks related to field engineering and communication. This strategy also supported a competitive procurement process to obtain external engineering and construction resources to complete the 2019 GMP work plan.

Under the 2019 GMP, the Eversource Investment Planning team again utilized specific and dedicated cost control processes to isolate and monitor all costs associated with the GMP. The Company relied on an accounting process to specifically track GMP costs and expenditures, which includes the continued use of a work order process to track grid modernization investments separately from other capital projects undertaken by the Company. All grid modernization work orders for the 2018 and 2019 GMPs link to a specific grid modernization project, which in turn links to a specific line of business. This process is discussed in more detail in its May 15, 2020 filing regarding recovery of 2019 grid modernization investment costs through the GMF.

Consistent with its experience under the 2018 GMP, the foundational steps described above enabled the Company to implement its 2019 GMP in an efficient and cost-effective manner. Additionally, this framework allowed the Company to proactively look forward through the portfolio to understand and plan for areas of opportunity to accelerate the deployment schedule to the maximum extent possible over the remainder of the 2018-2020 GMP.

C. Summary of 2019 GMP Investment Deployment (Actual vs. Planned)

Drawing upon the implementation strategy described above, the Company continued to implement its GMP in 2019. Planning efforts for the 2019 GMP focused on achieving the milestone targets established in the Company’s August 15, 2018 *Grid Modernization Plan Statewide and Eversource-Specific Infrastructure Metrics Baselines and Targets* filing (“Baseline and Targets Filing”)(see Table 2.4.7). The Company’s planning efforts were also informed by the grid modernization infrastructure and performance metrics approved by the Department on July 25, 2019.

The 2019 GMP unit targets from the Baseline and Targets filing is reproduced below *Table 1: 2019 Units Status* in column “Plan Units (2019).” In Table 1, the Company has reflected its progress relative to 2019 targets in the columns “Construction Complete Units (2019)” and “Commissioned Units (2019)”. If the unit was not both constructed and commissioned, Table 1 provides the units to be installed in the 2020 GMP year under the column, “2019 Unit Carry Over (2020)”.

Table 1: 2019 Units Status

Investment Categories	Preauthorized Device Types	2018 Unit Carry Over (2019)	Plan Units (2019)	Construction Complete Units (2019)	Commissioned Units (2019)	2019 Unit Carry Over (2020)
Monitoring & Control (SCADA)	Microprocessor Relays (SS)	3	100	87	87	16
	4kV Circuit Breaker SCADA (SS)	n/a	21	16	16	5
	Recloser SCADA	3	11	19	19	0
	Padmount Switch SCADA	18	24	41	41	1
	Network Protector SCADA	n/a	50	83	0	50
Distribution Automation	Overhead DA	4	100	165	148	0
	Overhead DA w/Ties	n/a	23	45	45	0
	4kV Oil Switch Replacement	10	57	89	89	0
	4kV AR Loops	n/a	16	17	17	0
Volt-Var Optimization	VVO - Regulators	15	80	69	69	26
	VVO - Capacitor Banks	n/a	76	71	71	3
	VVO - LTC Controls	0	6	4	4	0
	VVO - Line Sensors	n/a	125	189	189	0
	VVO - IT Work	n/a	n/a	n/a	n/a	n/a
Advanced Distribution Management System (ADMS)	Advanced Load Flow	n/a	n/a	n/a	n/a	n/a
	GIS Verification	n/a	n/a	n/a	n/a	n/a
	Distribution Management System	n/a	n/a	n/a	n/a	n/a
Communications	Communication - FAN	n/a	6	4	4	2
	Communication - Fiber	5	125	0	0	0

In order to appropriately assess the Company’s performance under its 2019 GMP, understanding the manner in which the Company tracks progress under its GMP work orders is important. The Company utilizes two classifications when categorizing the status of an investment:

- **Construction Complete:** the Company classifies a GMP unit as “Construction Complete” when a device is placed in-service, meaning that it is used and useful. Due to the nature of the Company’s GMP investment categories, it is often the case, particularly in regards to line-equipment devices, that a piece of equipment is installed and electrically placed into service, but has not yet gone through its commissioning process, which, when complete, places that piece of equipment into the Company’s monitoring and control systems (i.e., SCADA).
- **Commissioned:** once a device is commissioned, the piece of equipment is electrically connected to the system, classified as in-service, and has been connected into the Company’s monitoring and control systems, typically SCADA, which allows authorized personnel control and/or visibility of that device. The Company refers to the completion of the commissioning step as communicating and functioning consistent with the specifications set out in the GMP.

In terms of reporting its progress on the GMP in the Annual Report, the Company is reporting on both the Construction Complete and Commissioned statuses in order to provide a complete, accurate and transparent view of progress. As shown in *Table 2: 2019 Capital and In-Service Spend Summary*, any grid modernization device or system that has been categorized as Construction Complete is reflected in the Plant In-Service columns.³ While a GMP investment is classified as in-service when it falls in the “Construction Complete” category, the Company does not consider it to be operating and providing benefits consistent with the GMP in such a manner that it helps to advance the Department’s grid modernization goals, until the investment is “Commissioned”. When an investment is “Commissioned”, it is complete within the GMP process.

Cost recovery under the GMP is initiated when an investment is “Construction Complete,” which is in-service, and used and useful in accordance with the Department’s cost recovery standard and precedent. It is at this point that the Company reviews the work orders associated with that investment to ensure the costs charged to-date were appropriately charged to the GMP work order and recoverable through the GMF. Costs will continue to accrue on a work order until the work order is “Commissioned.” After the work order is “Commissioned,” the Company will undertake the same review of the additional costs incurred to move the investment into the “Commissioned” category.

For the investments that were classified as Construction Complete in 2019, the Company will include the costs associated with the investment in its 2019 cost recovery filing to be submitted on May 15, 2020.

As can be seen in *Table 1: 2019 Unit Status* above, the Company undertook an aggressive approach to implementing the 2019 GMP and made significant strides in implementing the GMP. In a few investment categories, the Company did not fully meet its target for 2019. The primary driver of missed targets was an aggressive incremental workload driving an implementation schedule that did not provide for extra time to address unforeseen field conditions. This was particularly significant in the case of the more complex substation projects that involved system outages planned well in advance of construction. In order to provide transparency in the process, the Company differentiated “carry-over” work in the 2020 work plan and established an internal target to complete all 2019 carry-over work in the first quarter of 2020.

As of April 1, 2020, carry-over work from the 2019 GMP associated with Microprocessor Relays, 4kV Circuit Breaker SCADA, Padmount SCADA and Network Protector SCADA have been constructed and commissioned. The Network Protector SCADA program completed all 83 units planned for the 2018-2020 GMP term, exceeding the 50-unit 2019 target.

Carry-over work for VVO regulators, VVO capacitor banks and Communications nodes and fiber investments were not completed prior to April 1, 2020. Commissioning of one VVO capacitor bank is on hold pending receipt of a replacement unit from the equipment vendor. Construction

³ The Company will also provide a similar summary of grid modernization devices and systems categorization in its May 15, 2020 cost recovery filing.

and commissioning of all 27 VVO regulators (nine locations) is on hold due to both permitting delays and issuance of a revised construction standard for platform regulators that includes additional standards for resilient design. One communications node remains outstanding due to site restrictions established due to a suspected positive test for COVID-19. As described above, the Company suspended the communications fiber program due to cost considerations.

In addition to the progress relative to GMP device targets, the Company achieved milestones associated with GMP programs for which unit targets are not appropriate. For instance, the Company made substantial progress on its ALF project. The Company completed a competitive procurement process for load flow software, selecting the DNV-GL product Synergi. The Company also defined the data structures and functional requirements, established IT and security protocols, built the model forge process and provided training to engineers. These efforts enabled the Company to achieve its first implementation milestone such that engineers can now use the Synergi tool to build and analyze models for all non-network feeders in Massachusetts. For the VVO program, the Company completed a competitive procurement process, selecting the Eaton product Yukon Integrated Volt Var Control system. The VVO project team made substantial progress building out models of 26 feeders and the Company expects to begin measurement and verification activities in the second quarter of 2020.

Additionally, during 2019, all remaining work associated with the GIS Verification for the eastern MA overhead infrastructure has been surveyed and all data updates to the Company's GIS system has been completed. The completion of this survey and verification work completes the three-year goal for this investment.

D. Summary of Spending (Actual v. Planned)

In "*Table 2: 2019 Capital and In-Service Spend Summary*" provided below, the Company has broken out the "Total Capital Spend" and "Plant In-Service" to correspond to the work order progress, as explained in the "*Summary of Grid Modernization Deployment (Actual v. Planned)*" table above. The Company has provided specific, detailed narratives in this Report on the details of each GMP investment category and device type.

Table 1: 2019 Capital and In-Service Spend Summary

Grid Modernization		2019 Capital Spend			2019 Plant in Service		
		Actual	Budget	Variance	Actual	Budget	Variance
		82,851,919	101,593,952	(18,742,033)	57,119,430	51,420,004	5,699,426
Investment Category	Preauthorized Device Type						
Monitoring & Control (SCADA)	Microprocessor Relay	14,991,129	20,319,438	(5,328,309)	9,693,573	9,051,121	642,452
	4kV Circuit Breaker SCADA	4,085,366	2,413,892	1,671,474	2,650,164	1,750,000	900,164
	Recloser SCADA	888,665	1,024,000	(135,335)	608,248	681,817	(73,569)
	Padmount Switch SCADA	615,476	299,000	316,476	631,169	622,605	8,564
	Network Protector SCADA	871,602	2,200,000	(1,328,398)	678,977	678,238	739
	OMS/AMI Integration	-	-	-	-	-	-
Distribution Automation	OH DA w/o Ties	12,069,703	13,167,000	(1,097,297)	12,532,547	9,982,818	2,549,729
	OH DA w/Ties	2,797,738	3,135,000	(337,262)	2,585,627	2,494,402	91,225
	4kV Oil Switch Replacement	13,881,098	10,010,000	3,871,098	12,280,567	10,525,154	1,755,413
	4kV AR Loop	891,645	880,000	11,645	217,240	-	217,240
Volt-Var Optimization	VVO - Regs, Cap Banks, Line Sensors	5,602,795	5,223,000	379,795	5,191,554	4,494,151	697,403
	VVO - LTC Controls	1,044,867	882,804	162,063	1,202,622	1,197,745	4,877
	VVO - IT Work	1,159,861	5,147,030	(3,987,169)	-	-	-
Advanced Distribution Management System (ADMS)	Advanced Load Flow	2,775,876	4,662,150	(1,886,274)	-	-	-
	GIS Survey (Expense)	6,338,926	-	6,338,926	-	-	-
	Dist. Management System	-	2,059,791	(2,059,791)	-	-	-
Communications	Numbers of Nodes	522,256	974,299	(452,044)	415,578	57,750	357,828
	Miles of Fiber	309,896	13,450,322	(13,140,426)	-	3,000,000	(3,000,000)
Workforce Management	Mobile Damage Assessment	-	-	-	-	-	-
Electric Vehicles	Electric Vehicles	10,979,264	6,378,693	4,600,571	8,431,565	6,884,203	1,547,362
Energy Storage	Martha's Vineyard	1,302,875	3,360,030	(2,057,155)	-	-	-
	Provincetown	1,722,882	6,007,503	(4,284,621)	-	-	-

Below are several aspects of the 2019 GMP implementation that impact the financial performance under the 2019 GMP, as related to the capital spend:

- **Microprocessor Relays:** Though the unit costs are higher than expected, the program was short of its unit and budget goals for the year. Work continued uninterrupted into 2020 when the remaining capital expense and plant in-service funds will be expended.
- **4kV Circuit Breaker SCADA:** Unit costs were found to be higher than expected for this investment, which drove the overage in 2019.
- **Padmount Switch SCADA:** There was more work at many sites than had originally been expected and budgeted, which is why this program was over-budget for 2019. Budgeted unit costs for this investment are relatively low, therefore small cost deviations can appear as larger percentage deviations. The Company expects the unit costs to come further in line with budget.
- **Network Protector SCADA:** Though the goal was not formally met in 2019, significant work was completed in 2019 on this investment and unit costs are expected to be significantly lower than expected.
- **OH DA w/o Ties:** Unit costs were consistently below the budgeted amounts and even in lieu of completing additional units, this investment was under budget for 2019.
- **4kV Oil Switch Replacements:** The unit costs for this investment are averaging on budget and the reason for the overage in 2019 was due to the increased units completed above the 2019 target.
- **VVO Devices:** As a combined category, VVO regulators, VVO capacitor banks and line sensors were close to budget and unit costs were close to expectations for each equipment type.

- VVO IT: After final design and vendor selection, the costs to implement this investment were substantially lower than expected and budgeted.
- ALF: Similar to the VVO IT investment, after selecting a vendor and implementing the program, costs were lower than expected and budgeted.
- DMS: Even though budgeted for 2019, the Company deferred the DMS budget to 2020 in order to better analyze the overall IT/OT investments and ensure that the selection of DMS projects complemented the long-term vision.
- Miles of Fiber: As is elaborated upon in Section III of this Report, following a thorough analysis, the Company determined that there was not a cost-effective solution that would benefit customers under the Miles of Fiber program. This investment was limited to minor work in support of another GMP investment.
- EV: The Company made a concerted effort to accelerate this program in 2019 and therefore exceeded originally budgeted expectations.
- Energy Storage: The deviation in the energy storage spend is primarily due to the shift in the execution of the major contracts with the battery vendor, NEC.

The Company closely monitors the current and expected spend for the various investments and has made, and will continue to make, adjustments and shifts between authorized investments to ensure that the most appropriate, cost-effective and customer-beneficial devices and technology are deployed within the authorized GMP timeframe.

Table 2 above includes capital spending and expense spending associated with the GIS Verification program. In addition, the Company spent an additional \$1,242,806 in expense associated with the evaluation work undertaken by Guidehouse (formerly Navigant) on behalf of Eversource and the other Distribution Companies are required by the Department in D.P.U. 15-122, EV Make-Ready work and internal GMP labor. The internal GMP labor is the labor that was validated through the GMP testing process for recovery.

II. Program Implementation Overview

A. Organizational Changes Designed to Support Program Implementation

In order to ensure the successful and efficient implementation of the GMP, beginning in 2018 the Company layered the GMP into its existing business practices and leveraged the existing capabilities, processes, procedures, departments and personnel within the Eversource system. Administratively, the portfolio of GMP programs is managed by a group of three dedicated employees, the Grid Modernization Portfolio Manager, Program Analyst and Financial Analyst shown in Figure 1 below. These personnel were charged with developing and constructing the execution platform, and reporting, closing and dispositioning each of the GMP programs. The remaining personnel identified in Figure 1 depict existing employees who are supporting the implementation of the GMP efforts.

Administratively, to support the integration, the team developed a process framework to evaluate, analyze, align and manage cross-functional responsibilities. Though a robust system from the outset, the Company made several enhancements during 2019, to its repository and tracking process. Under this process framework, the Company has undertaken the following steps in order to successfully implement and manage the GMP.

- **Evaluate/Inventory:** The team continued to study the strategic and end-state goals of the GMP program, identified the internal and external stakeholders who will/can influence program completion and success, and mapped the data repositories with relevant information, such as STORMs and Passport, the Company's work management systems, PowerPlan, the Company's financial repository system, the Company's Geographical Information System ("GIS"), the Outage Management System, the Primavera P6 scheduling systems, and various other data sources. This data was aggregated into a centrally housed database to enable report generation and analysis that will be used over the course of the GMP to track investments and the Company's overall progress under the GMP.
- **Analyze:** The GMP analysts further refined the data into the GMP Portfolio Tracker allowing for internal monitoring and reporting for quality assurance/quality control ("QA/QC") checks. This step is critical to successful GMP execution as it allows for visibility into the GMP implementation, which enables the Company to identify potential issues as early as possible during a given investment and develop and apply a resolution before program impact. During 2019, enhancements were made to the GMP Portfolio Tracker to include:
 - More granular tracking of the various elements of individual work orders. This allowed the team to understand and communicate what open tasks/requirements may be left to completed, within a specific work order, and adds another quality check on closing out work orders.
 - A more robust set of data has been added to the recurring data downloads from the various Company systems. Some of these additions include the tracking to the

circuit and substation for a given work order, with a quality assurance process to ensure these are accurate for reporting purposes. The team also now tracks on a recurring basis the number of customers affected by the OH DA investments and another quality assurance check on when a specific work order is placed in-service, which ensures accurate reporting.

- **Align:** The GMP represents incremental work that was overlaid onto and integrated with Eversource’s existing controls and processes. Therefore, the core team coordinated and facilitated a blended oversight and engagement of the various departments responsible for the execution of the GMP, such as Procurement, Planning, Operations, Information Technology, and various administrative functions. This provides inter-departmental visibility into the various GMP program types and enables more effective and efficient planning of work and resources. For 2019, the team, shown in Figure 1, below, developed several enhanced reporting elements to assist in the monitoring of and communication regarding the portfolio. Some of those enhancements include: 1) the addition of “Workdown Curves” that graphically communicate how the plan has been executed to date, and the remaining planned trajectory through the year end; and 2) monthly financial review meetings with key team members that allow for immediate and decisive review, understanding and communication of the portfolio financials to ensure alignment across the Company’s organization.

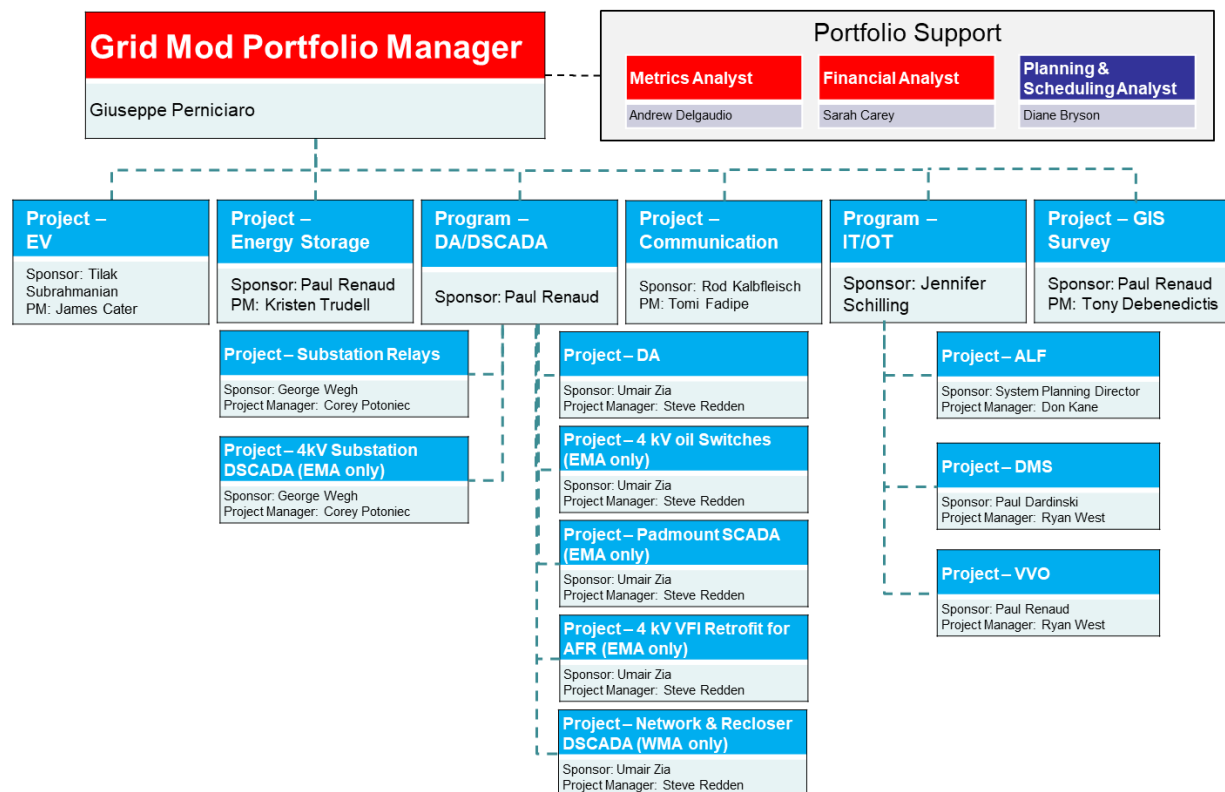
Figure 1 Grid Modernization Team

Core Grid Mod Team	
<u>Name</u>	<u>Title</u>
Andrew DelGaudio	Program Analyst
Sarah Carey	Financial Analyst
Don Kane	Lead Engineer
Emilio Cepeda	Engineer
Giuseppe Perniciaro	Portfolio Manager
Ryan West	Manager - Grid Mod
Akhil Punnoose	Lead Engineer
Tony Lasa	Lead Engineer
Hicham Khiredine	Associate Engineer
Kelsey McGlashan	Engineer
John Kreso	Engineer
Deb DiNuzzo	Admin Assistant
Jennifer Schilling	Director - Grid Mod

- **Manage:** Through the use of cross-functional GMP project managers, recurring status and coordination meetings, and recurring reporting, the core GMP team utilizes an execution platform to oversee and guide the implementation of the GMP program to ensure Eversource deploys the GMP investments in an efficient and effective manner designed to advance the achievement of the Department's identified grid modernization objectives. Enhancements to 2019 include the establishment of recurring meetings, chiefly at the project level, but also with individual and team leadership meetings, which enhanced the communication flow of the fast-paced programs of the GMP throughout the large organization.

These steps represent critical foundational steps that were developed and deployed in order to ensure that all GMP investments were undertaken in a deliberate and efficient manner. This framework was utilized in the execution of the 2019 GMP and will be used for future GMPs.

Figure 2 Grid Modernization Organization



Operationally, the GMP is being implemented by a combination of internal and contracted operational personnel, such as line workers, electricians, technicians, IT developers, and commissioning agents. Eversource uses a matrix organizational structure, as can be seen in Figure 3 below, with many support functions cutting horizontally across the various operational resources. This structure promotes consistency across the enterprise and the ability to scale the organization to incorporate significant initiatives, such as the GMP.

Figure 3 Eversource Organizational Structure

			<u>COO</u>	<u>CUSTOMER/CORPORATE RELATIONS</u>
			<u>Electric Operations</u>	<u>Energy Efficiency</u>
SUPPORT TEAMS	Grid Modernization Team	Engineering	↑ ESS Martha's Vineyard Provincetown Microprocessor Relay	↑
		Major Projects (PM)	4kV Circuit Breaker SCADA Recloser SCADA Padmount Switch SCADA Network Protector SCADA	↑
		Human Resources/I.T.	OH DA OH DA w/Ties 4kV Oil Switch Replacement	↑
		Finance, Regulatory and Treasury	4kV VFI Retrofit for DA VVO - Regulators VVO - Capacitor Banks VVO - LTC Controls VVO - Line Sensors VVO - IT Work	↑ EV Infrastructure
		Supply Chain	Advanced Load Flow GIS Verification (Expense) Dist. Management System	↑
		Enterprise Energy Strategy	Numbers of Nodes Miles of Fiber	↑

B. Cost and Performance Tracking Measures

GMP Accounting Process

The Company developed a distinct accounting structure to ensure that GMP costs were isolated from all other capital project costs and were incremental to existing or business as usual investments. The GMP accounting structure started with the creation of new cost control centers for both Eastern Massachusetts (E98) and Western Massachusetts (5GW). Although the GMP was designed and will be implemented across the Company's service territory, the Company is still required, consistent with the Department's directives, to maintain separate financial records for NSTAR Electric and the former WMECO. D.P.U. 17-05, at 44-45. Next, the Company created separate lines of business for each investment type to track GMP projects and work orders separately from any base capital work. The separate lines of business are listed below:

- Electric Vehicle – 12165
- Energy Storage – 12160
- Advanced Sensing Technology – 12190
- Automated Feeder Reconfiguration – 12170

- Urban Underground System Automation – 12175
- Communications – 12180
- Distribution System Network Operator – 12185.

The Company also created a mechanism for properly tracking all GMP Labor charges. Originally a specific work order, GMPLBR21, was established to track these labor charges, but a new specific work order (GMPLBR00) was created to track all new external hires whose work is dedicated 100 percent to the GMP, *i.e.*, these new hires do not perform any work on other Eversource programs or initiatives. The change in work orders was completed so that costs associated with the external hires would be completely segregated and independent of costs associated with the pre-authorized investments. All charges from the old work order were migrated to the new work order to retain all historic entries. Eversource internal labor direct charges their time to the relevant GMP work orders whenever possible and appropriate. In the event that these individuals cannot direct charge their time, their time is charged to Engineering & Supervision (“E&S”) to be spread across all work orders consistent with Eversource accounting practice for all capital work. For existing employees, *i.e.*, those individuals employed prior to March 15, 2018, all of their labor expense and productive and non-productive time will remain as an expense in the employee’s home cost center and is not recoverable under the current GMF. All outside services procured to design/implement/construct grid modernization capital units of property will charge the GMP capital work orders and be recoverable through the GMF.

GMP Cost Tracking Process

Total O&M and Capital Spend

The Company created a cost tracking process to track total spending for the entire GMP portfolio. This process was designed to be an accurate and repeatable process that required minimal manual effort to ensure data consistency and that the spending was incremental. A customized view was created in Eversource’s budgeting and financial application, Planning Analytics,⁴ that contains only GMP projects and lines of business. The view contains monthly Actuals, Budget, Variance, and Projection information that are automatically populated in Planning Analytics.

- Actuals – numbers feed into Planning Analytics directly from Eversource’s other financial reporting system, PowerPlan.
- Budget – numbers are input into Planning Analytics at the end of each calendar/budgeting year for the following calendar/budgeting year. Budget numbers are then ‘locked down’ within the first week of the calendar year so that there cannot be any changes to the budget throughout the year.
- Variance – automatically calculated in Planning Analytics (Actuals-Budget).

⁴ The Company changed its software package from TM1 to Planning Analytics in 2019.

- Projection – numbers are input into Planning Analytics monthly, based on historical performance and Actuals from the prior month.

As Actuals accrue for each project, the Projections are manually entered into Planning Analytics by the Budgeting group, who receive updated figures from Project Managers. The Actuals, Budget, Variance, and Projections populate in both a Month to Date and Year to Date view, and the data from the Planning Analytics view is extracted directly into Excel. On or around Business Day 4 of each month's accounting close process, the Grid Modernization Financial Analyst extracts the Planning Analytics data to perform a year-to-date and month-to-date variance analysis of the GMP portfolio and report results to various groups internally. Analysis of Planning Analytics Actuals is also performed to further ensure that the Planning Analytics data is the same as the PowerPlan data.

Total Plant in Service

The Company has created a cost tracking process to track total plant in service dollars for the entire GMP portfolio. Total dollars placed in service cannot be tracked in the same manner as total capital spending because Planning Analytics does not contain the necessary FERC account information used to classify a work order/project as being in service. This information is extracted from PowerPlan, Eversource's Fixed Asset system. To populate this information, the Grid Modernization team established a query in PowerPlan to capture all costs distinctly associated with the GMP. The query contains detailed information needed to accurately and comprehensively track GMP costs, such as FERC Account, Accounting Work Order, Entity, Funding Project, Line of Business, etc. FERC Accounts 106010 and 101010 denote that an Accounting Work Order is Plant in Service. Similar to the total capital spending Planning Analytics process, the PowerPlan extract is performed by the Grid Modernization Financial Analyst on or around Business Day 4 of each month's accounting close process.

Controls and Ensuring Data Accuracy

The Company created various informal and formal tracking mechanisms to report on portfolio performance and ensure the accuracy of the data. In addition to the established accounting process described above, the Company carefully scrutinizes and assesses the reported data. A mechanism was created to track GMP portfolio operational performance and analyze GMP work order activity. The reporting combines both financial and operational metrics of the GMP portfolio. Operational work order details are formally tracked using this reporting. Work order detail, including but not limited to, work order description, service center, costs and work order status are pulled into the reports from various Eversource systems. The Grid Modernization Program Analyst refreshes the data weekly. Eversource's work management systems (Passport and STORMS) are queried weekly to pull GMP work orders that have been created. The population of work orders is cross checked to the Company's financial reporting tool, PowerPlan. Data is organized by project and by the GMP-specific lines of business discussed above in the GMP Accounting Process section. Any identified inconsistencies are addressed and corrected in a timely manner. For example, if it is determined that a work order was inadvertently written to the wrong GMP project and/or line of

business, the analyst would work with engineering to cancel and rewrite the work order to the correct GMP project and line of business.

As a further review of the data, weekly meetings are held with diverse groups of Eversource personnel. The summarized GMP data, as well as detailed data from the tracking mechanism, is shared and analyzed during this meeting. In addition, the Grid Modernization Portfolio Manager shares additional information related to the program, such as program risks, issues, and progress towards internally established targets. The Grid Modernization Project Managers also report on progress made for their respective areas of responsibility. The weekly meetings provide a recurring opportunity and platform to discuss any issues related to or potentially impacting the GMP.

Informal processes also exist outside of the formal tracking reports and weekly meetings. Integrated Planning & Scheduling, Engineering, Procurement, Corporate Performance Management, and other functional groups across Eversource are in constant communication regarding all aspects of Company business, including the implementation of the GMP. Representatives of these various departments work cross functionally and collaboratively to meet GMP portfolio performance expectations. Stakeholders within these various department also maintain their own tracking mechanisms, which are cross checked periodically to the formal GMP source document maintained by the Grid Modernization Program Analyst.

Grid Modernization Unit Tracking Process

GMP-qualified units are manually tracked by the Grid Modernization Program Analyst in the GMP portfolio tracking reports. As discussed above, all GMP work orders are reviewed and analyzed on a weekly basis, with any inconsistencies or other issues addressed proactively in a timely manner. Based on the attributes assigned to a GMP work order and depending on the outcome of the discussions and collaborations with the GMP Project Manager and/or Engineering, a GMP-qualified unit(s) is assigned to the appropriate GMP work order.

As described above, Eversource has developed a robust and detailed set of multi-disciplinary processes and procedures to track the costs associated with GMP projects to ensure that the Department's directives from D.P.U. 15-122 are comprehensively addressed. The Company's procedures allow for detailed analysis to support GMP investments and, eventually, cost recovery. Over the course of the 2018-2020 (and future) GMPs, the Company will continuously assess its tracking and reporting processes and, as appropriate, modify those processes and adopt best practices.

C. Project Approval Process

Consistent with the Company's Capital Authorization Policy and procedures, all GMP projects that were placed in service in 2019 have received the requisite spending authorization (adhering to the APS 1 Project Authorization Policy). All GMP projects link to one of the specific GMP lines of business and all GMP work orders link to a specific GMP project, which rolls up to a GMP line of business. For GMP projects where the total costs are below \$100,000, the authorization

has been granted via the annual program blanket approval that occurs as part of the capital plan book review by the Company's Board of Directors. For GMP projects where the total cost exceeds \$100,000, a specific project identification number is assigned and a Project Approval Form ("PAF") is written and approved through the PowerPlan system following the delegation of authority process set out in the Capital Authorization Policy. If a GMP project is expected to exceed the original authorized dollar amount, then a supplemental project authorization form is required when the direct costs of the project exceed or are expected to exceed the original authorized amount by the following levels:

- \$25,000 for projects less than \$250,000;
- \$50,000 for projects greater than \$250,000 and less than \$500,000; and
- 10 percent for projects greater than or equal to \$500,000.

III. Implementation by Investment Category

III.A.1. Monitoring and Control

(Microprocessor Relays, 4kV Circuit Breaker SCADA, Recloser SCADA, Padmount SCADA, Network Protector SCADA)

A. Description of work completed

MICROPROCESSOR RELAYS: Under the 2019 GMP, the Company continued to replace the Electromechanical feeder overcurrent, reclosing, and under-frequency relaying schemes with a Primary 351S relay and a Backup 751 relay and associated test devices. The primary relay will include pushbutton controls for the breaker(s), primary overcurrent protection, Hot Line Tag, reclosing, breaker failure, and under-frequency load-shedding schemes. The backup relay will serve as the SCADA interface and will include backup overcurrent protection and breaker timing logic.

4KV CIRCUIT BREAKER SCADA: Under the 2019 GMP, the Company commenced construction on several projects to upgrade circuit breakers to have DSCADA capabilities (control, indications, and analogs) at 4kV underground substations in Eastern Massachusetts. The work includes replacing distribution feeder electro-mechanical relays with modern microprocessor relay protection schemes and installing new, or upgrading existing, station remote terminal units (“RTUs”) or adding real-time automation control (“RTACs”), to add control, indication, and analog functionality at all feeder breakers, tie-breakers, and secondary transformer breakers where they currently do not exist.

RECLOSER SCADA: Under the 2019 GMP, the Company exhausted its overhead recloser devices in the field that were both compatible and did not have communications capability. Accordingly, the strategy was modified so that, instead of simply adding a communications package, the Company replaced oil-filled recloser locations with new reclosers, which included the communications equipment necessary so that the device can be centrally monitored and controlled by the Company’s System Operations Center (“SOC”).

PADMOUNT SWITCH SCADA: Under the 2019 GMP, the Company identified existing motor-operated padmount switch devices in the field that are both compatible and do not currently have communications capability. Once these devices were identified, the Company added a radio package to the location, so that the device can be centrally monitored and controlled by the Company’s SOC.

NETWORK PROTECTOR SCADA: Under the 2019 GMP, the Company installed the Digital Grid network monitoring system to the network system in the Springfield, MA area. The system includes enhancing relays at various field locations and, at the substation, the installation of communications couplers on each of the affected circuits, tying back to a control panel, which will ultimately to be tied into the Company’s communications infrastructure. At this time, the field

devices will not be built into the Company's existing SCADA system. The reason for this is to allow the Company to continue to build and implement its new enterprise-wide SCADA system, which has been in progress and will be cutover, for Massachusetts, during the 2020 GMP plan year. Once the SCADA cutover is completed and operational, the teams will evaluate and plan to integrate the Digital Grid system directly into the SCADA platform. Until the transition to SCADA, the Digital Grid relays and station devices will be monitored and controlled via the Digital Grid software platform, which provides monitory capability for the status of the network protectors, in addition to the several additional data points that were added at each location. These new data points included but are not limited to information such as, voltage, current, fault current, hot line tagging status, power factor, reactive power, under frequency status and hardware information. The system will be centrally monitored and controlled by the Company's SOC.

B. Lessons-Learned/Challenges and Successes

As a general lessons learned and after reviewing the 2018 Appendix 1 data submitted on January 31, 2020, supplementing the 2018 Grid Modernization Report, an error was discovered in the plant in-service ("PIS") data, identified in column "L" of tab "5.a Spending – 2018 Report" within the 2018 Appendix 1 spreadsheet. The cost data had inadvertently been broken out to the investment type level, as opposed to being retained as a total value for the entire Monitoring & Control investment category. The Company corrected this mistake in tab "5.a Spending – 2018 Report" within the 2019 Grid Modernization Annual Report's Appendix 1. This change was also noted at the bottom of the tab in the 2019 Report's Appendix 1. Additionally, and because this spending tab of Appendix 1 is essentially all capital, the GIS Verification projects' spending, which was entirely expense, was removed from the entire portfolio summation of investments. This oversight was only contained in the Appendix 1 supplemental report. The 2018 Grid Modernization Annual Report, filed May 1, 2019, is accurate, as submitted.

MICROPROCESSOR RELAYS:

- Work completed within a substation typically requires significant coordination between Company departments. Due to the fast-paced nature of each of the substation projects, ensuring tight coordination still presented challenges in 2019. Obtaining the right mix of internal and external resources also provided some challenges, mostly during the solicitation and onboarding process. As an example, the contracted resources required for this work are both highly specialized and limited within the marketplace. To compete for services and receive competitive pricing, it was important for the Company to solicit multiple projects to provide a definitive pipeline of work that could be completed in succession under a single mobilization as opposed to single projects spread out over the year with numerous mobilization/demobilization in between.

Once contracted and scheduled, the onboarding of new, external employees to an existing workforce will always provide challenges until both teams learn each other's cultures, habits and work styles, and become integrated. The time

frame for this integration can vary greatly. However, once the teams work out these initial interactions and processes, production and efficiency will continue to increase. The Company worked hard to limit any demobilization of a contracted resource once they had been onboarded to avoid the inherent slow-down of the integration process.

- Substation work is often complex and comprehensive. It has been the Company's experience with previous, non-GMP substation projects, that during the execution of the initially scheduled project, it is possible to identify unforeseen conditions and/or additional conditions that are appropriate and prudent to repair/replace in concurrence with the original work scope. This approach is logical, common in the industry and cost-efficient. The Company is following this same operational approach for any substation work being constructed under the GMP, while ensuring that all costs associated with any work completed that is not due to or related to GMP investments are segregated from the GMP and accounted for separately. The Company has successfully balanced funding and completing all prudent ancillary substation work and maintaining a strict segregation between GMP and non-GMP costs. For 2019, the Company continued to leverage economies of scale by concurrently completing multiple projects within the same substation. After reviewing several completed project locations (substations) the team determined that these efficiencies resulted in a unit-cost savings of 30-40 percent, as compared to performing this work independently and stand-alone.
- Since all GMP-related substation work is incremental to the Company's base capital business, and because much of the substation work requires the use of highly skilled or niche-skilled resources, securing external labor with the requisite skills and experience to assist with this aggressive program has posed challenging, though not insurmountable. The Company has continued to work with the appropriate vendors, as far ahead of construction as possible, utilizing the 2018-2020 GMP set of projects to help secure these contracts, when/where needed.
- For the 2020 GMP plan year and beyond, the Company will explore the possibility of utilizing third-party packager/kitting firms to assist with aggregating and coordinating materials (often from 3rd party vendors), so that the correct material is delivered when needed. Investments such as the Microprocessor Relay and 4kV Circuit Breaker programs do not require overly complex materials. However, there are many common parts and pieces that need to be coordinated to ensure they're on site at the correct times. Additionally, the volume of these projects is not insignificant. Since the procurement process requires multiple Company departments to be involved in the specification, procurement ordering, delivery and receipt of material, the advantage of using a firm such as a 3rd party packager is the ability to free up these internal Company resources to focus on more pressing and complex issues as opposed to these fairly standard and recurring projects.

- After reviewing the 2018 Appendix 1 data submitted on January 31, 2020 that supplemented the 2018 Annual Grid Modernization Report, the Company determined that there was an error in unit data, identified in column “G” of tab “5.a Spending – 2018 Report” within the 2018 Annual Report Appendix 1 spreadsheet. The data inadvertently omitted three relay units that were carried over from 2018 to 2019. The Company made this correction to tab “5.a Spending – 2018 Report” within the 2019 Grid Modernization Annual Report’s Appendix 1. This change was also noted at the bottom of the spreadsheet. This oversight was only contained in the January 31, 2020 Appendix 1 supplemental filing. The 2018 Grid Modernization Annual Report, filed May 1, 2019, is accurate, as submitted.

4KV CIRCUIT BREAKER SCADA:

- The 4kV circuit breaker SCADA work is very similar to the Microprocessor Relay program and has similar feedback on the lessons learned.

RECLOSER SCADA:

- This program has been instituted in the Company’s Western Region where the Company identified significant opportunities to enhance SCADA sectionalizing capabilities, particularly on long feeders. The Company is nearing the completion of all possible locations which can accommodate the addition of a communications package or complete recloser replacement (with communications).
- Commissioning resources, due to their specialized skill set, was identified as an area of opportunity by the Company. For 2019, the Company placed emphasis on planning and monitoring of the Commissioning team and developed an aggressive but executable plan to complete the work. Though front-loaded toward the first half of the year, this plan utilized the entirety of 2019 and was socialized further in advance with relevant parties, so that the various Company departments were aware of the larger-than-normal influx of work. This helped with: pre-programming devices in the area work centers; making sure devices were ready to go for physical installation; and allowing for better coordination of commissioning to avoid overly extended workloads. This allowed for a reasonable work curve, opposed to “bow waves” of work.
- In 2018, the Company exhausted the list of locations on its distribution system that have compatible existing equipment, which can be upgraded by adding radio communications to enable SCADA capability. Based on this, the Company modified this GMP program to focus on a “replace, in-place” program where locations utilizing older, oil-filled equipment have the entire recloser replaced with new, SCADA-capable equipment.

- After reviewing the 2018 Appendix 1 data submitted on January 31, 2020 that supplemented the 2018 Annual Grid Modernization Report, the Company determined that there was an error in unit data, identified in column “G” of tab “5.a Spending – 2018 Report” within the 2018 Annual Report Appendix 1 spreadsheet. The data inadvertently omitted three recloser units that were carried over from 2018 to 2019. The Company made this correction to tab “5.a Spending – 2018 Report” within the 2019 Grid Modernization Annual Report’s Appendix 1. This change was also noted at the bottom of the spreadsheet. This oversight was only contained in the January 31, 2020 Appendix 1 supplemental filing. The 2018 Grid Modernization Annual Report, filed May 1, 2019, is accurate, as submitted.

PADMOUNT SWITCH SCADA:

- During 2018, the Company initially had timing challenges with finding the correct combination of device type locations and sufficient communications methods. This placed the program behind schedule.
- As of the submission of the 2018 Annual Grid Modernization Report on May 1, 2019, the Company had validated all the previously selected 2018, 2019 and 2020 locations, designed the projects and was ready to commence construction. However, similar to its experience with the Recloser SCADA program, the Company may exhaust the list of those locations where simply adding a communications package to an existing padmount switch is feasible. If this is the case, the Company will evaluate redeploying funds from an alternative investment category(s), and performing a “replace, in-place” installation of new pad mounted switch gear in areas of high customer impact.
- After reviewing the 2018 Appendix 1 data submitted on January 31, 2020 that supplemented the 2018 Annual Grid Modernization Report, the Company determined that there was an error in unit data, identified in column “G” of tab “5.a Spending – 2018 Report” within the 2018 Annual Report Appendix 1 spreadsheet. The data inadvertently omitted 18 padmount units that were carried over from 2018 to 2019. The Company made this correction to tab “5.a Spending – 2018 Report” within the 2019 Grid Modernization Annual Report’s Appendix 1. This change was also noted at the bottom of the spreadsheet. This oversight was only contained in the January 31, 2020 Appendix 1 supplemental filing. The 2018 Grid Modernization Annual Report, filed May 1, 2019, is accurate, as submitted.

NETWORK PROTECTOR SCADA:

- The most significant lesson learned for this program was that the Company should have segregated the field work, which was presented to the Department on a unit-basis, from the substation work, which comprised the more significant work effort and is not attributable to a “unit.” The completion of the substation

work was required prior to any of the 83 field relay devices being able to be commissioned into the new system. Therefore, even though the Company exceeded the commitment of installation of the relays in 2019, and completed most all of the substation work, it was not able to commission any of the devices and therefore did not categorize the devices as “Grid Mod Qualified.”

- The Company underestimated the material lead-time on communications couplers (that receive information from the devices in the field), which caused the completion of the substation work to be pushed into 2020. This was mainly due to the Company’s substation feeders being fed from reactors, which required a capacitive coupler, instead of the much more common inductive couplers. Therefore, the related equipment from the vendor was not as readily available. The team analyzed multiple paths that may have retained the original unit delivery schedule, but ultimately, none of them provided an increased financial or customer benefit and therefore were abandoned. Work on this project continued directly into 2020 and the long-lead couplers were received in February 2020, after which the team scheduled feeder outages and installed and commissioned all the couplers at the substation reactors. As of April 1, 2020, this project is fully commissioned, online, and has completed its three-year term commitment. Even with the shift of this completion, the project was still completed well before the three-year term-end and significantly underbudget. The budget under-run is primarily due to the Company not having full engineering and design completed during the original filing period. After vendor selection and full design, costs ended up being less than expected.

C. Actual vs. Planned Implementation and Spending

Refer to Tables 3 and 4 below for the Company’s 2019 implementation unit and spending summaries for the Monitoring and Control GMP Investments. Spending was broken down into “Total Capital Spend” and “Plant In-Service.” As indicated in section I. Introduction, Plant In-Service is initiated by a device being “Construction Complete” and therefore cost recoverable.

Table 3: 2019 Implementation Summary

Investment Categories	Preauthorized Device Types	2018 Unit Carry Over (2019)	Plan Units (2019)	Construction Complete Units (2019)	Commissioned Units (2019)	2019 Unit Carry Over (2020)
Monitoring & Control (SCADA)	Microprocessor Relays (SS)	3	100	87	87	16
	4kV Circuit Breaker SCADA (SS)	n/a	21	16	16	5
	Recloser SCADA	3	11	19	19	0
	Padmount Switch SCADA	18	24	41	41	1
	Network Protector SCADA	n/a	50	83	0	50

Table 4: 2019 Implementation Cost Summary

Grid Modernization		2019 Capital Spend			2019 Plant in Service		
		Actual	Budget	Variance	Actual	Budget	Variance
		21,452,238	26,256,330	(4,804,092)	14,262,131	12,783,781	1,478,350
Investment Category	Preauthorized Device Type						
Monitoring & Control (SCADA)	Microprocessor Relay	14,991,129	20,319,438	(5,328,309)	9,693,573	9,051,121	642,452
	4kV Circuit Breaker SCADA	4,085,366	2,413,892	1,671,474	2,650,164	1,750,000	900,164
	Recloser SCADA	888,665	1,024,000	(135,335)	608,248	681,817	(73,569)
	Padmount Switch SCADA	615,476	299,000	316,476	631,169	622,605	8,564
	Network Protector SCADA	871,602	2,200,000	(1,328,398)	678,977	678,238	739
	OMS/AMI Integration	N/A	N/A	N/A	N/A	N/A	N/A

MICROPROCESSOR RELAYS:

The Company's implementation of the microprocessor relays was short of its 100-unit target by 16 units in 2019. The unit count plan for 2019 projected the Company to achieve 100 commissioned units. It became apparent during the resource planning stages of these projects earlier in 2019 that achieving 100 units in 2019 was going to prove challenging due to the man-power resource limitations and the outage sequencing constraints, at the end of the year due to a high-volume of both GMP and typical Company base commitment work.

Work in 2018 had been concentrated solely in Western Massachusetts. For 2019, work continued in Western Massachusetts, but, for the first time, the Company expanded this program to Eastern Massachusetts. Significant effort was taken to build a team, validate locations, and execute the 2019 plan to install the microprocessors simultaneously at multiple locations. To leverage experience, the Company utilized the same teams that were undertaking the 4kV Circuit Breaker SCADA program. Although the Company fell short of its 2019 goal, this significant coordination and concerted effort represents a level of success at the Company and demonstrates the Company's ability to leverage internal expertise to continue the implementation of the GMP.

Through the development of new project teams, engineering and design of the projects, and limited outage work allowed over the summer months, the outage sequencing associated with these investments resulted in a very busy second half of 2019. Some of the projects ended up on the critical path, with no leeway for schedule changes without affecting the project end-date. A combination of storms for one station and unforeseen conditions at two others ultimately pushed the projects into 2020, despite significant recovery efforts. Some of these efforts included:

- interdepartmental coordination at the senior levels of the organization to ensure timely decisions and real-time updates;
- shifting resources in order to accelerate the schedule, working towards completing two feeder relays per week;
- working portions of the weeks of Thanksgiving and Christmas; and
- increased reporting to all levels to ensure timely information exchange

As of March 31, 2020, all 2019 carry-over relays have been completed and commissioned.

- Similar to 2018, for the Total Capital Spend the unit-costs for this program continued to average higher than budgeted unit costs. Some economies of scale were realized during 2019 when Microprocessor Relay projects were completed in parallel with other projects within the same substation. The Company reviews project costs in real-time and made adjustments/decisions where needed at the project level to analyze and reallocate funds across GMP programs as appropriate. In this case, funds were imported from other under-run (such as OH DA) or modified investments (such as the Miles of Fiber) in order to account for higher budgeted costs. Based on its 2018-2019 experience and projections for 2020, the Company has revised its original budget upward. Originally, the Company expected that the initial program startup costs and compressed-duration contracted work that was observed in 2018 was a portion of the costs of the overrun and that actual unit-costs would come further in alignment with budgeted unit costs. But even after continued operations and a competitive procurement process, that did not prove to be the case. This is principally due to the use of specialty contracted resources and the overtime required to perform this incremental work internally. Based on its experience in both the Eastern and Western regions of the state in 2018 and 2019, the revised term-end cost projections, as they relate to the overall GMP portfolio, provide for increased budgetary and projections accuracy.
- In analyzing the cost increases from budget to actual, the Company has identified several drivers of the increases, as discussed below.
 - a. Each substation addressed in the Microprocessor Relay program had some commonality, but also a level of uniqueness that required various levels of effort, and money, to address. It was the unique nature of the substations, coupled with the corresponding resource/skillset(s), that resulted in the variations in implementing Microprocessor Relays at the substations, including the unit costs.
 - b. Due to the incremental nature of the Grid Mod work, it is often necessary to engage vendor resources to augment the Company's internal staff. Many of these resources have limited availability, such as Lead Commissioning Engineers ("LCEs") and Substation Test Engineers, both of which perform work for many aspects of the Company, not just for the GMP. The Company's solicitations are typically limited to approximately four technically qualified companies. Due to their significant experience, two of the four firms are highly sought after. These resource limitations in the market have led to increased negotiated rates over the last several years. This trend is expected to continue as more and more of the Company's, and the electric distribution sector in general, devices become more complex and interconnected.

4KV CIRCUIT BREAKER SCADA:

- The Company's implementation of the 4kV Circuit Breaker SCADA relays was short of its 21-unit target by 5 units in 2019. The unit count plan for 2019 projected the Company to achieve 21 commissioned units. It became apparent during the engineering stages of these projects earlier in 2019 that achieving 21 units in 2019 was going to prove very challenging due to the need to engineer and design for an entire additional substation which requires hundreds of man-hours worth of work, and which would have significantly overallocated resources. Ultimately, it was not feasible to accomplish this complex and detailed work in 2019 in order to meet the original 21-unit plan and therefore the Company's actual 2019 plan was 18 units.

As with the Microprocessor Relay program, the 4kV Circuit Breaker SCADA program experienced identical challenges. Through the development of new project teams, engineering and design of the projects, and limited outage work allowed over the summer months, the outage sequencing ended up with a very busy last-half of the year. One of these projects ended up on the critical path, again, with no leeway for schedule changes without affecting the project end-date, after a getaway cable fault prevented the substation outage sequence from proceeding on schedule. This was a time-consuming repair and pushed the project into 2020, despite significant recovery efforts, similar to those efforts undertaken in connection with the microprocessor relay investments. As of March 31, 2020, all 2019 carry-over relays have been completed and commissioned.

- Total Capital Spend for this program averaged higher than budgeted unit costs. The Company reviews project costs in real-time and makes adjustments/decision where needed at the project level and analyzes and reallocates funds across GMP programs as appropriate. In this case, funds were imported in order to account for higher budgeted costs. The Company has revised its original budget upward based on the results of 2019 and the projections into 2020. This was done both for the added unit cost, and for the increase in actual units planned (see section H of this document). The increase in unit costs was principally due to the use of specialty contracted resources and the overtime required to perform this incremental work internally. Based on its experience in 2019, the revised term-end cost projections, as they relate to the overall GMP portfolio, provide for increased budgetary and projections accuracy.

RECLOSER SCADA:

- The recloser SCADA program continued to be implemented in a very efficient and cost-effective manner over the course of 2019. The Eversource GMP team is familiar with completing this type of work and was able to leverage existing processes to implement this incremental investment on the Company's system.

Due to its efficient and effective processes and planning, the Company was able to exceed its 2019 goal of 11 units by five units.

- As discussed in the “Lessons Learned” section above, the Company had shifted this program into a ‘replace, in-place’ program as an efficient way to continue to deploy SCADA communications to existing field locations.
- The Total Capital Spend for this program is still below budgeted unit costs, even after modifying the implementation of this GMP program to a “replace, in place.” Based on its experience to date with this GMP program, the Company anticipates that it will continue to remain consistent with or slightly under the budgeted costs.

PADMOUNT SWITCH SCADA:

- The Company’s implementation of the Padmount Switch SCADA program was short of its 24-unit target by one unit in 2019. This was unfortunately due to a work order accounting error which was identified during project reviews as a duplicate entry. This error was identified too late in the year for the Company to be able to install an additional unit to meet the goal. During 2018, the Company experienced challenges in field validating padmount locations to ensure that both the equipment type and communications infrastructure was adequate. Many of these challenges were related to the existing equipment being unable to accept a bolt-on communications package. Although this delay hindered 2018 implementation, the outcome of the extended field validation surveys was that the 2019 list of locations was ultimately confirmed, which positioned the team for a successful 2019 execution. The Company was able to meet its 2019 goal of 24 units. There is the possibility that the Company will exhaust sufficient locations to reach the original 62-unit, three-year goal. This would be similar to the condition experienced in the Recloser SCADA program. Should that situation arise, the Company will look to perform several “replace, in-place” locations of padmounted switch equipment.
- The Total Capital Spend for this program indicates that the average unit costs are slightly higher than budgeted. Based on the Company’s analysis into the cost increases, it determined that the majority of the increase was associated with the time and effort to analyze and validate the chosen locations for these devices, as well as the additional work that was sometimes required to allow the existing device to operate with the installed communications package. Following the completion of the 2019 implementation and the review of costs, an additional increase to the overall budget for the GMP program may be necessary. If additional funds are needed, the Company will reallocate the necessary funds from other GMP programs that are under budget.

NETWORK PROTECTOR SCADA:

- Under the Network Protector SCADA program, which encompassed the integration of the Digital Grid solution, the Company was unable to successfully commission any of its 50-unit target. As discussed above, after final designs were completed, there was a significant portion of the work that was required to be completed within the substation related to the respective network feeders. The timing of the engineering and design of this work, coupled with an unforeseen long lead material item, resulted in the completion of the substation work being rescheduled for 2020, which therefore prevented the commissioning of any field relay devices in 2019.

Although no units were commissioned in 2019, the Company completed the construction of the majority of the entire project, including replacing all 83 relays, which were placed in service in 2019. Despite the fact that these devices could not be remotely viewed or operated in 2019, their implementation did still allow for a Company personnel to locally review and analyze the new relays' functionality via a laptop computer and umbilical cord that connects to the relay. Additionally, the majority of the substation work was completed in 2019, such that the project would be ready to receive the long-lead material (feeder couplers that receive field relay information) in mid Q1 2020, allowing the 11 feeders to be cut-over into the new Digital Grid system. As of March 31, 2020, all 2019 carry-over relays and all 2020 relays have been completed and commissioned.

- The total Capital Spend for this program is significantly below budgeted costs. Digital Grid was the vendor selected for the project as their products are on the Company's Standards. In addition, the Digital Grid system is used in various forms in other parts of the Company's franchise. At the time of the original GMP filing in D.P.U. 15-122, the exact system configuration was not known. However, after final design and the efficiencies in work execution, it was evident that there would be significantly more budget to allocate. The Company will employ the Digital Grid system at additional networks within the Western Massachusetts territory and will re-deploy the remaining portion of the budget to other GMP programs consistent with the Department's order in D.P.U. 15-122

D. Performance on Implementation/Deployment

Refer to Appendix 1 for the year-to-year and overall portfolio implementation/deployment data.

E. Description of Benefits Realized as the Result of Implementation

There are immediate benefits to the Company and ultimately its customers by having visibility and control of additional devices in the field, such as insight into emergent conditions, remote switching and acquisition of load data. Additionally, the increase of the investment types identified

in this section will have an effect on several of metrics identified in section IV and VI of the 2019 Grid Modernization Annual Report and Appendix 1. Refer to “Massachusetts Grid Modernization Program Year 2019 Evaluation – Monitoring and Control” provided by Guidehouse (formerly Navigant) for further analysis.

F. Description of Capability Improvement by Capability/Status Category

METHODOLOGY

Microprocessor Relays: The specific relays selected for this program were based on a list of feeders and their characteristics. One characteristic was an indication if SCADA was available. Selecting non-SCADA feeders was the first pass analysis. Next, substations for which there was major (non-GMP) work scheduled but not anticipated to be completed prior to year 2020 were eliminated from consideration. Next, all substations that utilized overhead reclosers serving as feeder breakers were removed from consideration. Finally, all substations with scheduled retirements were removed from consideration. What followed from this analysis was the list of substations and feeders that were good candidates for the microprocessor relay upgrades.

SCADA Switches (Recloser, Padmount, Network): Prioritization for reclosers, secondary network⁵ protectors and padmount switches was based on the same zone size and reliability ranking methodology as described in the Distribution Automation section of the 2018 Grid Modernization Annual Report (Section III.A.2). These criteria included: number of customers impacted by the device (higher); and the circuit reliability (lower). Padmount switches had an additional criterion: motorized switches were prioritized and were a requirement for investment.

EXPECTED CAPABILITY IMPROVEMENT:

Enabling Monitoring and Control (SCADA) on distribution system equipment provides Eversource with accurate minimum load data for circuit segments. This data is required for Eversource to perform load flow analysis in support of Demand Response (“DR”) integration and automated feeder reconfigurations within a centralized, real-time logic system like a Distribution Management System (“DMS”). Additionally, and even prior to full circuit automation and integration with the GMP-driven IT systems, these new/upgraded devices will provide an enhanced level of visibility and control to the system operators.

Enabling monitoring and control of motor-operated padmount switches will have significant reliability benefits by enabling a scheme in which switches will indicate the fault location, enabling dispatch to remotely isolate the faulted cable section and restore power to all customers on the loop.

⁵ The 2018 GMP investment plan did not include “Network SCADA” switches.

G. Key Milestones

The Company maintains an execution plan and schedule of all its GMP investment categories. This schedule, which encompasses all three years of the GMP, was developed and is administered with the requisite flexibility that enables the Company to adjust its investment schedule and timing over the course of the GMP in the event that external factors, such as third-party resource availability, material availability, outage authorization, or unforeseen conditions (substations) impact the GMP and the relevant investment schedule. However, a sampling of the key 2019 milestones follows:

- Accelerated deployment of Recloser SCADA investment.
- Selection and engineering for all remaining Microprocessor Relay and 4kV SCADA investments complete.
- Full design of Network Protector SCADA investment and accelerated deployment of field relays.

H. Updated Projections for Remainder of the Three-Year Term

On August 15, 2018, the Company submitted its Baseline and Targets Filing, which included the 2018-2020 GMP base line (Baseline and Targets Filing at 15, Table 2.4.7). *Table 5: Three Year Term Projections* provided below provides the projections for 2020 for all remaining investment categories. It should be noted that the Company decreased its term projection for Microprocessor Relays and increased its projection for 4kV Circuit Breaker SCADA. This results in a net reduction between the two investment types of six units. The Company will work to identify six additional relays to include in the 2020 GMP investment year to come back in-line with baseline goals. Additionally, throughout 2020, the Company will continue its analysis on the GMP portfolio and will make the necessary adjustments to effectively utilize the total \$133 million authorized 2018-2020 GMP budget.

Table 5: Three-Year Term Projections

Investment Categories	Preauthorized Device Types	Total (3-Year Plan)	2020 Plan
Monitoring & Control (SCADA)	Microprocessor Relay	193	96
	4kV Circuit Breaker SCADA	55	39
	Recloser SCADA	37	3
	Padmount Switch SCADA	62	18
	Network Protector SCADA	83	83

III.A.2. Distribution Automation

(OH DA, OH DA w/Ties, 4kV Oil Switch, 4kV AR Loop)

A. Description of Work Completed

Overhead Distribution Automation (“OH DA”): Under the 2019 GMP, the Company continued to install new OH Reclosers (typically Nova Form 6) with full SCADA capability to coordinate with the existing devices/equipment in the field and further reduce the number of customers affected during an outage. This was a very successful program and has aided in reducing the average customer zone size.

Overhead Distribution Automation with Ties (“OH DA w/Ties”): Under the 2019 GMP, the Company identified areas and installed recloser technology in order to tie circuits together. The majority of these locations were areas originally consisting of manual tie points, which were automated into existing loop schemes in addition to being remotely viewed and operated via the System Operations Center.

4kV Oil Switches: Under the 2019 GMP, the Company identified locations and replaced existing oil-filled underground switches with new G&W Vacuum Fault Interrupter (“VFI”) switches with full SCADA capability. Under the 2018-2020 GMP, switches are being installed in strategic locations to support the 4kV Auto-Restoration (“AR”) Loop” program when it comes online.

4kV AR Loops: Under the 2019 GMP, the Company made a decision to move from the purely “4kV VFI Retrofit” investment and into a system that will allow for a decentralized automated loop restoration solution. This solution allows for a controller to be placed at the substation to have peer-to-peer communication with all of the other field switching devices on a particular circuit (and adjacent circuit). In the event of a cable failure, the circuit(s) will be able to quickly and autonomously reconfigure themselves, thereby restoring the maximum number of customers in the shortest time. The Company selected a substation, with its respective circuits, to develop into an automated loop system utilizing a Schweitzer Engineering Laboratories (“SEL”) application and equipment. This included installing the communications and distribution automation controller (“DAC”) infrastructure in the substation and upgrading field devices, which were overlapped with “4kV Oil Switch” replacements, to ensure remote operability. This GMP investment represents a significant step forward into an area of 4kV automation that the Company has not previously included on its distribution system.

B. Lessons-Learned/Challenges and Successes

OH DA:

- The OH DA program contains typical device installation that is consistent with the Company’s experience in installing devices on its system. Given that the Company had processes and procedures in place to address these types of

installation, it was efficient in leveraging those processes to set up and undertake these incremental GMP investments.

- The Company identified commissioning resources as an area of opportunity going forward. The emphasis that that Company placed on planning and monitoring of the Commissioning team for 2019 enabled it to develop and implement an achievable yet aggressive plan. Continuous communication and situational awareness was the key factor in achieving the Company's objectives under the OH DA program.
- A grouping of 20 reclosers in the Company's South region was installed in order to cutover these circuits from an older network into a radial/loop configuration. The Company had expected to install these units and allow them to coordinate without further work. However, after implementation, it was determined that the local substations also required upgraded protection and control settings to ensure the reliable and safe operation of the new devices. The time frame of this development occurred too late in 2019 to be able to design and install the required settings at the substations. Therefore, the Company took these 20 new reclosers offline until all remaining substation settings work could be completed.
- After reviewing the 2018 Appendix 1 data submitted on January 31, 2020 that supplemented the 2018 Annual Grid Modernization Report, the Company discovered an error discovered in the unit data, identified in column "G" of tab "5.a Spending – 2018 Report" within the 2018 Appendix 1 spreadsheet. The data inadvertently omitted four recloser units that were carried over from 2018 to 2019. The Company has made a correction to tab "5.a Spending – 2018 Report" within the 2019 Annual Grid Modernization Report's Appendix 1. This change was also noted at the bottom of the relevant tab of the Appendix 1 spreadsheet. This oversight was only contained in the Appendix 1 supplemental report. The 2018 Grid Modernization Annual Report, filed May 1, 2019, is accurate, as submitted.

OH DA w/Ties:

- This Company's experience with this program in 2019 was very similar to its experience with the OH DA program discussed above and the Recloser SCADA program discussed in section III.A.1.
- One of the lessons learned from 2018 was the need to closely coordinate OH DA, OH DA with Ties and Recloser SCADA work undertaken by the Company's Protection and Control engineering teams. Such close coordination is necessary because any changes in automated, switchable devices in a circuit will affect the coordination aspects for all remaining devices on that circuit. Therefore, if each of the aforementioned investment types had been completed independently of each other, there would have been constant and inefficient engineering rework to achieve the necessary coordination between these

investments. The wholistic approach that the Company implemented and the rigor that was placed on program oversight and communication prevented this potential inefficiency.

4kV AR Loop:

- As previously discussed, the 4kV automation had never been implemented by the Company. As with any new technology implementation there was a learning curve. Specific to this investment was the challenge of finding the correct blend of communications infrastructure, compatible equipment, and relevant customer counts, so as to have a meaningful reliability improvement for as many customers as possible. This was further compounded by the need to iterate the loop system design to be able to determine the correct blend of infrastructure and equipment. The search to find adequate substations that did not require substantial upgrades to account for communications infrastructure or compatible equipment resulted in the design associated with this program being extended well into 2019. This schedule extension placed significant pressure on the Company's commissioning teams because their established execution plan was shifted to overlap with other work. Now that the Company has a design of the loop system as a template, the most significant lessons learned were the need to have a detailed survey of prospective substations. This effort is complex and time consuming and will be one of the challenges the Company faces in 2020.

4kV OIL SWITCHES:

- The replacement of the underground oil switches is a complex process. The challenge is due in part to the high customer density and the electrical outage boundaries that need to be established in order to perform the work. Though 2018 had a truncated execution timetable for these investments, the volume of these replacements in 2019 was significantly higher. The teams responsible for these replacements continued to:
 - closely coordinate, so that the work could be planned and executed as efficiently as possible to limit the extent and duration of the planned outage. The teams accomplished this balance by planning as much maintenance and/or non-GMP work as possible to be undertaken during the outage. The teams ensured that GMP work was maintained separately (administrative/financially) from the other work. The specific GMP work and cost tracking processes developed to implement the GMP consistent with the Department's directives were followed in order to maintain this strict separation.
 - in order to avoid having to schedule a second planned outage, the teams identified all of the GMP switch locations in advance so that, were an emergency outage to occur that happened to overlap the GMP location, the installation team could work to install the GMP device at the same time as

undertaking the work to address the initial emergency outage. The decision to complete GMP work in this manner was and will continue to be evaluated on a case-by-case basis to determine the merits of extending the existing outage to install the GMP device versus requiring a second, separate outage to install the device.

- when an emergency outage occurred in the 4kV underground system, if an oil switch was identified as being within the electrical outage boundaries and could be efficiently replaced without extending the existing outage, crews would react quickly to replace the oil switch. The crew’s supervisor and management teams carefully review field work charging to ensure that costs were maintained separately from the outage event, and vice versa, that outage event costs were not included in the oil switch replacement. This was a very effective process and prevented customers from experiencing a future, planned outage, in order to remove the oil switch.
- After reviewing the 2018 Appendix 1 data submitted on January 31, 2020 that supplemented the 2018 Annual Grid Modernization Report, the Company discovered an error discovered in the unit data, identified in column “G” of tab “5.a Spending – 2018 Report” within the 2018 Appendix 1 spreadsheet. The data inadvertently omitted ten oil switch units that were carried over from 2018 to 2019. The Company has made a correction to tab “5.a Spending – 2018 Report” within the 2019 Annual Grid Modernization Report’s Appendix 1. This change was also noted at the bottom of the relevant tab of the Appendix 1 spreadsheet. This oversight was only contained in the Appendix 1 supplemental report. The 2018 Grid Modernization Annual Report, filed May 1, 2019, is accurate, as submitted.

C. Actual vs. Planned Implementation and Spending

Tables 6 and 7 below show the implementation unit and spending summaries for the Distribution Automation work undertaken in 2019. Spending was broken down into “Total Capital Spend” and “Plant In-Service.” As indicated in section I. Introduction, Plant In-Service is triggered by a device being “Construction Complete” and therefore cost recoverable.

Table 6: 2019 Implementation Summary

Investment Categories	Preauthorized Device Types	2018 Unit Carry Over (2019)	Plan Units (2019)	Construction Complete Units (2019)	Commissioned Units (2019)	2019 Unit Carry Over (2020)
Distribution Automation	Overhead DA	4	100	165	148	0
	Overhead DA w/Ties	n/a	23	45	45	0
	4kV Oil Switch Replacement	10	57	89	89	0
	4kV AR Loops	n/a	16	17	17	0

Table 7: 2019 Implementation Cost Summary

Grid Modernization		2019 Capital Spend			2019 Plant in Service		
		Actual	Budget	Variance	Actual	Budget	Variance
		29,640,184	27,192,000	2,448,184	27,615,980	23,002,374	4,613,606
Investment Category	Preauthorized Device Type						
Distribution Automation	OH DA w/o Ties	12,069,703	13,167,000	(1,097,297)	12,532,547	9,982,818	2,549,729
	OH DA w/Ties	2,797,738	3,135,000	(337,262)	2,585,627	2,494,402	91,225
	4kV Oil Switch Replacement	13,881,098	10,010,000	3,871,098	12,280,567	10,525,154	1,755,413
	4kV AR Loops	891,645	880,000	11,645	217,240	-	217,240

OH DA:

- The Company exceeded the 100-unit target for 2019 by 44 units. The Company also installed and commissioned an additional 20 units. This work was completed to increase reliability in a portion of the distribution system by cutting over from an older network system. However, without performing additional work to change the protection and control settings for the substations feeding these areas, potential protection and control coordination issues were possible for the newly installed reclosers. Because of this potential for coordination issues, and the fact that the substation work could not be completed in 2019, the newly installed and commissioned recloser devices were taken off-line. The Company did not include these devices as “Grid Mod Qualified,” but they are effectively built and ready to be placed back online after additional work is completed in the first part of 2020.
- The Total Capital Spend for this program is below budgeted unit costs. Because the Company essentially completed all remaining units for the three-year term in 2019, there will be a significant underrun in this investment budget, which will be redeployed to other GMP investment areas. Plant In-Service is slightly higher than capital spend due to several units from 2018 not being categorized as in-service units in the early part of 2019. The Company’s 2018 GMP Annual Report provides additional details.

OH DA w/Ties:

- The Company exceeded the 23-unit target for 2019 by 22 units, which is seven units above the three-year goal. Installation of the 45 units resulted in 18 circuit ties. These ties were generally simple circuit ties in which a manual switch was replaced with a tie-recloser. In some instances, additional reclosers were added on either side of the tie to either reduce customer counts between load or to facilitate recloser coordination.

The Total Capital Spend for this program is below budgeted unit costs, even while completing installations above the three-year term goal. Because the Company has completed all remaining units for the three-year term in 2019, there will be a significant underrun in this investment budget, which may be utilized for additional ties or will be redeployed to other investment areas.

4kV AR Loop:

- The Company completed its 2019 goal by achieving remote visibility and control of 4kV underground field devices, including a tie switch. However, because the program was changed from an exclusively VFI retrofit program to an automated restoration loop program, the use of “units” in the sense of field units was no longer appropriate. A more appropriate unit of measure is “loops created.” This is primarily due to the diversity of work required in the field to obtain remote visibility and control. In some instances, a communications package was the only requirement, while in other instances an entire switch replacement was necessary. Given this, the Company has worked to dovetail the “4kV Oil Switch” replacement program into the loops, where possible.

As discussed in section A, above, the Company has selected an SEL system to administer the loop logic. After much iteration, a final design was established in 2019 and, in addition to the completed field devices, the Company completed the installation of the SEL distribution automation controller cabinet and established radio and cellular communication nodes so that field devices could communicate to the SEL DAC.

Time in 2019 expired before the final communications commissioning could occur between the SEL DAC and the Company’s front-end SCADA processors. Consequently, this also meant that the site acceptance (“SAT”) testing and final system configuration could not occur in 2019.

As of March 31, 2020, the communications path between the SEL DAC and the Company’s SCADA system has been completed. The SAT is scheduled to occur in early Q2 of 2020. This timeframe was necessary due to the Company cutting over its existing SCADA platform to a new system in mid-late Q1 2020. The Company expects to have the auto-restoration loops functional by mid-Q2 2020.

- The Total Capital Spend for this program is on schedule but will not reflect originally expected deployment, due to the change in program function. The Company is planning for additional stations to develop 4kV AR loops but due to the challenges discussed above, it is possible that the entire budget will not be expended. The Company will continue to evaluate the progress of the program and expend or redeploy funds to other investments, as appropriate.

4kV OIL SWITCHES:

- The Company exceeded its 57-unit goal by 22 units. This was a significant undertaking and the lessons learned from 2018 were fully employed in order to make the 2019 execution successful.
- The Total Capital Spend for this program is higher than originally budgeted because the Company executed a stretch goal plan and commissioned many more switches than originally projected. As discussed in various areas of this Report, the ability to effectively coordinate across various Company departments was instrumental in

executing an aggressive GMP. This is particularly true with the execution complexity of working within the 4kV underground system. To aid this process, the Company provided specific points of contact in the form of a task-force for execution. Once the 2019 unit goal was met, the Company maintained the execution momentum and continued to install and commission devices. Average actual unit costs are in-line with budgeted unit costs. However, individual locations vary in their degree of complexity and therefore costs from location, to location, can also vary.

D. Performance on Implementation/Deployment

Refer to Appendix 1 for the year to year and overall portfolio implementation/deployment data.
Description of Benefits Realized as the Result of Implementation

There are immediate benefits to the Company of having visibility and control of additional devices in the field, such as insight into emergent conditions, remote switching and acquisition of load data. Additionally, the increase of the investment types identified in this section will have an effect on several of metrics identified in section IV and VI of this 2019 Grid Modernization Annual Report and Appendix 1. Refer to “Massachusetts Grid Modernization Program Year 2019 Evaluation Report – Advanced Distribution Automation” provided by Guidehouse for further analysis.

E. Description of Capability Improvement by Capability/Status Category

METHODOLOGY:

To prioritize circuit investment, each circuit was analyzed to identify existing isolation segments or zones. Zone sizes were determined by the number of customers impacted in each zone. Zones with customers greater than the 500 for Eversource West (former WMECO service territory) and 1,000 customers for Eversource East (NSTAR Electric service territory) were prioritized. Circuit reliability based on historical System Average Interruption Duration Index (“SAIDI”) and System Average Interruption Frequency Index (“SAIFI”) from 2015, 2016 and 2017 was also considered when selecting circuits for investment. The poorer the reliability of the circuit, the higher priority the circuit and its associated zones received. A weight of 60 percent was applied to the zone size and 40 percent for their reliability score and then normalized on a 1 to 100 scale, with 100 being the highest priority for investment. Zones were ranked separately between Eversource East and West. For feeders that lack alternate supply sources, infrastructure will be built where cost-effective to tie radial circuits to deliver the benefits of automation. Existing circuit ties will be bolstered to increase their back-up capability where cost-effective.

The Company selected OH DA with Circuit Tie locations using a list of radial zones with existing manual three phase tie equipment installed. Circuit reliability performance and number of customers within the zone were then used as factors to prioritize each zone for the addition of DSCADA enabled, automatic sectionalizing equipment. Radial zones without a manual alternate source were not considered as viable options for this project.

In siting the investments for automating and upgrading the existing 4kV switching, sectionalization and SCADA infrastructure, the Company focused on the Greater Boston and Cambridge areas. The current, existing 4 kV sectionalization, which is a critical component of the system serving high-density residential and commercial areas, was installed in the period of 1920-1940, making it the least modernized portion of the Company's distribution system. The investment consists of replacing existing switches with the latest technology and SCADA, so these devices have the same functionality as their overhead counterparts.

GMP investments in 4kV switches were prioritized using the same zone size and reliability ranking methodology as described above for the overhead circuit.

The selection criteria for the 4kV AR Loop program was based on the related substation having a long-range plan of staying at the 4kV operating voltage in addition to having sufficient space for the new DAC and telecommunications equipment and compatible RTU's/RTAC's and relays. In addition to the substation criteria, the team looked for areas: 1) with a high density of exiting field switches that could be used as-is, replaced, or upgraded; 2) where there are underground switches that are difficult to access (since the AR Loops will help prevent manual entries); and 3) with high customer impact such as large customer concentrations or important infrastructure.

EXPECTED CAPABILITY IMPROVEMENT:

DA technology will allow the grid to sense the existence of a fault, automatically isolate it to the smallest possible segment and then restore service to all customers outside the faulted zone with supply from alternate sources. By decreasing the number of customers in each segment between sectionalizing automated devices, the Company can reduce the impact of outages. With this added sectionalization and tie capability, the grid will dramatically increase its ability to reconfigure itself based on systems conditions. In the case of outages during major events, e.g., storms, these DA investments will reduce the duration and extent of the storm events and can result in meaningful benefit to customers.

In addition to these benefits, the automated devices in the field will reduce the amount of day- to-day manual switching operations which occur as a normal part of maintaining the electric system and adding new customers. From a system planning perspective, the enhanced flexibility to shift load based on prevailing conditions has the potential to defer capital upgrades.

Upgrading existing 4kV switches with automation technology will bring the benefits of DA to the Greater Boston and Cambridge areas, as described above. Automated feeder reconfiguration will work by automating the midpoint and tie switches on a circuit such that the midpoint will open for a fault between it and the station breaker allowing the tie to close in and automatically restore the unaffected back half of the circuit. The midpoint switch will operate like a conventional VFI and open for faults beyond it, so the front half of the circuit is unaffected. The Company anticipates that this added automation will reduce the impact of outages to the customers on circuits where it is deployed.

F. Key Milestones:

The Company maintains an execution plan and schedule of all its GMP investment categories. This schedule, which encompasses all three years of the GMP, was developed and is administered with the requisite flexibility that enables the Company to adjust its investment schedule and timing over the course of the GMP in the event that external factors, such as third-party resource availability, commissioning resources, and material availability. However, a sampling of the key milestones from 2019 follows:

- Development and finalization of engineering and design for the first-ever 4kV AR Loop on the Company's system.
- Completed the three-year goal for the OH DA w/Ties investment type, ahead of schedule.
- Completed 44 more reclosers than planned for 2019 and essentially completed the three-year goal for the OH DA, ahead of schedule.
- Completed 22 more 4kV oil switch replacements than planned for 2019.

G. Updated projections for remainder of the three-year term

On August 15, 2018, the Company submitted its Baseline and Targets Filing, which included the 2018-2020 GMP baseline (Baseline and Targets Filing at 15, Table 2.4.7). *Table 8: Three Year Term Projections* provides the projections for 2020 for all remaining investment categories. Because of the efficiencies of the OH DA and OH DA w/Ties investment programs, and in addition to redeploying funds, the Company added an additional 24 units and eight units, respectively, above the three-year term goal for completion in 2020. Additionally, throughout 2020, the Company will continue its analysis on the GMP portfolio and will make the necessary adjustments to effectively utilize the total \$133 million authorized 2018-2020 GMP budget.

Table 8: Three-Year Term Projections

Investment Categories	Preauthorized Device Types	Total (3-Year Plan)	2020 Plan
Distribution Automation	OH DA	220	47
	OH DA w/Ties	45	0
	4kV Oil Switch Replacement	105	16
	4kV AR Loop	78	61

III.A.3. Volt-Var Optimization

(Regulators, Capacitors, Line Sensors, LTC's, IT)

A. Description of Work Completed

REGULATORS: Under the 2019 GMP, the Company continued to install voltage regulators on select feeders from select substations to support the Volt-Var Optimization (“VVO”) program. The regulators are generally similar to those the Company typically installs on its system, with the exception being that communications equipment is added to the control in order to enable remote control and monitoring by system operators and the central VVO software.

CAPACITORS: Under the 2019 GMP, the Company installed capacitor banks on select feeders from select substations to support the VVO program. The capacitor banks are generally similar to those the Company typically installs on its system, with the exception being that communications equipment is added to the control in order to enable remote control and monitoring by system operators and the central VVO software.

LINE SENSORS: Under the 2019 GMP, the Company installed line sensors on select feeders from select substations to support the VVO program. The Company installed two types of sensors: 1) Aclara feeder-head monitoring sensor, which is currently used by the Company to measure current and voltage across its distribution system; and 2) a Bitronics end-of-line/grid-edge sensor, which is new to the Eversource system. This sensor is a unique solution that measures current and voltage at the grid edge using its own power supply as opposed to the power harvesting method used by the Aclara sensor. These line sensors enable remote monitoring of select data, by the central VVO software.

LOAD TAP CHANGERS: Under the 2019 GMP, the Company installed new controls on substation transformer load tap changers (“LTCs”) at select substations. These devices enable direct communication from the VVO system. The LTCs will automatically adjust feeder voltage based on local measurement and will be optimized by the central VVO software located in the system operations center (“SOC”).

VVO IT: The Company has completed procurement and installation of the VVO software and hardware. The software component includes Eaton’s Yukon Integrated Volt-Var Control (“IVVC”) program paired with Eaton’s Visual T&D (“V-T&D”) program. IVVC is the VVO control algorithm, while V-T&D provides the visual system one-line overlay through which the system operators will control and monitor the VVO deployment. In order to support efficient and secure implementation, the hardware was configured in three separate components (development, pre-production and production).

B. Lessons-Learned/Challenges and Successes

LTCs: The lessons learned with the LTC program were similar to that of the microprocessor relay program, specifically in requiring close coordination between Company departments undertaking

these GMP investments. Please see Section III.B. for further discussion around the lessons learned.

- The Company took the lessons learned from the 2018 GMP investment year and applied them to the remaining units in 2019. The Company focused specifically on ensuring that it had sufficient time to plan and allocate the correct resources. This program was successful in 2019 and completed all of the three-year term goals, ahead of schedule.

REGULATORS:

- Since the VVO program is a new initiative for the Company, it took additional engineering time to locate and design the specific field components. The Company completed the engineering for all regulator locations in late 2018. For all but the largest-sized regulators, installations were quick and efficient. However, for the larger 548A platform regulators, the Company experienced two challenges. First, due to the physical size of these devices, any new locations were required to be sited through the respective town's planning department, including public hearing. For many locations, this process was conducted on anormal schedule, but in several locations, the planning and permitting process was very lengthy. In several instances, the process is still on-going as of March 31, 2020. Second, prior to construction, the Company identified the need to revisit the design standard for large, platform-mounted voltage regulators to increase resiliency. As a part of this process, the Company performed a full review of the installation process, which caused delay. As of March 31, 2020, the design standard has been published and the Company is moving forward to complete construction for the remaining GMP voltage regulators based on new requirements. The Company will endeavor, in the future, to utilize different equipment/technology that will enable the regulator function but at a significantly smaller and less obtrusive size.
- As a part of the quality assurance review process, in a limited number of circumstances, the Company identified factory-caused communication and wiring discrepancies that needed to be addressed prior to commissioning into the central VVO software. This is often the consequence of utilizing a device new to the Company, and each took time to review and correct.
- After reviewing the 2018 Appendix 1 data submitted on January 31, 2020 that supplemented the 2018 Annual Grid Modernization Report, the Company discovered an error discovered in the unit data, identified in column "G" of tab "5.a Spending – 2018 Report" within the 2018 Appendix 1 spreadsheet. The data inadvertently omitted 15 regulator units that were carried over from 2018 to 2019. The Company has made a correction to tab "5.a Spending – 2018 Report" within the 2019 Annual Grid Modernization Report's Appendix 1. This change was also noted at the bottom of the relevant tab of the Appendix 1 spreadsheet. This oversight was only contained in the Appendix 1 supplemental report. The 2018 Grid Modernization Annual Report, filed May 1, 2019, is accurate, as submitted.

CAPACITORS:

- The capacitor banks were a relatively straightforward piece of equipment to install and there were limited challenges except, as with the regulators, when field commissioning several devices. As with the regulators, the Company discovered several factory-caused communication and wiring discrepancies when field testing the devices. This is often the consequence of utilizing a new system/device, and each took time to review and correct.

LINE SENSORS:

- The selection of the feeder-head monitoring sensor was straightforward, and the Company's process for procurement, installation and commissioning of the devices was performed very efficiently.
- The design, selection and procurement of the end-of-line/grid-edge sensors was challenging. This was primarily due to the lack of industry standardization on this nascent technology that the Company could utilize to guide the selection process. As a result, the procurement process was iterative and time consuming. However, even with the unforeseen delays, the installation of the end-of-line/grid-edge sensors was straightforward and the work was completed on schedule within the 2019 GMP plan year.

VVO IT

- During the procurement process, the project team found the live demonstrations and reference calls to be quite valuable. The team held detailed reference calls with other utility customers that had procured similar IT platforms and implemented VVO pilots and was able to ask questions about their experience and lessons-learned from their respective VVO pilots and deployments. – The Eversource team incorporated that insight into its deployment strategy, both for the field devices and in the contract for the VVO software package.
- During the IT system deployment, the project team faced challenges in implementing the VVO system architecture. One challenge involved having to provide access to the engineering and analytical teams outside of the control room while still meeting the stringent IT security requirements that apply to electric operations infrastructure. This necessitated a significant collaboration between multiple Company departments and a series of architectural modifications which resulted in a creative solution that successfully balanced the competing requirements.

C. Actual vs. Planned Implementation and Spending

Refer to Tables 9 and 10 below for the Company's 2019 implementation unit and spending summaries for the VVO GMP investments. Spending was broken down into "Total Capital Spend"

and “Plant In-Service.” As indicated in the Introduction of the 2019 GMP Annual Report, Plant In-Service is triggered by a device being “Construction Complete” and therefore cost recoverable.

Table 9: 2019 Implementation Summary

Investment Categories	Preauthorized Device Types	2018 Unit Carry Over (2019)	Plan Units (2019)	Construction Complete Units (2019)	Commissioned Units (2019)	2019 Unit Carry Over (2020)
Volt-Var Optimization	VVO - Regulators	15	80	69	69	26
	VVO - Capacitor Banks	n/a	76	71	71	3
	VVO - LTC Controls	0	6	4	4	0
	VVO - Line Sensors	n/a	125	189	189	0
	VVO - IT Work	n/a	n/a	n/a	n/a	n/a

Table 10: 2019 Implementation Cost Summary

Grid Modernization		2019 Capital Spend			2019 Plant in Service		
		Actual	Budget	Variance	Actual	Budget	Variance
		7,807,523	11,252,834	(3,445,311)	6,394,176	5,691,896	702,280
Investment Category	Preauthorized Device Type						
Volt-Var Optimization	VVO - Regulators	5,602,795	5,223,000	379,795	5,191,554	4,494,151	697,403
	VVO - Capacitor Banks	-	-	-	-	-	-
	VVO - LTC Controls	1,044,867	882,804	162,063	1,202,622	1,197,745	4,877
	VVO - Line Sensors	-	-	-	-	-	-
	VVO - IT Work	1,159,861	5,147,030	(3,987,169)	-	-	-

REGULATORS:

- Although it completed 69 voltage regulators in 2019, the Company’s implementation of the VVO regulators was short of its 95 unit target by 26 units (nine locations) in 2019. Note that the Company treated each individual regulator as a unit. In some instances, a location would have one unit (for single phase), and in other instances a location may have three units (for three-phase). Engineering and design were completed in 2018 for the VVO regulators.

During the engineering process, the Company determined the three-year total number of voltage regulators needed to achieve full VVO functionality on the program feeders is 96 units, a decrease relative to the original estimate of 105 units. As noted above, issues with permitting and a delay due to updated platform voltage regulator design standards prevented the Company from achieving its target for 2019. As of March 31, 2020, no additional units have been installed relative to the end of 2019.

- The Total Capital Spend for this investment is at budgeted unit costs. However, due to additional work required to install the remaining larger 548A platform regulators, the Company expects to see the average unit installation costs increase for the remaining units to be commissioned in 2020.

CAPACITORS:

- Relative to its goal of installing 76 units, the Company installed 71 units in 2019. As a result, the Company was short of its 76 unit target by five units in 2019. Two

of the five locations were constructed in the field but were not commissioned due to damaged parts that needed to be replaced by the vendor. One location was not completed due to an unexpected and lengthy permitting process with the local municipality. Following detailed engineering, the Company determined that the two remaining units are not necessary to achieve full VVO functionality on the program feeders.

- The Total Capital Spend for this investment is at budgeted unit costs.

LINE SENSORS:

- The Company exceeded its 125-unit target by 64 units in 2019. Completion of the engineering for the VVO line sensors went generally as expected for feeder-head sensors but was a very iterative process for the end-of-line/grid-edge sensors, as was discussed earlier in this section. Engineering and design work were completed in Q2 2019. Based on this engineering and design work, the Company determined that additional line sensors would be required to provide telemetry for the VVO software to optimize voltage on the program feeders. As a result, the Company adjusted the line sensor quantity to 189 units, an increase relative to the original estimate of 140 units. The Company treated each individual sensor as a unit, with some locations having one unit for single phase and other locations having three units for three-phase. The line sensor work is completed for the three-year term.
- In aggregate, the total capital spend for this investment is slightly higher than budgeted due to the increased number of installed line sensors. On average, line sensor unit costs were on budget. The 78 Aclara line sensors were installed at lower than expected unit cost. Due to the complex design requirements to ensure adequate power supply, the 111 end-of-line sensors were installed at a higher than expected unit cost. As a part of the process of designing the end-of-line sensor solution, the Company identified opportunities to lower cost by avoiding low-value features such as battery back-up. In an effort to lower total cost, the Company limited the deployment of end-of-line sensors and used Aclara line sensors whenever possible. Any budget overrun here will be supported via underruns in other investment categories.

LOAD TAP CHANGERS:

- The Company installed four LTC controls in 2019, two fewer than target. Due to the final engineering design for the VVO system, the Company reduced its three-year target from 10 LTC controls to 8 units. As a result, only four LTC controls were required in 2019 to complete the LTC program for the three-year term. As was the case with the microprocessor relays, the Company leveraged the lessons learned from 2018 and capitalized on a longer planning process in order to successfully implement these GMP investments.

- The Total Capital Spend for this investment indicates a significantly higher than budgeted unit costs. As the year progressed, the Company's team carefully monitored costs and made the decision to move forward with this investment due to its interrelated nature with the rest of the VVO devices. Originally, it was expected that the actual unit-costs would come further in alignment with budgeted unit costs, but that did not prove to be the case. The primary drivers of the unit costs overruns were the need to perform some work with internal resources on overtime and the need for higher cost specialized external contractors. To address the budget overruns, funds were allocated from other underrun or modified investment budgets in order to account for higher budgeted costs.

VVO - IT

- Company has completed procurement and installation of the VVO software and hardware components (described above) in three physical environments (Development, Pre-Production, and Production). The completed IT work also includes system configuration, database builds, and testing. The testing is currently ongoing with completion and go-live scheduled for end of Q1 2020.
- As discussed in the 2018 Grid Mod Annual Report, the Company did expect to have the VVO IT system completed and commissioned in 2019. However, consistent with the implementation of new technologies, challenges were experienced along the way, which extended the go-live date into Q1 2020, as described above.
- The Company is pressing forward aggressively, so that the VVO system can be brought online and operational, so that measurement and verification testing can commence as soon as possible and extend through the required evaluation duration.
- The Total Capital Spend for this investment is coming in lower than expected. The primary drivers of the budget underrun is lower than expected software costs and implementation of a more efficient work plan for the model build process. The Company is evaluating costs and progress in real-time and will redeploy under-run funds to other IT/OT programs.

D. Performance on Implementation/Deployment

Refer to Appendix 1 for the year to year and overall portfolio implementation/deployment data.

E. Description of Benefits Realized as the Result of Implementation

There are immediate benefits to the Company in having visibility and control of additional devices in the field, such as increased voltage regulation, as additional regulators are added to the Company's system. However, measurable benefits will not be realized until substation and circuit level reporting is completed, in accordance with the proposed performance metrics. Additionally, the increase of the investment types identified in this section will have an effect on several of metrics identified in section IV and VI of this 2019 Grid Modernization Annual Report and

Appendix 1. Refer to “Massachusetts Grid Modernization Program Year 2019 Evaluation Report – VVO” provided by Guidehouse for further analysis.

F. Description of Capability Improvement by Capability/Status Category

METHODOLOGY:

Eversource is targeting the deployment of VVO in a limited geographic region (Western MA) that consists of substations and circuits under the jurisdiction of a single control room. The circuits in the target region offer a diverse mix of load and distributed generation (“DG”) penetration, which will provide a comprehensive understanding of the impact of VVO across a broad range of circuit types. Within the target region, Eversource picked locations for the pole-top devices based on a combination of load flow analyses, engineering judgment, wireless communication coverage, and any local siting concerns.

The strategy for deployment is focused on maximizing the Company’s ability to understand and quantify the benefits from VVO while minimizing the number of and disruption to control room and field personnel impacted by the deployment.

IT:

In tandem with the deployment of the VVO field devices described above, Eversource will be deploying a VVO monitoring and control software package in the control room that normally supervises and operates the VVO target region. During a competitive and rigorous procurement process which started with six qualified vendors, a cross-functional project team thoroughly reviewed all submitted proposals and further vetted a shortlist of vendors through live product demonstrations and reference calls. Eversource has selected a software solution from among the proposals that best meets the scope and requirements of this deployment, as well as compliance with Eversource IT/OT standards. Software delivery, installation, and testing is scheduled for 4Q 2019.

EXPECTED CAPABILITY IMPROVEMENT:

VVO is expected to lower peak demand, reduce line losses, lower energy supply costs, and reduced greenhouse gas (“GHG”) emissions. The Company also expects that customers in the VVO area potentially could see a reduction in their bills, without any adverse impact to their power quality or change in their normal electric use.

IT:

As described in the previous section, the overall VVO deployment is expected to lower peak demand, reduce line losses, lower energy supply costs, and reduce GHG emissions. The Company also expects that customers in the VVO area potentially could see a reduction in their bills, without any adverse impact to their power quality or change in their normal electric use.

Eversource anticipates that the metering capabilities of the field devices at the feeder heads and the end of the line, which will be timestamped and archived by the VVO control software, will deliver a level of visibility and monitoring into the distribution system that was previously unavailable. In addition to understanding and quantifying the benefits of VVO, the Company expects that this data will also provide valuable insight into energy use patterns, DG and weather impacts, undetected power quality issues, etc.

G. Key Milestones

The Company maintains an execution plan and schedule of all its GMP investment categories. However, the VVO program is an entirely new system to the Eversource distribution infrastructure. Significant work has been placed on developing milestones and schedules, but as with any new system, it may be necessary to amend these milestones as the program progresses. A current sampling of the key milestones follows:

VVO – Line Devices:

- Finalized and completed engineering and design of the VVO system.
- Procured and received all major equipment.
- Completed the three-year unit targets for line sensors and LTCs.
- 70 percent and 96 percent complete for installation of regulator and capacitor banks, respectively.

VVO – IT

- Detailed project plan (Q2-2019).
- Build Complete (Q4-2019).
- Acceptance Testing (Q1-2020).
- Full Commissioning (system operational) (End of Q1-2020).

H. Updated projections for remainder of the three-year term

On August 15, 2018, the Company submitted its Baseline and Targets Filing, which included the 2018-2020 GMP baseline (Baseline and Targets Filing at 15, Table 2.4.7). *Table 11: Three Year Term Projections* provides the projections for 2020 for all remaining investment categories.

The VVO control software slipped from end of Q4 2019 to the end of Q1 2020. The company will still move forward with a phased approach for enabling VVO at the targeted substations and the respective circuits. The Company projects having VVO enabled on all selected feeders by 2Q 2020 with the measurement and verification (“M&V”) commencing in 2Q 2020.

Table 11: Three-Year Term Projections

Investment Categories	Preauthorized Device Types	Total (3-Year Plan)	2020 Plan
Volt-Var Optimization	VVO - Regulators	96	27
	VVO - Capacitor Banks	74	3
	VVO - LTC Controls	8	0
	VVO - Line Sensors	189	0
	VVO - IT Work	N/A	N/A

III.A.4. Advanced Distribution Management System (“ADMS”)

(GIS Verification, Advanced Load Flow)

A. Description of Work Completed

Geographic Information System (“GIS”) Verification: The objective of the GIS verification project is to physically visit all overhead facilities in the eastern MA service territory to verify existing data against assets as they currently exist in the field. The final output of the project will provide an accurate GIS database of pole location and attribute information, associated equipment, phasing information and a verification of customer addresses fed by each individual transformer. Improved GIS data accuracy will, among other things, improve the functionality of the Company’s advanced load flow (“ALF”) tool and increase the accuracy of customer event restoration notifications.

Work progressed as planned during the 2019 GMP investment year. The Company’s vendor continued field data collection activities for the remainder of the eastern MA overhead system and, as of year-end 2019, had completed all elements of the project, including uploading the data into the Company GIS database.

ALF: This GMP program includes the implementation of ALF software to create detailed computer models of the Company’s distribution system. In parallel, the data sources critical to the accuracy of the models will be assessed and enhanced as necessary to leverage the advanced functionality of the software. This enhancement of model data sources will also be critical to the operation of other functions, including VVO and ADMS. During the 2019 GMP investment year, the Company:

- Defined GIS and other sources’ data structure and integration requirements to the Synergi Software.
- Defined functional requirements to be delivered during implementation.
- Built a central engineering database to collect, prepare, and load non-GIS data into the Synergi model build.
- Established the IT networking, environments, and security protocols to provide a production software solution to the business.
- Built the model forge process to produce initial draft models of the Eversource distribution system within the Synergi software.
- Assessed and prioritized data quality that directly impacts the accuracy of the models.
- Provided basic training to impacted engineering groups to enable end-user acceptance.

B. Lessons-Learned/Challenges and Successes

GIS VERIFICATION: After resolving the upload issues in 2018, the remainder of this program continued to be implemented efficiently in 2019 without additional challenges.

ALF: In 2019, the Company was focused on implementing the Synergi software which included project planning, design, and implementation activities. During design, the Company focused on defining the underlying data structure in GIS and then mapped these attributes to the needs of the Synergi software. This effort spent reviewing data structure and attributes provided a solid foundation to then build from for the remainder of the project. This effort was critical to the success of the model build process.

C. Actual vs. Planned Implementation and Spending

The GIS Verification program had significant expense-only spend in 2019. The ALF program had capital spending during the 2019 GMP investment year, but the Company has not yet placed anything in-service in relation to this program; therefore, the 2019 capital spending will not be included in the May 15, 2020 Grid Modernization Factor (“GMF”) filing. Additionally, given the nature of these investments, neither of these programs are being tracked on a unitized basis. The GIS verification is tracked based on percent of survey and data transfer complete. Survey data collected by the vendor is subject to a quality assurance and quality control review by the Company that must be satisfied prior to considering the survey completed. The ALF project is tracked based on milestone completion.

GIS VERIFICATION:

- During the 2019 GMP investment year, the Company completed all remaining work associated with this program, for the entire three-year GMP term.
- The Total Capital Spend for this program is zero because this is an expense-only initiative. The Company was scheduled to spend all of the total \$6 million budget through 2019, but due to some necessary additional survey points that were collected in the field to enable further efficient data gathering, the budget increased to ~\$6.4 million.. The increase in spending relative to budget for the GIS Verification project will be addressed by reallocation from other GMP programs. The Company is not projecting to exceed its approved GMP budget.

ALF:

- The plan for 2019 included detailed project planning, design, implementation and delivery of a static model in Synergi for all circuits in the Company’s service territory.
- The Company completed the detailed project plan for project milestones, budget and resources. This project plan then drove the remaining tasks for 2019.
- A detailed design describing the IT systems, as well as the functional requirements, was completed for the Synergi software solution.
- The Company executed the project plan and design for a static model build by building the IT environments, installing software, delivering code for data translation, performing functional and security testing, training end users, and delivering a product to be automated in phase 2.

- The Total Capital Spend for this program is lower than budgeted. The Company will continue to review costs allocations and redeploy funds as needed to other GMP IT/OT investments.

Grid Modernization		2019 Capital Spend			2019 Plant in Service		
		Actual	Budget	Variance	Actual	Budget	Variance
		9,114,802	6,721,941	2,392,861	-	-	-
Investment Category	Preauthorized Device Type						
Advanced Distribution Management System (ADMS)	Advanced Load Flow	2,775,876	4,662,150	(1,886,274)	-	-	-
	GIS Survey (Expense)	6,338,926	-	6,338,926	-	-	-
	Dist. Management System	-	2,059,791	(2,059,791)	-	-	-

D. Performance on Implementation/Deployment

Given the nature of the GIS investment, the relatively short duration of the project and its categorization as a foundational investment necessary to support other GMP investments, the Company has not proposed specific performance metrics for this GMP investment. Regarding the ALF program, please refer to Appendix 1 for the year-to-year and overall portfolio implementation/deployment data.

E. Description of Benefits Realized as the Result of Implementation

While there will be immediate benefits to the Company via the verification of field conditions, those benefits do not currently have a measurable output. The verification of data will directly contribute to the various existing and new electric distribution system GMP platforms.

- Benefits of GIS Verification: Greater accuracy in customer outage communications.
- Benefits for ALF:
 - Improved ability to optimize capital asset deployment and system reconfiguration.
 - Better contingency scenario planning.
 - Increased accuracy of GIS and other related data, lowering the cost and timeline to achieve the level of data accuracy required to support a DMS load flow.
 - Lowered cost and time to perform impact studies for customers applying to interconnect DER to the Company's distribution system.
 - Platform to perform more advanced analysis with automated logic, including automated hosting capacity analysis.

Refer to "Massachusetts Grid Modernization Program Year 2019 Evaluation – Advanced Distribution Management System/ Advanced Load Flow (ADMS/ALF)" provided by Guidehouse (formerly Navigant) for further analysis.

F. Description of Capability Improvement by Capability/Status Category

With the completed work in 2019, the Company has improved its distribution modeling capability. A static model built from GIS and other data sources improves the Company's ability to perform system planning studies across the entire distribution network on an ad hoc basis with direct engineering department involvement. This model is also the platform for which future automated analysis can be built.

G. Key Milestones

GIS VERIFICATION:

- The full deployment of the program is completed for the three-year term.

ALF: The ALF program represents a major improvement from prior load flow capability for Eversource, including new automation of model builds and a new software product for the eastern Massachusetts portion of the Company's service territory. Significant work has been undertaken in developing milestones and schedules, but as with any new system, it may be necessary to amend these milestones as the program progresses. A current sampling of the key milestones follows, with note that these milestones indicate future events, whereas other "Key Milestones" sections in this Report reflect the progress under the 2019 plan.

- Phase 1:
 - Mobilization and Design Complete (Q3-2019)
 - Build Complete (Q4-2019)
 - Testing Complete (Q4-2019)
 - Phase 1 Commissioning (Q4-2019)
- Phase 2:
 - ALF Automation design Complete (Q2-2020)
 - ALF Automation build Complete (Q3-2020)
 - Testing Complete (Q3-2020)
 - Phase 2 Commissioning (Q4-2020)

H. Updated Projections for Remainder of the Three-Year Term

GIS Verification:

- All work for the GIS Verification program was completed in 2019.

ALF:

- 2019: Phase 1 included implementation of required hardware and base software, including automation of the model build process from GIS. Additional data source enhancement continued through Phase 1, with limited inclusion in the automated model build process.

- 2020: Phase 2 will include completion of automated model build process, including additional enhanced data sources, and any required software configuration to accommodate those additional sources. The Company expects to enable semi-automated load flow capability for all non-mesh circuits by year-end.

III.A.5. Communications

(Miles of Fiber, Nodes)

A. Description of Work Completed

Communications investments are defined by two categories, Nodes and Fiber. The Company continued to execute the Nodes program in 2019. The objective of the Nodes program is to improve the capacity of the Company's communications network to transmit signals between field devices and the Company's system operations centers. In total, four nodes projects were completed in 2019. The first project was a critical upgrade of two front end processing units required for the SCADA system to collect and utilize data from field devices. Three additional wireless node projects were completed in 2019, increasing the capacity of existing radio infrastructure in eastern Massachusetts.

As described in Section B, with respect to the Fiber program, the Company made the decision in 2019 to discontinue work originally planned to build out fiber to the Company's distribution substations. The Company did extend less than a mile of fiber to Station 60 in eastern Massachusetts as a part of the 4kV Circuit Breaker SCADA program.

B. Lessons-Learned/Challenges and Successes

ADSS MILES OF FIBER:

- Following completion of detailed engineering, the project review process determined that the Fiber project did not demonstrate a reasonable benefit relative to the cost to customers. In its initial filing with respect to communications investments, the Company had originally planned to build out 250 miles of fiber to connect distribution substations across Massachusetts into the Company's existing fiber network. Based on the results of its engineering analysis, the Company determined the per mile cost of deploying fiber averaged approximately four times the original estimate, chiefly due to the identified and designed make-ready work. The needs assessment determined that although this fiber build out would augment and reinforce the Company's communications infrastructure for future grid modernization investments, the additional fiber was not required to deliver any of the benefits associated with the 2018-2020 GMP. The decision not to move forward with the fiber program was reviewed and approved by the Company's Grid Modernization Executive Steering Committee.

NODES:

- The Company has confirmed that augmenting wireless communications infrastructure is a cost-effective option to ensure increase throughput of data transmission.

C. Actual vs. Planned Implementation and Spending

Refer to Tables 12 and 13 below for the Company’s 2019 implementation unit and spending summaries for the Communications Investments. Spending was broken down into “Total Capital Spend” and “Plant In-Service.” As indicated in Section I. Introduction, Plant In-Service is triggered by a device being “Construction Complete” and therefore cost recoverable.

Table 12: 2019 Implementation Summary

Investment Categories	Preauthorized Device Types	2018 Unit Carry Over (2019)	Plan Units (2019)	Construction Complete Units (2019)	Commissioned Units (2019)	2019 Unit Carry Over (2020)
Communications	Communication - FAN	n/a	6	4	4	2
	Communication - Fiber	5	125	0	0	0

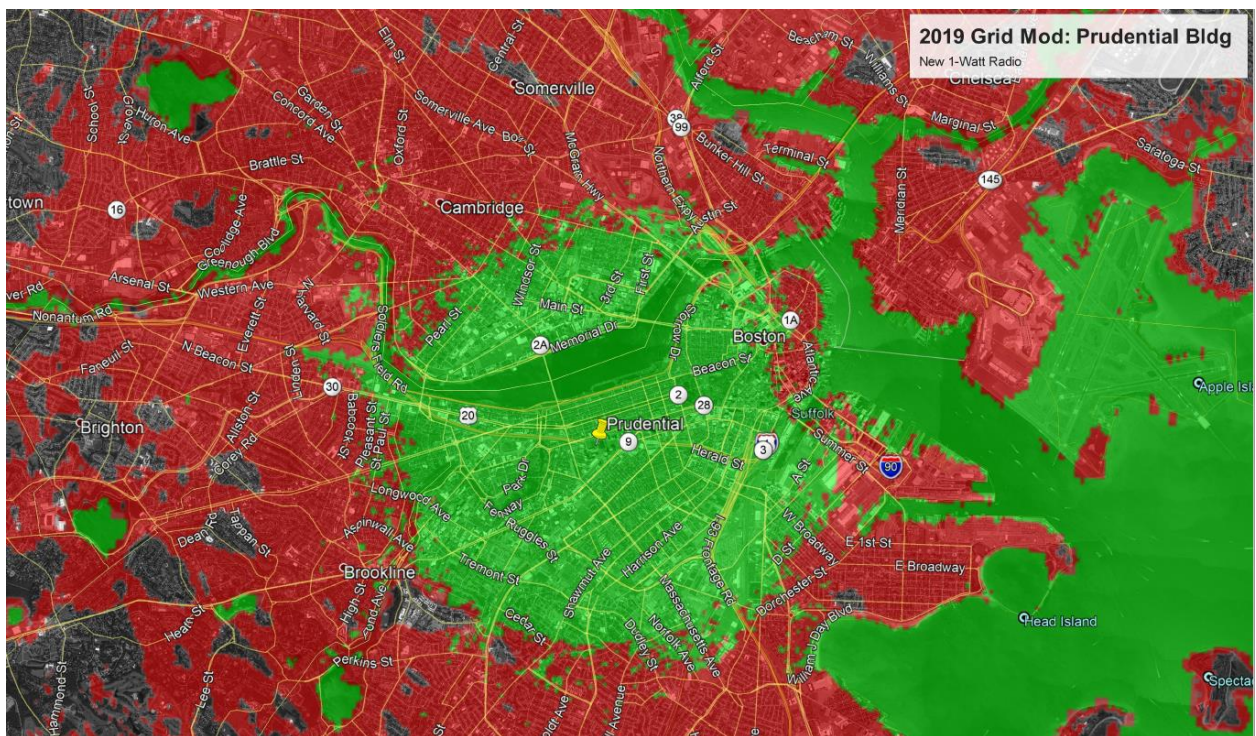
Table 13: 2019 Implementation Cost Summary

Grid Modernization		2019 Capital Spend			2019 Plant in Service		
		Actual	Budget	Variance	Actual	Budget	Variance
		832,151	14,424,621	(13,592,470)	415,578	3,057,750	(2,642,172)
Investment Category	Preauthorized Device Type						
Communications	Numbers of Nodes	522,256	974,299	(452,044)	415,578	57,750	357,828
	Miles of Fiber	309,896	13,450,322	(13,140,426)	-	3,000,000	(3,000,000)

MILES OF FIBER: As discussed in above, the ADSS Miles of Fiber program was eliminated from the 2018-2020 GMP due to significant unit cost increases that the Company did not consider prudent to expend and funds were redeployed to other investments.

NODES: The Company’s implementation of the node program was short of its 6-unit goal by two units. This is primarily due to the need to change two locations of the nodes late into the year. The first change was necessary because the Company could not obtain the required frequency for one location due to the FCC license freeze on the 900MHz radio band. The other change was necessary due to a medium range plan to rebuild the substation where one of the new nodes was to be placed. It was determined that any work now install a radio master would be required to be removed and reinstalled at a later date and therefore was not prudent use of the investment funds. This change caused a strain on construction and commissioning resources that could not be overcome. A sampling of the coverage increases of the nodes that were installed in 2019 can be found below in Figures 4 and 5.

Figure 4: Prudential – New Radio Master Installation Coverage



The Prudential Center (Figure 4) was a new radio Master installation and is one of the best performing distribution automation (“DA”) Master sites in the Company’s North region providing coverage for remote radios in the Metro Boston area. It was beginning to be oversubscribed due to the number of remote units programmed to it. The new Master radio added under the GMP in 2019 allowed the Company to supplement the existing Master radio, pick up any new DA remotes and avoid the overloading issue. It also provided additional redundancy in the radio Network, allowing for the distribution of the remote radios across two Masters, thereby eliminating one as a single point of failure.

Figure 5: Shoot Flying Hill – New Master Radio, Before and After Coverage



The Shoot Flying Hill (Figure 5) was an existing radio Master that provided minimal coverage. Multiple repeaters were required to extend the signal to remote switches. The new Master radio, a licensed 5-Watt radio, added under the GMP in 2019 provides added coverage, allowing the Company to supplement the existing Master radio, significantly reducing the need for repeaters. Having a large number of repeaters in a radio network introduces latency which can negatively impact performance. Not only does the new radio Master provide added coverage, it also allows for improved radio network performance.

For the Total Capital Spend, work is progressing as planned and will remain in line with the revised total budget, as described above.

D. Performance on Implementation/Deployment

It is not possible to quantify the performance increases experienced with broader coverage and increased throughput of data, other than to note that communication failure rates will decrease, with fewer field locations that will fail a communications check. This allows remote devices to operate in new areas on the system. See Section C, above for sampling of coverage maps.

E. Description of Benefits Realized as the Result of Implementation

The immediate benefits from this program are namely the increased coverage areas with the upgraded radio node locations and the ability to process significantly more communication traffic via the upgrade front-end processors of the SCADA system. Refer to Appendix 1 for the year-to-year and overall portfolio implementation/deployment data. Refer to “Massachusetts Grid Modernization Program Year 2019 Evaluation – Communications” provided by Guidehouse (formerly Navigant) for further analysis.

F. Description of Capability Improvement by Capability/Status Category

The capability improvements associated with the upgrade or addition of radio nodes within the territory provide for an expanded coverage area which will allow locations that may have previously been inaccessible by radio to now have remotely monitored and/or control equipment installed and commissioned into the Company’s system at the most efficient rate. In addition to the nodes, upgrades to the Company’s front-end SCADA processing units were completed to allow for the significant increase in deployed field devices, as part of the GMP, to communicate with the Company’s system operations center.

G. Key Milestones

The Company retains an execution plan and schedule of all its investment categories. This schedule, which encompasses all three years of the GMP, was developed and is administered with the requisite flexibility that enables the Company to adjust its investment schedule and timing over the course of the GMP in the event that external factors, such as third-party resource availability, material availability, etc. However, a sampling of the key 2019 milestones follows:

- Engineering and design was completed for a significant portion of the ADSS Miles of Fiber work, ultimately leading to the decision to discontinue the Fiber program as a component of the 2018-2020 GMP.
- All node locations for the GMP plan were identified.

H. Updated Projections for Remainder of the Three-Year Term

On August 15, 2018, the Company submitted its Baseline and Targets Filing ([see](#) page 15, Table 2.4.7). *Table 14: Three Year Term Projections* provided below provides the projections for 2020 for all remaining investment categories. As was discussed above, the ADSS Miles of Fiber investment was eliminated from the GMP. The funds associated with the fiber investment were redeployed to other GMP investment categories

Table 14: Three-Year Term Projections

Investment Categories	Preauthorized Device Types	Total (3-Year Plan)	2020 Plan
Communications	Numbers of Nodes	10	6
	Miles of Fiber	0	0

III.B. Feeder Level Implementation By Investment Category

A. Monitoring and Control:

1. Highlights of Feeder Level Implementation

The Monitoring and Control program is specifically designed to increase remote visibility and control of existing devices already located on the Company's system. For 2019, the Company continued to install microprocessor relays and convert, or replace, existing padmounted and overhead switches to be SCADA-capable. Although already part of the system, these devices will now allow for:

- Increased visibility and remote operability by the system operators.
- Provision of valuable data related to load conditions and switch position (open/closed).
- The ability for the system operators to remotely apply protection schemes to the devices, when crews need to work within the device boundaries.
- In terms of the overhead, the reclosers can be built into existing loop schemes, allowing for autonomous system healing.
- In terms of the underground (4kV), the switches will be available for future loop scheme build out.

2. Feeder Level Lessons Learned/Challenges and Successes

As discussed in Section III, due to the volume and incremental nature of a technical program such as this, securing the correct blend of internal and external resources was challenging. The Company determined that it needed to start the solicitation of these outsourced resources earlier than its typical process. In addition to resource availability, there were times when all site conditions of a new project cannot be fully reviewed ahead of time, i.e., there may be the need to schedule electrical outage simply to observe the condition of energized parts in order to understand how to proceed with design work. Because of the compressed nature of this work, it is typically not feasible/practical to schedule this additional up-front outage in order to verify site conditions. Therefore, the Company makes a calculated assessment to move forward with the understanding that unforeseen conditions may arise. Unforeseen conditions did occasionally arise during the 2019 GMP, and the Company determined that it was necessary to gather immediate responses to the unforeseen conditions, so not to affect the over-all schedule, which included pre-planned outages.

The Recloser SCADA program was successful in its design and construction, and leveraging the lessons learned from 2018, the Company developed an execution plan for 2019 that did not overly stress the commissioning resources, originally identified to be a potential constraint on GMP progress. Also, as discussed in the 2018 Grid Modernization Annual Report, the Company modified the Recloser SCADA program to encompass a "replace in-place" alternative that enabled the continued successful implementation of the program while keeping the per-unit installation costs below original budgeted costs.

In 2018, the Padmount SCADA program presented challenges from the stand-point of coordinating the correct type of existing field equipment with a location suitable for communications. During 2018, a significant amount of time was spent coordinating these requirements and locating suitable locations to fulfill the entire 2018-2020 GMP commitment. Because of this up-front effort, the Company was on track to complete its 2019 goal but was ultimately one unit short of its 2019 goal due to an administrative mistake where one location was inadvertently counted twice. However, after a further refined reviewed of the eligible and available locations, Company determined that it has exhausted the locations which would only require a communications package. Therefore, the Company anticipates that there will be a small subset of devices which will have to be replaced in their entirety. Due to the low budgeted unit costs for this investment and the relatively high replace in-place costs for padmount switches, the Company will further evaluate in 2020 how best to meet the unit goals established in the August 15, 2018 Compliance filing.

The Network Protector SCADA program was largely a success, as the Company successfully installed and commissioned all of the 83 relays, which was 33 more than planned. However, and as discussed in Section III.A of this Report, the substation component of this project was required to be fully constructed and commissioned prior to any of the 83 devices being qualified for inclusion under the GMP. The commissioning of the substation work was delayed due to an unforeseen long lead piece of equipment. In hindsight, the Company should have divided the relay work and the substation work for tracking purposes.

B. Distribution Automation:

1. Highlights of Feeder Level Implementation

Any time a device is placed on the system which will allow for increased fault location precision and the ability to further minimize the effects of that fault, the system's capabilities will inherently improve. The overhead reclosers (new locations, replace in-place, and field ties) and 4kV (VFI switches and 4kV VFI retrofits for AR Loops) installations in 2019 contributed to both areas of improvement. In addition, these devices allow for:

- Increased visibility and remote operability by the system operators.
- Provision of valuable data, as related to load conditions and switch position (open/closed).
- The ability for the system operators to remotely apply protection schemes to the devices when crews need to work within the device boundaries.
- In terms of the overhead system, the reclosers can be built into existing loop schemes, allowing for autonomous system healing.
- In terms of the underground (4kV) system, the switches will be available for future loop scheme build out.

2. Feeder Level Lessons Learned/Challenges and Successes

Given that the penetration levels of the current GMP program investments, devices in one program must be closely reviewed and coordinated with the devices of another program. As a result, and particularly for the overhead devices, this made choosing and installing the 2019 reclosers a challenge because of the future work, via other programs, that may affect the current installation. For example, if an overhead recloser is placed on a particular feeder, that recloser would get specific data settings for its controller, to accommodate the circuit as it is configured. However, if through the Recloser SCADA or Overhead DA with Circuit Ties programs, other devices are also to be placed on that circuit, then the controller settings of the first recloser would need to be changed, so that all devices coordinate together. This issue was discussed in the 2018 Grid Modernization Annual Report and fed directly into the engineering and management of the device deployment in 2019. Although this coordinated approach increased the time to engineer and design these investments, it was critical to use this deliberate and holistic approach to help lay the groundwork for continued very successful device deployment in 2019 which saw the Company significantly surpass its original goal.

Implementing GMP programs on the 4kV underground systems, which are often located in densely populated city environments, is affected by numerous factors, such as the coordination of vehicle removal, police details, city permits and manhole/vault cleaning in order to first inspect the site and equipment to ensure compatibility with the program's intent. These factors were present during the 2019 investment year, but by leveraging the coordination lessons learned from 2018, including the implementation of a task-force approach that identified owners and key points of contact within the process, the Company was able to continue to successfully deploy devices well in excess of its original goal.

A significant lesson lessons learned from the Company's experience with the 2018 GMP implementation, which carried into the 2019 GMP, was the need for careful and upfront planning to ensure that all necessary tasks are undertaken and accomplished in the necessary order and under to correct timing. This planning enabled the Company to identify situations (emergent or planned) that existed in areas adjacent to the GMP work area in question, allowing the Company to leverage those ancillary projects and obtain data while other work was progressing. For instance, if there is a circuit outage evolution for a non-GMP project in the vicinity of a future GMP device installation, the Company utilized that outage to collect data and/or perform pre-work on the GMP device location. These efforts required close coordination between GMP and non-GMP projects, which the requisite separation and tracking of costs.

C. Volt-Var Optimization

1. Highlights of Feeder Level Implementation

As discussed in the 2018 Grid Modernization Annual Report, the Company completed the VVO analysis, selected substations and circuits, identified the specific field device locations and selected the software platform. The Company had targeted 2019 as the year to install all VVO field

components to have them ready for final commissioning when the IT portion of the program was completed in 2020. The Company's execution plan was well designed, and all LTC controls and line sensors were installed and commissioned with communications. Capacitor banks and regulators were on target for completion in 2019, but unforeseen conditions, as described in section III.A.3, resulted in the Company being short of their overall goal.

2. Feeder Level Lessons Learned/Challenges and Successes

As discussed in the 2018 Grid Modernization Annual Report, the regulator field devices come in three different sizes. The largest of these devices requires a significant amount of pole/platform infrastructure to enable its installation. As a preliminary step to their installation at new locations, the Company (or Verizon for their pole-set areas) must petition the local municipal siting authority for permission. These petitions can be denied and/or held up by the siting authority and, given that only certain select feeders have been identified for inclusion in this program, there are limited opportunities for the Company to adjust the installation locations. Back up locations, in the event that a primary location is not feasible, that stay consistent with the overall VVO plan can sometimes be identified. For instance, siting locations can sometimes be shifted along the pole line. However, because of the specific function of the VVO field devices, the opportunity for deviation from the designed location is typically quite small. Even with proactively managed communications with the municipalities, there ultimately ended up being siting challenges for the largest of the regulator units. Additionally, because the VVO design encompasses all feeders for a specifically-selected substation, it is not feasible to simply select another feeder that is not part of the planned substation.

The permitting constraints, coupled with identified stability issues discussed earlier in this Report, significantly extended the 2019 installation timeframes into 2020. As of early Q1, 2020 the Company has resolved the stability issues and permitting is progressing forward. The installation teams plan to install all outstanding field units early Q2, 2020.

In addition to the challenges with the regulators, the end of line sensors were a challenge to design and source. This is a nascent technology, and the Company needed to work with a vendor to develop the and prove out the specification before being able to take delivery for installation. The installations were successfully done in 2019 but took much longer than anticipated.

D. Advanced Distribution Management System

1. Highlights of Feeder Level Implementation

The Advance Distribution Management System program was not administered on a feeder basis. For 2019, the Company obtained a "static model" status for the ALF investment for all of the Company's circuits. Additionally, the GIS Survey investment was completed for all circuits in the Eastern Massachusetts (NSTAR Electric) region of the service territory.

2. Feeder Level Lessons Learned/Challenges and Successes

For the ALF investment, significant time and effort was taken to define and map underlying data structures to ensure the Synergi tool would operate as intended.

E. Communications

1. Highlights of Feeder Level Implementation

The Communications program is not being implemented on a “Feeder Level.” Please see Section III of this Report for a further discussion of the Communications program.

2. Feeder Level Lessons Learned/Challenges and Successes

The Communications program is not being implemented on a “Feeder Level.” Please see Section III of this Report for a further discussion of the Communications program.

IV. Description and Report on Each Infrastructure Metric

As part of its approval of the Company's GMP, the Department approved the proposed statewide and company-specific infrastructure metrics. Regarding statewide infrastructure metrics, the Department required the Distribution Companies to report on the following: (1) system automation saturation; (2) number/percentage of sensors installed versus planned; (3) percentage of circuits with installed sensors; and (4) total number of grid-connected DG facilities, nameplate capacity and estimate output of each unit and type of customer-owned or operated units. D.P.U. 15-122, at 198-199. As for the Eversource-specific infrastructure metrics, the Company is required to report on the following for each category of preauthorized grid-facing investment: (1) the number of devices or other technologies deployed; (2) the associated cost for deployment; (3) reasons for deviation between actual and planned deployment for the GMP investment year; and (4) projected deployment for the remainder of the GMP term. *Id.* at 200-201. To assist in the development of these baselines, the Department directed each of the Distribution Companies to develop and maintain information on its system design, operational characteristics (*e.g.*, voltage, loading, line losses), and ratings prior to any deployment of preauthorized grid-facing technologies. *Id.* at 203. Additionally, the Department directed the Distribution Companies, when developing their proposed baselines to use, to the extent possible, information reported in the annual service quality filings, as well as other publicly available information. *Id.*

While the purpose of these infrastructure metrics is to determine how performance can be changed because of grid modernization investments, there are outside factors, over which the Company has no control, that can and will impact performance. Weather, customer behavior, economic conditions and other factors will have a significant influence on the parameters being measured under these metrics.

The statewide infrastructure metrics use the following common definitions across the Distribution Companies.

Grid Modernization Device - any device that meets the requirements of either a fully automated or a partially automated device.

Fully Automated Device – a device that meets all of the following requirements:

- reacts to system conditions to isolate or restore portions of the electric system;
- communicates system quantities (*e.g.*, voltage, trip counts) to a central location, such as SCADA; and
- the state of the device can be remotely controlled by dispatch.

Partially Automated Device – a device that meets at least one of following requirements:

- Reacts to system conditions to isolate or restore portions of the electric system;

- Communicates system quantities (e.g., voltage, trip counts) to a central location, such as SCADA;
- The state of the device can be remotely controlled by dispatch; or
- Be capable of upgrade to a fully automated device without full replacement.

Sensor – Equipment that sends or records information of the electric system that can be used to improve the efficiency or effectiveness of workforce or asset management (e.g., Fault locators that would help pinpoint a problem for more efficient crew deployment).

Statewide Infrastructure Metrics

1.1 Grid Connected Distribution Generation Facilities

The data used in the calculation of this metric consider units that have an executed Interconnection Service Agreement (“ISA”) and are in service and connected to the distribution system.⁶

The Company has tracked the following data on a substation and circuit basis:

- a. Total number by technology or fuel type – count of units by technology or fuel type
- b. Nameplate capacity by technology or fuel type – sum total of nameplate capacity
- c. Estimated output by technology or fuel type – sum of nameplate capacity * capacity factor * 8760 hours
- d. Type of customer-owned or operated units by technology and fuel type – (i.e., count of Photo Voltaic (“PV”), wind, Combined Heat and Power (“CHP”), Fuel Cell, etc.)
- e. Nameplate as a Percent of Peak Load – calculated as total nameplate capacity (MW) / peak load (MW)

The baseline for this metric has been quantified and calculated based upon units in service by December 31, 2017. Please refer to the Company’s Baselines and Targets Filing for the detailed baseline quantities.

The 2019 results for this metric are summarized in the table below. The 45,427 facilities represent an increase of 10,314 facilities over the baseline amount of 35,113. The increase was primarily driven by PV facilities. The supporting details can be found in Attachment SI-1.

⁶ It is important to note that DER developers’ decisions regarding DER interconnection may be influenced by tax incentives, subsidies, and costs and availability of the technology, which, in turn, will influence these metrics.

SI-1 Grid Connected Distribution Generation Facilities 2019

a. Number of Facilities

Technology Type	Number of Facilities
Fuel Cell	5
Gas Turbine	15
Hydro Electric Turbine	23
Internal Combustion Engine	220
Internal Combustion Turbine	4
Micro Turbine	5
Other	1
PV	45,033
Steam Turbine	4
Wind Turbine	117
Grand Total	45,427

1.2 System Automation Saturation

This metric measures the automation saturation by customer served by fully automated or partially automated device. The terms “fully automated” and “partially automated” refer to feeders for which Eversource has attained optimal or partial, respectively, levels of visibility, command and control, and self-healing capability through the use of automation.

The baseline saturation rate has been calculated based on what existed on the Eversource system as of the date the baseline was first calculated on August 1, 2018. Customers that can benefit from multiple devices will be counted as one for purposes of calculating the baseline. The installations will not be limited to the main line infrastructure and will include no-load lines and distribution system supply lines.

The following matrix has been provided as guidance to determine which type of equipment would be considered partially automated, fully automated or included as a sensor.

Device Type	Not Included	Partial Automation	Full Automation	Included as a Sensor
Feeder Breakers (No SCADA)		X		
Feeder Breakers (SCADA)			X	X
Reclosers (including sectionalizers, single phase reclosers, intellirupters, ASU) (No		X		
Reclosers (including sectionalizers, single phase reclosers, intellirupters, ASU)			X	X
Padmount Switchgear (No SCADA)		X		
Padmount Switchgear (SCADA)			X	X
Network Transformer/Protector with full SCADA			X	X
Network Transformer/Protectors with monitoring, no control		X		X
Network Transformer/Protector with no SCADA	X			
Feeder Meter (e.g., ION, with comms)				X
Capacitor and Regulator with SCADA		X		X
Capacitor and Regulator no SCADA	X			
Line Sensor (with comms)				X
Fault Indicator (with comms)				X
Other Fault Indicators (no comms)	X			
Other Voltage Sensing (with comms)			X	X
Sectionalizer (no SCADA)		X		
Sectionalizer (SCADA)			X	
Customer Meter	X			
Distribution /step down Transformer	X			
Other Substation Breakers	X			
Fuse	X			

As more automation is installed on the Company's system, both under the GMP and pursuant to other system investment outside of the GMP, the results of this metric will be reduced.

Metric Calculation:

Customers Served

Fully Automated Device + 0.5*(Partially Automated Device)

The baseline for this metric has been quantified and calculated based upon equipment in service as of August 1, 2018. Eversource's baseline is 247.1. Please see the Company's Baselines and Targets Compliance Filing for circuit level detail.

The calculated score at the end of 2019 was 179.8. This is an improvement of 67.3 over the baseline amount of 247.1. Please see Attachment SI-2 and Attachment SI-3 for circuit level detail.

1.3 Number/Percentage of Circuits with Installed Sensors

This metric measures the total number of electric distribution circuits with installed sensors⁷ which will provide information useful for proactive planning and intervention. The installation of sensors provides the means to enable proactive planning and measure several grid modernization initiatives such as VVO and asset management. A sensor analytics development program is an essential part of grid modernization and provides the visibility into network operations needed to move toward an effective grid modernization program.

The baseline for this metric consists of all sensor installations on Eversource's distribution circuits and substations, including existing installations.

The baseline for this metric has been quantified and calculated based upon equipment in service as of August 1, 2018. Eversource's baseline has been calculated as 82.3 percent. Please see the Company's Baselines and Targets Filing for the circuit detail used to develop the baseline.

For 2019, Eversource's number and percentage of circuits with installed sensors has increased to 83.7 percent. Please see the Table SI-3 below for further details.

**TABLE SI-3 NUMBER/ PERCENTAGE OF CIRCUITS
WITH INSTALLED SENSORS
2019**

Sensor	Number of Feeders	Percent
Y	1,735	83.7%
N	339	16.3%

⁷ Please see the previous matrix for devices that have been defined as "sensor" for the purpose of determining whether a circuit has a sensor.

Eversource-Specific Infrastructure Metrics

2.1 Number of devices or other technologies deployed

Under this metric, Eversource has tracked the following information per GMP investment at the substation and circuit level where appropriate:

- a. Number of devices or other technologies deployed
- b. Total number of devices planned
- c. Percent – Number of devices installed / total number of devices planned

This metric is strictly a GMP deployment metric: accordingly, the baseline for this metric necessarily starts at zero to ensure that pre-GMP investments are not captured in the baseline.

Please refer to Table S2-1 below for the Company's GMP investment deployment for 2019.

Table S2-1

Grid Modernization - 2019 Unit Deployment

Investment Areas and Preauthorized Device Types	Commissioned Units		
	2019 Actual	2019 Plan	%
Monitoring & Control (SCADA)	163	230	71%
Microprocessor Relay	87	103	84%
4kV Circuit Breaker SCADA	16	21	76%
Recloser SCADA	19	14	136%
Padmount Switch SCADA	41	42	98%
Network Protector SCADA	-	50	0%
Distribution Automation	299	210	142%
OH DA	148	104	142%
OH DA w/Ties	45	23	196%
4kV Oil Switch Replacement	89	67	133%
4kV AR Loop	17	16	106%
Volt-Var Optimization	333	302	110%
VVO - Regulators	69	95	73%
VVO - Capacitor Banks	71	76	93%
VVO - LTC Controls	4	6	67%
VVO - Line Sensors	189	125	151%
VVO - IT Work	N/A	N/A	N/A
Advanced Distribution Management System (ADMS)	N/A	N/A	N/A
Communications	4	136	3%
Numbers of Nodes	4	6	67%
Miles of Fiber	-	130	0%
Electric Vehicles	N/A	N/A	N/A
Energy Storage	N/A	N/A	N/A
Martha's Vineyard	N/A	N/A	N/A
Provincetown	N/A	N/A	N/A
Totals	799	878	91%

2.2 Associated cost for deployment

Under this metric, the Company has tracked the following information per investment type at the substation and circuit level where appropriate:

- a. Cost of devices or other technologies deployed
- b. Total cost of devices planned
- c. Percent – Cost of devices installed / total cost of devices planned

Please refer to Table S2-2 below for the Company's associated cost for deployment for 2019.

Table S2-2

Grid Modernization - 2019 Deployment (\$)

Investment Areas and Preauthorized Device Types	Capital Spend (in thousands \$)		
	2019 Actual	2019 Budget	%
Monitoring & Control (SCADA)	21,452	26,256	82%
Microprocessor Relay	14,991	20,319	74%
4kV Circuit Breaker SCADA	4,085	2,414	169%
Recloser SCADA	889	1,024	87%
Padmount Switch SCADA	615	299	206%
Network Protector SCADA	872	2,200	40%
Distribution Automation	29,640	27,192	109%
OH DA	12,070	13,167	92%
OH DA w/Ties	2,798	3,135	89%
4kV Oil Switch Replacement	13,881	10,010	139%
4kV AR Loop	892	880	101%
Volt-Var Optimization	7,808	11,253	69%
VVO - Regulators	2,375	5,223	45%
VVO - Capacitor Banks	2,549	0	N/A
VVO - LTC Controls	1,045	883	118%
VVO - Line Sensors	679	0	N/A
VVO - IT Work	1,160	5,147	23%
Advanced Distribution Management System (ADMS)	2,776	6,722	41%
Advanced Load Flow	2,776	4,662	60%
GIS Verification (Expense)	0	0	N/A
Dist. Management System	0	2,060	0%
Communications	832	14,425	6%
Numbers of Nodes	522	974	54%
Miles of Fiber	310	13,450	2%
Electric Vehicles	10,979	6,379	172%
Energy Storage	3,026	9,368	32%
Martha's Vineyard	1,303	3,360	39%
Provincetown	1,723	6,008	29%
Totals	76,513	101,594	75%

2.3 Reasons for deviation between actual and planned deployment for the plan year

Under this metric, the Company tracked the following information per investment at the substation and circuit level where appropriate:

- Number of devices or technology installed versus plan for a given year
- Cost of devices or technologies installed versus plan for a given year
- Reason for discrepancies

Please refer to Table S2-3 below for the Company's reasons for deviation between actual and planned deployment for the plan year.

Table S2-3

Grid Modernization - 2019 Unit vs. Cost Deployment

Investment Areas and Preauthorized Device Types	Commissioned Units			Plant In-service (in thousands \$)		
	2019 Actual	2019 Plan	(%)	2019 Actual	2019 Budget	(%)
Monitoring & Control (SCADA)	163	230	71%	14,262	12,784	112%
Microprocessor Relay	87	103	84%	9,694	9,051	107%
4kV Circuit Breaker SCADA	16	21	76%	2,650	1,750	151%
Recloser SCADA	19	14	136%	608	682	89%
Padmount Switch SCADA	41	42	98%	631	623	101%
Network Protector SCADA	-	50	0%	679	678	100%
Distribution Automation	299	210	142%	27,616	23,002	120%
OH DA	148	104	142%	12,533	9,983	126%
OH DA w/Ties	45	23	196%	2,586	2,494	104%
4kV Oil Switch Replacement	89	67	133%	12,281	10,525	117%
4kV AR Loop	17	16	106%	217	0	N/A
Volt-Var Optimization	333	302	110%	6,394	5,692	112%
VVO - Regulators	69	95	73%	2,136	4,494	48%
VVO - Capacitor Banks	71	76	93%	2,384	0	N/A
VVO - LTC Controls	4	6	67%	1,203	1,198	100%
VVO - Line Sensors	189	125	151%	672	0	N/A
VVO - IT Work	N/A	N/A	N/A	0	0	N/A
Advanced Distribution Management System (ADMS)	N/A	N/A	N/A	0	0	N/A
Advanced Load Flow	N/A	N/A	N/A	0	0	N/A
GIS Verification (Expense)	N/A	N/A	N/A	0	0	N/A
Dist. Management System	N/A	N/A	N/A	0	0	N/A
Communications	4	136	3%	416	3,058	14%
Numbers of Nodes	4	6	67%	416	58	720%
Miles of Fiber	-	130	0%	0	3,000	0%
Electric Vehicles	N/A	N/A	N/A	8,432	6,884	122%
Energy Storage	N/A	N/A	N/A	0	0	N/A
Martha's Vineyard	N/A	N/A	N/A	0	0	N/A
Provincetown	N/A	N/A	N/A	0	0	N/A
Totals	799	878	91%	57,119	51,420	111%

As is further discussed in section III.A of this Report, there were a variety of factors that precluded the Company from commissioning all the units planned for calendar year 2019. Most common among these was the aggressive schedule set forth by the Company and the unforeseen constructability issues with the VVO devices. With the exception of several VVO devices and one communications Node, whose commissioning was impacted by the Covid-19 pandemic and the related Massachusetts State of Emergency work and other restrictions, all of the work not completed in 2019 was placed in-service and commissioned as of April 1, 2020.

2.4 Projected deployment for the remainder of the three-year GMP term

The metric compares the revised projected deployment with the original targeted deployment as the Company implements its GMP. The year-by-year investment plan is subject to change based upon the quantity of work completed, the availability of the technology, material lead times, contractor availability, etc. Each year's revised investment plan will be used as the basis of comparison for the following year's GMP work.

Under this metric, the Company has tracked the following information per investment at the substation and circuit level where appropriate:

- a. Number of devices or technology to be installed the following year
- b. Cost of devices or technologies installed the following year

The metric will be used as the baseline and target for the following year's work and will be reported on an annual basis. Please refer to Table S2-4 below for the Company's projected GMP investment deployment for 2020.

Table S2-4

Grid Modernization - Total Deployment Plan (Cost vs. Units)

Investment Areas and Preauthorized Device Types	Commissioned Units			Capital Spend (in thousands \$)		
	2018 Actual	2019 Actual	2020 Plan	2018 Actual	2019 Actual	2020 Plan
Monitoring & Control (SCADA)	28	163	239	4,516	21,452	23,822
Microprocessor Relay	10	87	96	3,363	14,991	14,762
4kV Circuit Breaker SCADA	-	16	39	84	4,085	6,983
Recloser SCADA	15	19	3	963	889	675
Padmount Switch SCADA	3	41	18	106	615	270
Network Protector SCADA	-	-	83	0	872	1,132
Distribution Automation	25	299	124	3,200	29,640	15,804
OH DA	25	148	47	2,268	12,070	4,185
OH DA w/Ties	-	45	-	0	2,798	1,720
4kV Oil Switch Replacement	-	89	16	932	13,881	6,500
4kV AR Loop	-	17	61	0	892	3,399
Volt-Var Optimization	4	333	30	377	7,808	4,165
VVO - Regulators	-	69	27	0	2,375	620
VVO - Capacitor Banks	-	71	3	0	2,549	0
VVO - LTC Controls	4	4	-	377	1,045	0
VVO - Line Sensors	-	189	-	0	679	0
VVO - IT Work	N/A	N/A	N/A	0	1,160	3,545
Advanced Distribution Management System (ADMS)	N/A	N/A	N/A	0	2,776	9,107
Advanced Load Flow	N/A	N/A	N/A	0	2,776	9,102
GIS Verification (Expense)	N/A	N/A	N/A	0	0	0
Dist. Management System	N/A	N/A	N/A	0	0	5
Communications	-	4	6	0	832	1,435
Numbers of Nodes	-	4	6	0	522	1,435
Miles of Fiber	-	-	-	0	310	0
Electric Vehicles	N/A	N/A	N/A	2,860	10,979	18,981
Energy Storage	N/A	N/A	N/A	1,583	3,026	44,427
Martha's Vineyard	N/A	N/A	N/A	959	1,303	11,945
Provincetown	N/A	N/A	N/A	625	1,723	32,482
Totals	57	799	399	12,536	76,513	117,742

The Company submitted its Baseline and Targets Filing in the Compliance Filing on August 15, 2018, which included the 2018-2020 GMP baseline (Baseline and Targets Filing at 15, Table 2.4.7). As discussed in section I.B of this Report, the Company is continuously seeking opportunities to accelerate the preauthorized device type unit deployments in an efficient and cost-effective manner. In accordance with this perspective, the Company did accelerate several of their deployment schedules in 2019. Additionally, for some GMP programs, the Company completed all of the investments planned over for the three-year term, in 2019. The statuses, including deployment schedules, for each respective investment category and type are discussed in Section III of this Report. Please also refer to the Company's Attachment ES-1, which provides the Excel versions of the Eversource-specific tables included in Section 2.1, Section 2.2, Section 3.3, and Section 2.4.

V. Distributed Energy Resources (“DER”)

Installations of DER are growing at an astonishing rate in many parts of the United States, including Massachusetts. This surge in DER deployment on utility distribution systems has been accelerating over the last decade and is forecast to continue for the foreseeable future

The vast majority of DER installations are solar projects. The projects range from the high-volume residential roof top to large multi-MW stand-alone projects. The success of DER installations in recent years has led to high saturation levels in many areas of the Company’s distribution system. The DER activity of large scale solar in areas of relatively low electric load has been high over the last decade and, as shown in Figure 6, continues to see significant application activity.

Figure 6: 2019 Interconnection Applications

Territory	Status	Simplified	EXP/STD	Totals
EM	Applications Online in 2019	3,467	103	3,570
	Applications Received in 2019	4,808	654	5,462
WM	Applications Online in 2019	1,496	32	1,528
	Applications Received in 2019	1,804	59	1,863

There are new complicating factors that are now evolving in the market that require more technical review time and integrated system work to ensure the safety and reliability of the system. These factors include the emergence of:

- 1) Solar plus-storage market
 - a. This market has added complexity to DER studies and screens as well as metering and incentive program applicability.
 - b. Applicants are interested in maximizing incentive programs across state and Independent System Operator (“ISO”) markets which leads to confusion on application tracks.
- 2) Substation upgrades
 - a. Due to high saturation levels in certain areas of the system, studies are determining that substation upgrades are required to allow for project interconnection. This makes studies and construction activities more complicated and time-consuming. It also requires the Company’s planning teams to account for the potential for additional sub-station work or dedicated express feeders due to the expected continuing DER activity. The Company must ensure that resources are utilized, and projects are executed in an efficient fashion, which requires careful planning and coordination.

3) More frequent ISO transmission studies

- a. ISO is requiring studies for projects less than 5 MW in areas it deems saturated. This adds additional time, cost and engineering effort to many projects that historically did not have this extra layer of administrative and engineering complexity. Utilities and Transmission Groups are performing more level 0/1 and level 3 transmission studies and, in some cases, doing them in groups to process them more quickly than if they were processed sequentially. ISO and Eversource work together on the study process to minimize customer impact, but Eversource is aware that these new requirements are confusing to customers.

4) New metering and design configurations

- a. Metering configurations that vary based on system design and/or incentive program (e.g., ISO program participation, SMART program energy storage adder).
- b. Multiple service requests on single parcel and/or building (dedicated service for the DER which is separate from the existing customer).

5) Aggregation of small projects in certain areas

- a. Over time the number of small projects interconnected in an area leads to significant installed capacity.
- b. Simplified applications for multiple small projects in the same area require additional study and administrative and engineering burden to execute outside of the normal simplified process.

Eversource has participated in the D.P.U. 19-55 discussions with DER stakeholders to work on alignment and updates to the statewide Interconnection Tariff. Discussions have been targeted on topics such as group studies, cost allocation, metering, communications, energy storage, ASO Studies and ISO market participation.

Eversource is constantly exploring opportunities to better manage its DER grid interconnection processes in ways that can more fully leverage technology advances (e.g., advanced inverter functionalities), enable procedural transparency, and recognize evolving technical standards.

- Eversource recognizes first and foremost that a core group of technical experts is needed to streamline the application studies and effectively adapt to the changing dynamics. Accordingly, the Company has hired and is currently hiring additional engineers, analysts, and program managers into the DER Planning organization. During 2019, six engineers, one analyst and one program manager have been hired into the team, with the following objectives:
 - Streamline the interconnection process;
 - Provide additional resources to continue to perform efficient and cost-effective system impact studies;

- Support faster adaptation of new/updated industry standards and regulatory policies;
- Further refine and improve the Company’s interconnection standards, processes, procedures;
- Provide developers/customers with additional technical experts to facilitate interconnection options; and
- Perform rapid DER impact analyses for off-normal system configurations to reduce outages to the interconnected sites.

Eversource also recognizes that research in these emerging issues is critical in order to continue to support additional integration of DERs, especially with the emergence of a multitude of varying types of technologies. As such, Eversource has provided \$16,000 to the Worcester Polytechnic Institute (“WPI”) MPQ project where engineering students in their final year at WPI are conducting a research project on the evaluation of the flicker analysis. Furthermore, Eversource has also provided approximately \$300,000 in 2019 in research organizations such as the Electric Power Research Institute (“EPRI”) for performing relevant research to improve the integration and operability of DERs. For example, the Company has provided funding for studies related to enhanced modeling and simulation techniques for DER integration.

Additionally, the Company has rolled out and is continually exploring initiatives associated with mapping tools, an interactive self-service application portal, and proposing selective locations for storage to meet utility needs. Accurate, up-to-date maps of the distribution system can play a useful role for both the Company and potential DER interconnection applicants. For the utility, having this information can support a more rapid review of an interconnection application on a specific feeder. For applicants, having access to a more dynamic version of the map, specifically one that indicates remaining hosting capacity for new DER projects, allows them to be more selective in the types of projects and their specifics (e.g., capacity, technology deployed, etc.) to pursue in a formal interconnection application. By increasing visibility into the characteristics and feasibility of individual circuits, these maps can save both customers and the Company time and money.

The Company has published the first and second version of the Hosting Capacity Maps in its CT and Western MA service territories. In March 2020, the DER team also published the Hosting Capacity Map for Eastern Massachusetts (“EMA”) and is currently working towards the monthly update on that data. These maps, which do not depend on the use of an ALF tool, expeditiously provide key preliminary information to developers. The Company continues to work to incorporate feedback and data requests from the Department of Energy Resources (“DOER”) and DER developers into the maps.

As demonstrated at the February 13, 2019 technical session, the Company recognizes that hosting capacity maps are of critical importance to developers. As described in Section III, as a part of its GMP, the Company is making progress on its ALF program that will ultimately support the development and deployment of subsequent versions of hosting capacity maps based on more sophisticated logic as calculated by the ALF tool. Given the dynamic nature of DER in

Massachusetts, the Company's continued investment in foundational grid modernization investments is crucial to ensuring that the Company is able to aid these developers in siting and interconnecting their projects as part of an expedient and efficient process.

VI. Performance Metrics

A. Description and Report on Each Performance Metric

In D.P.U. 12-76-B, the Department directed Eversource, National Grid and Unitil (collectively, the “Distribution Companies” or “Companies”) to include in their respective GMPs performance metrics that measure progress towards the objectives of grid modernization. D.P.U. 12-76-B, at 30. Eversource filed proposed performance metrics with its GMP in D.P.U. 15-122, as did National Grid and Unitil in each of their respective GMP dockets. The Department determined that additional work was needed to develop performance metrics that appropriately track the quantitative benefits associated with pre-authorized grid-facing investments, and progress toward the Grid Modernization objectives. D.P.U. 15-122, at 95-106. The Department ordered the Distribution Companies to file revised proposed performance metrics designed to address the preauthorized grid-facing investments and noted that it would convene a stakeholder process to facilitate review of the revised performance metrics. *Id.* at 202.

On August 15, 2018, the Distribution Companies filed revised proposed performance metrics. Following that filing, the Department, the Department of Energy Resources (“DOER”) and the Cape Light Compact (“Compact”) issued information requests to the Distribution Companies regarding the revised proposed performance metrics. On February 13, 2019, the Department held a technical conference to aid its review of the Distribution Companies’ revised proposed performance metrics. Following the technical conference, the Department issued a Memorandum on March 19, 2019, ordering the Distribution Companies to file further revised performance metrics consistent with the directives set out in the Memorandum. March 19, 2019 Memorandum at 2-5. The Companies submitted final revised proposed performance metrics on April 9, 2019.

On July 25, 2019, the Department stamp approved the Companies’ proposed performance metrics dated April 9, 2019. This section of the Grid Modernization Annual Report describes the statewide, as well as company-specific, performance metrics that Eversource is using to evaluate progress towards the grid modernization objectives. Please note that, as the statewide metrics apply to Eversource, National Grid and Unitil, this section of Eversource’s 2020 Annual Grid Modernization Report will refer to all three Distribution Companies when describing the statewide metrics. For each performance metric, this section will identify the type, objective, assumptions, calculation approach, organization of results, and baselines.

The Department also ordered the Distribution Companies to develop a formal evaluation process, including an evaluation plan and evaluation studies, to review the Distribution Companies’ preauthorized grid modernization plan investments and their progress toward meeting the Department’s grid modernization objectives. D.P.U. 15-122, at 204-205. Guidehouse (formerly Navigant Consulting, Inc.) is completing the evaluation to ensure a uniform statewide approach and to facilitate coordination and comparability across the Distribution Companies.

The data supporting the performance metrics have been provided to the Guidehouse evaluation team by the Company. Results of the Monitoring and Control, as well as the Distribution Automation, investment areas are expected to be shared by Guidehouse in June 2020, as stated in DPU-EP-1-1. Results of other investment areas, such as Volt Var Optimizat on (“VVO”), are expected to be shared in June 2021. The performance metrics will be based on statistical analyses performed by the evaluation team using data provided by each Distribution Company and are to be evaluated in 2021 to allow adequate data collection to be completed.

The underlying data that supports a number of the performance metrics can also be found in the 2019 Annual Report Appendix 1.

The next section provides the accompanying details behind the performance metrics. As noted above, the results of these metrics and supporting analysis will be provided by Guidehouse in the Evaluation Reports to be filed in Q3 2020 and Q3 2021. The following matrix has been provided to summarize the relationship between each performance metric and its associated investment category.

Metric	Investment Category					
	M&C	DA	VVO	ADMS	Comms	ALF
Volt Var Optimization (VVO) Baseline			X			
VVO Energy Savings			X			
VVO Peak Load Impact			X			
VVO Distribution Losses w/o AMF (Baseline)			X			
VVO Power Factor			X			
VVO – Energy and GHG Impact			X			
VVO Related Voltage Complaints Performance Metric and Baseline			X			
Increase in Substations with DMS Power Flow and Control Capabilities				X		
Control Functions Implemented by Circuit (VVO, Auto Reconfiguration)				X		
Numbers of Customers that benefit from GMP funded Distribution Automation Devices		X				
Reliability-Focused Grid Modernization Investments' Effect on Outage Durations	X	X				
Reliability-Focused Grid Modernization Investments' Effect on Outage Frequency	X	X				
Advanced Load Flow - Percent Milestone Completion						X
Eversource Customer Outage Metric (Average Zone Size)		X				

1.1 VOLT VAR OPTIMIZATION AND CONSERVATION VOLTAGE REDUCTION BASELINE

Volt VAR Optimization and Conservation Voltage Reduction (“VVO/CVR”) is a solution that reduces energy consumption and demand without the need for customer interaction or participation. The core principle behind VVO/CVR is that load is more optimally utilized at lower voltages. The primary focus of VVO/CVR is to reduce circuit demand and energy consumption by flattening and lowering voltage profile on the circuit while maintaining customer service voltage standards. In addition, VVO/CVR systems allow for more gradual and responsive control of reactive power devices, such as capacitors, which will help improve the overall system power factor and reduce system losses. VVO/CVR allows customers to realize lower consumption without experiencing a reduction on the level of comfort and service.

Quantifying the exact impact of VVO/CVR is difficult to achieve given the Companies’ current level of visibility into their systems. In a VVO/CVR system, the Companies will not have visibility into exactly what customer loads are being impacted, nor will they be able to identify the impact of the VVO/CVR system at any specific point in time. In order to have this level of visibility, the Companies would need to have interval metering at each residential customer’s premises. At this time, none of the Companies have this level of residential metering. The metrics discussed below are all based on a measurement and verification (“M&V”) process, which uses a statistical process to quantify the impact the VVO/CVR system has on the customers it serves.

1.1.1 Type of Metric

Statewide Performance Metric

1.1.2 Objective

Establish a baseline impact factor for each VVO enabled circuit which will be used to quantify the peak load, energy savings and greenhouse gas (“GHG”) impact measures.

1.1.3 Assumptions

VVO dynamically controls and coordinates multiple devices to manage both voltage and reactive power. System-wide efficiency is achieved by simultaneously coordinating operations using continuous measurements from multiple sensors distributed across the circuit.

Once a circuit has VVO enabled, a M&V process will be performed through operating VVO using a predetermined time period and series. Based on the results of this M&V process, a circuit level VVO impact and baseline will be created.

1.1.4 Calculation Approach

The following data will be tracked and reported on a substation and circuit basis:

- Determine circuit loads through measurements during on/off periods
- Apply temperature corrections.
- Develop load profiles.

As part of the baseline data capture, each VVO circuit will capture hourly circuit data for real and reactive power.

Time	P (kW)	Q (kVAR)
1:00 AM	4298	1949
2:00 AM	4061	1542
3:00 AM	3284	1574
4:00 AM	3408	1277
5:00 AM	2896	1519
6:00 AM	2900	1200
7:00 AM	3185	1388
8:00 AM	3103	1476
9:00 AM	4006	1868
10:00 AM	3817	1884
11:00 AM	4351	1997
12:00 PM	4635	2323
1:00 PM	5129	2390
2:00 PM	5213	2673
3:00 PM	5517	2677
4:00 PM	5378	2478
5:00 PM	5400	2855
6:00 PM	5658	2986
7:00 PM	5720	2638
8:00 PM	5643	2922
9:00 PM	5290	2664
10:00 PM	5346	2628
11:00 PM	5019	2496
12:00 AM	4801	2667

1.1.5 Organization of Results

This information will be provided for each VVO enabled circuit and serve as the baseline variable for calculating demand reductions or serve as variables for other calculations, such as reductions in GHG emissions. This calculation will be performed once and will support both circuit and system level impacts.

1.1.6 Baseline

The baseline will be calculated through M&V after each circuit and/or substation is placed into service. The Company recommends that each VVO/CVR circuit undergo a three to six-month M&V process, the results of which will be used to estimate the impact the system has on system load for the next five-years. At the end of five years, the M&V would be repeated to ensure that each Company is using recent and relevant results for metric reporting. Baselines will be reported during the first Annual Report following the field verification.

1.2 VVO ENERGY SAVINGS

1.2.1 Type of Metric

Statewide Performance Metric

1.2.2 Objective

Quantify the energy savings achieved by VVO using the baseline established for the circuit against the annual circuit load with the intent of optimizing system performance.

1.2.3 Assumptions

Once a circuit has VVO enabled, a M&V process will be performed through operating VVO using a predetermined time period and series. Based on the results of this M&V process, a circuit level VVO impact and baseline will be created.

1.2.4 Calculation Approach

The following data will be tracked and reported upon on a substation and circuit basis:

- a. Annual energy delivered in kilowatt hours (“kWh”) for 2015, 2016, and 2017.

Energy Savings will be represented by the net impact of VVO using the baseline established for the circuit against the annual circuit load.

1.2.5 Organization of Results

This information will be provided for each VVO enabled circuit and serve as the baseline variable for calculating demand reductions or serve as variables for other calculations. This will be performed annually, and support both circuit and system level impacts.

1.2.6 Baseline

VVO-related pre-investment baseline of energy delivered in kilowatt hours (“kWh”) will be provided for each feeder and substation within the service territory for the years 2015, 2016, and 2017 to the extent that historical metering data are available. For feeders where such data are currently not available, the Companies shall estimate the VVO-related pre-investment baseline of annual energy delivered in kWh and identify these feeders with estimates until the necessary metering is installed.

1.3 VVO PEAK LOAD IMPACT

1.3.1 Type of Metric

Statewide Performance Metric

1.3.2 Objective

This metric is designed to quantify the peak demand impact VVO/CVR has on the system with the intent of optimizing system demand.

1.3.3 Assumptions

For this metric, the Companies will utilize active circuit M&V peak demand reduction results from individual circuits. No M&V results older than five years will be used.

1.3.4 Calculation Approach

This metric will use the following data:

- Circuit level M&V estimated hourly demand reduction
- Circuit level hourly on/off VVO/CVR Status
- Circuit level hourly peak demand
- System Level yearly peak time

Each Company will apply the corresponding M&V estimated hourly demand reduction on all circuits with active VVO/CVR for the appropriate peak hour. As some circuits have different peak times, using the appropriate demand estimated reduction for the correct hour is important. This will result in a single (GW) estimated demand reduction attributed to VVO/CVR for each Company. Each Company's individual demand reduction attributed to VVO/CVR will be aggregated, resulting in the statewide estimated reduction.

1.3.5 Organization of Results

Each Company will provide individual circuit VVO/CVR performance, GWs estimated demand reduction, as well as the summation of total system impact.

1.3.6 Baseline

VVO-related pre-investment baseline of annual peak load in million-volt ampere ("MVA") will be provided for each feeder and substation within the service territory for the years 2015, 2016, and 2017.

1.4 VVO – DISTRIBUTION LOSSES WITHOUT AMF (BASELINE)

1.4.1 Type of Metric

Statewide Performance Metric

1.4.2 Objective

VVO reduces circuit demand by flattening and lowering circuit voltages, primarily by using voltage regulators. At the same time, VVO actively controls capacitor banks to maintain circuit power factors near unity. This distribution automation project will implement better voltage

regulation to improve power quality and reduce losses. This includes the coordinated operation of a voltage regulator with a transformer load-tap changer at a substation.

Electrical loss in the circuit can be investigated using the difference between power provided by the circuit regulator and the total power delivered to the consumer loads. This impact metric presents the difference between circuit load measured at the substation via the SCADA system and the metered load measured both at the substation and at line devices capable of capturing load over the necessary intervals.

1.4.3 Assumptions

There are many elements that contribute to differences between circuit load data and the hourly measurements. These factors include:

- Unmetered load, such as street lights
- Electricity theft
- Circuit line losses

1.4.4 Calculation Approach

Using hourly data for real and reactive power, one can determine hourly line losses. This represents both technical and non-technical, e.g., theft, losses.

1.4.5 Organization of Results

This information will be provided on an annual basis for VVO enabled circuits. Results will be based upon the results at the end of each calendar year.

1.4.6 Baseline

The baseline for line losses will need to be developed once the circuit is enabled and the data is captured. The baseline for this metric will be reported in the first annual report after the M&V is completed.

1.5 VVO POWER FACTOR

1.5.1 Type of Metric

Statewide Performance Metric

1.5.2 Objective

VVO reduces circuit demand by flattening and lowering circuit voltages, primarily by using voltage regulators. Simultaneously, VVO actively controls capacitor banks to maintain circuit power factors near unity. Power factor is an indication of how efficiently the distribution system is delivering power. A distribution system operating at unity power factor delivers real power more efficiently than one operating at either a leading or lagging power factor. This performance metric seeks to quantify the improvement that VVO/CVR is providing. However,

power factor alone is not sufficient to accurately describe the impact VVO/CVR has on the system. At low demand levels, a poor power factor is not as significant than at high demand levels. Therefore, some qualifications must be made to accurately track power factor.

1.5.3 Assumptions

Performance will be based on circuit level hourly power quality measurements at the substation.

1.5.4 Calculation Approach

This metric will use the following data:

- Circuit level hourly Power Factor
- Circuit level hourly on/off VVO/CVR Status
- Circuit level hourly peak demand

For this performance metric, only power factors corresponding to greater than 75 percent of a circuit's peak annual demand will be used. This qualified data will then be averaged to provide a circuit by circuit power factor performance metric. These averages will then be used to generate a system power factor performance, weighted by the peak demand of each respective circuit.

1.5.5 Organization of Result

The results of this metric will be reported in a tabular format on a circuit by circuit basis and a total system tally. Power factor is a dimensionless metric.

1.5.6 Baseline

The baseline will be measured with VVO disabled and then again with VVO enabled to develop a baseline. The baseline for this metric will be reported in the first Annual Grid Modernization Report after the M&V is completed.

1.6 VVO ESTIMATED VVO/CVR ENERGY AND GHG IMPACT

1.6.1 Type of Metric

Statewide Performance Metric

1.6.2 Objective

This metric is designed to quantify the overall GHG impact VVO/CVR has on the system. A GHG reduction estimate will be derived from the circuit level energy savings.

1.6.3 Assumptions

For this metric, each Company will utilize active circuit M&V energy reduction results from individual circuits. No M&V results older than five years will be used. To calculate GHG

reductions, each Company will use GHG emissions factors consistent with those used in the 2019-2021 Three-Year Energy Efficiency Plans for displaced GHG.

1.6.4 Calculation Approach

This metric will use the following data:

- Circuit level M&V estimated Energy Reduction
- Circuit level hourly on/off VVO/CVR Status
- Circuit level hourly energy
- GHG emissions factors consistent with those used in the 2019-2021 Three-Year Energy Efficiency Plans

Each Company will accumulate all hours with active VVO/CVR and use the respective M&V energy reduction estimate, applied against the hourly demand. This will result in a single (GWhr) estimated energy reduction attributed to VVO/CVR for each Company, and, when combined with other companies, statewide.

CO₂ avoided due to VVO/CVR will be calculated by multiplying the above energy reduction by a typical generation emissions factor based upon metric tons per MWh.

$$CO_2 \text{ Emissions(tons)} = \text{Energy Savings(MWh)} \times CO_2 \text{ Emissions Factor} \left(\frac{\text{tons}}{\text{MWh}} \right)$$

The calculation will use the GHG emissions factors consistent with those used in the most recent version (currently 2019-2021) Three-Year Energy Efficiency Plans.

1.6.5 Organization of Results

Each Company will provide individual circuit VVO/CVR performance, GWhrs estimated energy reduction, as well as the summation of total system impact.

1.6.6 Baseline

The baseline for this metric will be reported in the first Annual Grid Modernization Report after the M&V is completed.

1.7 INCREASE IN SUBSTATIONS WITH DISTRIBUTION MANAGEMENT SYSTEM (“DMS”) POWER FLOW AND CONTROL CAPABILITIES

1.7.1 Type

Statewide Performance Metric

1.7.2 Objective

This metric will demonstrate the progress in the Advanced Distribution Management System (“ADMS”) investment by tracking the substations that have been equipped with power flow

capabilities as well as the number of customers benefitting from the technology on each feeder. This metric will support the objective of optimizing system performance and more specifically improve asset utilization, improve reliability and integrate distributed energy resources. ADMS gives system operators increased visibility on the real time output of generating facilities. This metric is designed to demonstrate that the model is an accurate representation of field conditions.

1.7.3 Assumptions

A substation will be assumed to have DMS power flow capability when all feeders are modeled daily with no unwarranted voltage or capacity violations over a consecutive 30-day period.

1.7.4 Calculation Approach

This metric will track and report on the following:

From the time that a substation model is available on a daily basis, for each substation, number of voltage or capacity violations for a consecutive 30-day period, with explanation of any warranted voltage or capacity violations.

In addition, the Companies will report on the number of customers on each feeder benefitting from this technology.

1.7.5 Organization of Results

This information will be provided on an annual basis. Results will be based upon the results at the end of the calendar year.

1.7.6 Baseline

The baseline for this metric will start at zero since no feeders have been equipped with this technology. A chart with the total number of feeders installed each year along with a detailed report supporting the chart will be provided to support the tracking of this metric.

1.8 CONTROL FUNCTIONS IMPLEMENTED BY CIRCUIT (VVO, AUTO RECONFIGURATION)

1.8.1 Type

Statewide Performance Metric

1.8.2 Objective

This metric will show the progress in the ADMS investment by tracking the control functions implemented at the circuit level as well as the number of customers affected by the technology on each feeder. This metric will support the objective of optimizing system performance and more specifically minimize electrical losses and improve reliability.

1.8.3 Assumptions

A control function will be defined as the ability for the DMS to automatically issue command to field devices based on real time system condition, and a circuit will be included in this metric when all devices defined as “fully automated” can be automatically controlled.

1.8.4 Calculation Approach

This metric will track and report on the following:

- Circuits with control function implemented
- Type of control function implemented

In addition, the Companies will report on the number of customers on each feeder affected by this technology.

1.8.5 Organization of Results

This information will be provided on an annual basis. Results will be based upon the results at the end of the calendar year.

1.8.6 Baseline

The baseline for this metric will start at zero since the specific control functions laid out as part of the Companies’ respective GMPs have never been deployed. A table outlining the details behind the control functions implemented at the circuit level will be provided to support the tracking of this metric.

1.9 NUMBERS OF CUSTOMERS THAT BENEFIT FROM GMP FUNDED DISTRIBUTION AUTOMATION DEVICES

1.9.1 Type

Statewide Performance Metric

1.9.2 Objective

This metric will show the progress in the Distribution Automation (“DA”) investment by tracking the numbers of customers that have benefitted from the installation of DA devices. This metric will support the objective of optimizing system performance and more specifically reduce the duration and number of customers impacted by outage events. These investments will also allow for a reduction in manual switching operations, reduce operations cost and potentially defer capital upgrades with enhanced flexibility to shift load.

1.9.3 Assumptions

A customer will benefit from DA when their automated zone size is reduced.

1.9.4 Calculation Approach

This metric will track and report on the following:

- Circuit number
- Number of customers impacted

1.9.5 Organization of Results

This information will be provided on an annual basis. Results will be based upon the results at the end of the calendar year.

1.9.6 Baseline

The baseline for this metric will start at zero since this will be tracking only the customers that benefit from GMP investments. A table with the type of device, circuit number where installed and number of customers benefitted will be provided to support the tracking of this metric.

1.10 RELIABILITY-FOCUSED GRID MODERNIZATION INVESTMENTS' EFFECT ON OUTAGE DURATIONS

1.10.1 Type

Statewide Performance Metric

1.10.2 Objective

This metric will compare the experience of customers on GMP DA-enabled circuits as compared to the prior three-year average for the same circuit. This metric will provide insight into how DA can reduce the duration of outages.

1.10.3 Assumptions

Outages and their impact are typically situational in nature. The DA solutions must be capable of performing intended actions in under the one-minute threshold set by the Department. There may be circumstances where more complex FLISR schemes may take longer than one minute, but less than five, to properly locate, isolate and restore an impacted area safely. The circuit must have three years of System Average Interruption Duration Index ("SAIDI") history to be included in the metric. Additionally, numerous factors, such as a Company's tree trimming cycle, weather and vehicular accidents, can impact system reliability, regardless of a Company's grid modernization investments.

1.10.4 Calculation Approach

This metric will track and report on the following:

- Circuit level SAIDI for circuits that have DA enabled in the GMP plan year
- Three-year average circuit level SAIDI covering the years 2015, 2016, and 2017
- Compare the current year circuit SAIDI with the three-year historic average SAIDI of the circuit

AVERAGE ('CKAIDI 2015'+ 'CKAIDI 2016'+ 'CKAIDI 2017') - 'CKAIDI Year n' = if greater than 0, positive impact.

1.10.5 Organization of Results

This information will be provided on an annual basis. Results will be based upon the results at the end of the calendar year.

1.10.6 Baseline

The pre-investment baseline of a static three-year average circuit level SAIDI in 2015, 2016, and 2017 shall be provided for each feeder within the service territory. Additionally, the baseline shall be provided with and without Excludable Major Events⁸ along with a summary of the main causes of outages on each feeder. The metric will use the circuit three-year SAIDI covering the years 2015-2017 average as the baseline. It will compare the SAIDI results of the plan year to the circuit's 2015-2017 three-year historic average.

1.11 RELIABILITY-FOCUSED GRID MODERNIZATION INVESTMENTS' EFFECT ON OUTAGE FREQUENCY

1.11.1 Type

Statewide Performance Metric

1.11.2 Objective

This metric will compare the experience of customers on DA-enabled circuits as compared to the prior three-year average for the same circuit. This metric will provide insight into how DA can reduce the frequency of outages.

1.11.3 Assumptions

Outages and their impact are typically situational in nature. The DA solutions must be capable of performing intended actions in under the one-minute threshold set by the Department. There may be circumstances where more complex FLISR schemes may take longer than one minute, but less than five, to properly locate, isolate and restore an impacted area safely. The circuit must have three years of SAIFI history to be included in the metric.

1.11.4 Calculation Approach

This metric will track and report on the following:

⁸ The Department has defined an "Excludable Major Event" as a major interruption event that meets one of the three following criteria: (1) the event is caused by earthquake, fire or storm of sufficient intensity to give rise to a state of emergency proclaimed by the Governor (as provided under the Massachusetts Civil Defense Act); (2) any other event that causes an unplanned interruption of service to fifteen percent or more of an Electric Company's total customers in its entire service territory; or (3) the event was a result of the failure of another company's transmission or power supply system. D.P.U. 12-120-D, §I.B (2015). An interruption event caused by extreme temperature condition is not an Excludable Major Event. Id.

- Circuit level SAIFI for circuits that have DA enabled in the GMP plan year
- Three-year average circuit level System Average Interruption Frequency Index (“SAIFI”) covering the years 2015, 2016, and 2017
- Compare the current year circuit SAIFI with the three-year historic average SAIFI of that circuit

AVERAGE (‘CKAIFI 2015’+’ CKAIFI 2016’+’ CKAIFI 2017’) - ‘CKAIFI Year n’ = if greater than 0, positive impact.

1.11.5 Organization of Results

This information will be provided on an annual basis. Results will be based upon the results at the end of the calendar year.

1.11.6 Baseline

The pre-investment baseline of a static three-year average circuit level SAIFI in 2015, 2016, and 2017 shall be provided for each feeder within the service territory. Additionally, the baseline shall be provided with and without Excludable Major Events along with a summary of the main causes of outages on each feeder. The metric will use the circuit three-year SAIFI average covering the years 2015-2017 as the baseline for this metric. It will compare the SAIFI results of the GMP plan year to the circuit’s 2015-2017 three-year historic average.

1.11.6 VVO RELATED VOLTAGE COMPLAINTS PERFORMANCE METRIC AND BASELINE

1.11.7 Type of Metric

Statewide Performance Metric

1.11.8 Objective

The primary focus of the VVO investments is to manage circuit voltages at a lower threshold while maintaining minimum voltage service requirements for all customers on a substation and circuit. Since VVO will be actively managing voltages, there is a desire to track and report on the potential for the introduction of VVO-related voltage complaints. While VVO is not an active solution in use by the Companies today in Massachusetts, there may be historical low voltage causes that exist outside of a customer’s service connection and equipment. Certain voltage issues, such as those that are ultimately determined to have been caused by customer-owned equipment, will not be mitigated by the Companies’ VVO investments. The Companies will measure the change in voltage complaints following deployment of VVO technology to determine the impact relative to a pre-deployment baseline.

1.11.9 Assumptions

Prior to the requirement to track and report on whether VVO investments could potentially contribute to customer voltage complaints, there was never a need for the Companies to track

customer voltage complaints in this manner. For instance, in some cases large commercial and industrial (“C&I”) customers’ voltage complaints were processed through their customer account executives and were not necessarily logged in the Companies’ work management systems: thus, there is no data as to the cause of the voltage issue that gave rise to the complaint. While residential customer voltage complaints were logged in the respective systems, given that VVO is a new investment the Companies cannot reasonably associate these historical complaints as being caused or impacted by VVO investments. In an effort to develop a baseline for this metric, the Companies must manually review the available records to determine the cause and remedy of the voltage issue that led to the customer complaint.

Going forward, the Companies intend to specifically track customer voltage complaints to determine if VVO investments led to the voltage condition giving rise to the customer complaint. Eversource currently has a tracking and reporting process in its Western Massachusetts (“WMA”) service territory that enables it to capture and categorize the necessary data related to these voltage complaints. Eversource will expand this process into its Eastern Massachusetts (“EMA”) service territory in the near-term to ensure that all relevant data related to the impact of VVO investments on customer voltage complaints is tracked and reported. Unitil currently tracks customer voltage complaints in its Customer Information System (“CIS”) and plans to revise the system coding to better capture the data necessary to determine if a voltage issue was impacted by VVO investments. National Grid is currently exploring system and process improvements and enhancements to ensure it is able to track the necessary data on these customer complaints.

Given the lack of consistent and comprehensive data as to whether a customer’s voltage complaint was influenced by VVO investments, the Companies propose to utilize all customer voltage complaints received in 2015, 2016 and 2017 to develop the baseline for this performance metric. Additionally, since the compilation of the voltage complaints is a significant manual process, the Companies propose, for the 2018-2020 GMPs, to utilize the following circuits to establish the initial baseline for this performance metric.

Eversource – In its 2018-2020 GMP plans, Eversource will deploy VVO on circuits in Western MA. As previously mentioned, there was a voltage complaint tracking system in Western MA so Eversource will establish a baseline based on the information included in the Western MA tracking system and report on the Western MA performance. There are no VVO investments planned in Eastern MA during 2018-2020. Eversource will incorporate Eastern MA in its baseline, tracking and reporting process in 2021 for the next three-year GMP (2021-2023).

Unitil – Under its approved GMP, Unitil intends to install VVO investments on all of the circuits in its service territory. For this performance metric, Unitil proposes to utilize all of its circuits in establishing the baseline

National Grid – National Grid proposes, as an initial baseline, to use the 16 feeders on which it intends to install VVO investments under its 2018-2021 GMP. National Grid is targeting larger circuits in its service territory, that serve approximately 1000 customers or more. National Grid will, following its development and implementation of system and process improvements and enhancements to track these customer complaints and the relevant data, incorporate the remainder of the circuits in its service territory into the baseline for this performance metric for the 2021-2023 GMP.

Eversource and National Grid propose to update the baseline for this metric with respect to the 2021-2023 GMPs to include all circuits within their respective service territories.

1.11.10 Calculation Approach

This metric will track and report on the following:

- Quantity of voltage complaints for the current year that are deemed caused by VVO voltage management by circuit for circuits that will have VVO installed.
- Three-year average of all voltage complaints by circuit covering the years 2015, 2016, and 2017
- Compare the current year quantity of voltage complaints with the three-year historic average

AVERAGE ('Voltage Complaints 2015' + 'Voltage Complaints 2016' + 'Voltage Complaints 2017') = Voltage Complaint Baseline

1.11.11 Organization of Result

The baseline voltage complaints and the annual VVO-related voltage complaints (once VVO investments are active and enabled) will be provided on an annual basis for each circuit. Results will be based upon the results at the end of the calendar year. This will provide the Department an opportunity to assess the effectiveness of the VVO investments while minimizing the introduction of new customer impact.

1.11.12 Baseline

Utilizing the assumptions discussed above, the Companies will calculate the 2015 through 2017 baseline to use to measure process under this metric. Given the manual and time-consuming nature of the process to review and compile the customer complaint data, the Companies have determined that this process can be undertaken and completed by June 28, 2019 for incorporation into the Companies' respective 2018 Annual Grid Modernization Reports.

1.11.13 EVERSOURCE ADVANCED LOAD FLOW – PERCENT MILESTONE COMPLETION

1.11.14 Type of Metric

Eversource-specific Performance Metric

1.11.15 Objective

The metric is designed to demonstrate progress towards the final completion of a fully automated modelling tool. The metric will measure percent completion relative to a final deliverable of a fully automated load flow tool used by Eversource engineers and system operators to perform multi-circuit analysis for all non-network circuits.

1.11.16 Assumptions

Demonstration of progress will be measured by assessment of achieved functionality. Models and capabilities will continue to improve in functionality and accuracy with further refinements in a process of continuous improvement of modeling tools.

1.11.17 Calculation Approach

Under this metric, the percent completion will be determined based on the demonstrated progress with respect to the following milestone targets:

Static Analysis: Ability to analyze results at an individual circuit level - for new load, for Distributed Generation (“DG”) pre-application screening, fault analysis, high/low voltage complaint investigations.

Semi-Automatic 1: Ability to run basic analysis in an automated process at an individual circuit level – for new load, DG pre-application screening, fault analysis, high/low voltage complaint investigations

Semi-Automatic 2: Added capability to automatically run processes on groups of circuits – advanced DG impact studies, including contingencies and alternate source analysis.

Fully Automated: Capability to automatically run processes on all circuits, storing results in a database that can be used by engineering and operations, as well as for customer facing information tools like hosting capacity maps.

1.11.18 Organization of Results

Results will be organized by percent of feeders meeting each milestone target.

1.11.19 Baseline

The baseline is estimated at 40 percent of circuits meeting the Static Automation milestone and 10 percent of feeders meeting the Semi-Automatic 1 metric. Baseline for Static Automation 2 and Fully Automated are each 0 percent.

1.12 EVERSOURCE CUSTOMER OUTAGE METRIC

1.12.1 Objective

This metric is intended to measure progress in sectionalizing circuits into protective zones designed to limit outages to customers located within the zone. This metric will measure progress in achieving the grid modernization objective of reducing the impact of outages.

1.12.2 Assumptions

A protective zone is defined as the portion of a circuit or circuits that would be isolated by automated backbone devices that will operate automatically to minimize the number of customers affected in the event of an outage.

1.12.3 Calculation Approach

For each circuit and for the sum of circuits in eastern and western MA, the metric will track and report on the average zone size in terms of number of customers interconnected in each protective zone.

1.12.4 Organization of Results

This information will be provided on an annual basis. Results will be based upon the results at the end of the calendar year.

1.12.5 Baseline

The Company will provide the average zone size by circuit as of the end of 2017 as the baseline for this metric.

B. Lessons Learned/Challenges and Successes

Given that the reported performance metrics data is in the early stages, comparative analysis is not yet available to make a determination as to the efficacy of the GMP investments toward their objectives.

C. Hosting Capacity Analysis Update

The Advanced Load Flow (“ALF”) component of the Eversource GMP, which is a key enabler of future detailed Hosting Capacity (“HC”) maps, is proceeding on schedule, improving the automation capability to produce detailed distribution circuit models. This effort will enable

the creation of the HC maps during the early stages of the 2021-2023 GMP. Creating those maps will involve some additional model improvement (to achieve full automation capability) as well as the coding and automation within the load flow software and associated results database to produce the customer-facing maps.

In the meantime, Eversource has produced initial Hosting Capacity Maps, available via the Company website, providing a circuit level capacity value. This first step has not only provided some basic information to the public but has also given the Company some experience in HC map presentation options. Feedback from this tool will provide valuable input to the more detailed and robust maps to be developed in the next GMP.

VII. Research, Design and Development

In D.P.U. 12-76-B, the Department directed the Distribution Companies, as part of their GMPs, to propose research, design and development (“RD&D”) projects that focus on the testing, piloting, and deployment of new and emerging technologies to meet their grid modernization objectives. D.P.U. 12-76-B at 27-30. As part of its GMP, Eversource filed an RD&D proposal to undertake projects in the following areas: (1) sensing and monitoring; (2) advanced analytics; (3) real-time flexible action and dynamic integration of distributed energy resources; (4) impact of grid modernization technologies on low income customers; (5) pricing options; (6) customer engagement and behavioral response; and (7) microgrids. D.P.U. 15-122, at 44.

Ultimately, the Department did not approve the Company’s proposed RD&D projects, nor did it approve the proposals filed by National Grid and Unitil. Id. at 185. The Department indicated that any future RD&D proposals incorporated into future GMPs would be reviewed consistent with the standards developed by the Department in light of RD&D proposals made in other contexts. Id. at 185, citing D.P.U. 17-05, at 457-460; NSTAR Electric Company and Western Massachusetts Electric Company, D.P.U. 16-178, at 26, 29-30 (2017); Fitchburg Gas and Electric Light Company, D.P.U. 16-184, at 11 (2017). In reaching its decision, the Department emphasized that any future RD&D proposals contained in future GMPs should be the result of collaboration between the Distribution Companies and other stakeholders. Id.

Consistent with the Department’s decision in D.P.U. 15-122, the Company is not undertaking any RD&D efforts as part of its 2018-2020 GMP. The Company will, in developing any future RD&D proposals, collaborate with National Grid and Unitil, as well as relevant stakeholders, prior to filing any proposal with the Department for its review and approval.

VIII. Energy Storage

This Section discusses activity to-date on Eversource’s two battery energy storage (“BES”) projects following the Department’s final decision in the Company’s rate case, D.P.U. 17-05.

A. Outer Cape BES

Overview

The Outer Cape BES project will be constructed as a 24.9 MW / 38 MWh lithium ion battery system, located on approximately 1.4 acres at the Provincetown transfer station on land leased from the Town of Provincetown.

The primary purpose of the Outer Cape BES project is to provide back-up power during outages on Line 96, which is a single, three-phase distribution line that serves as many as 11,000 customers from the Towns of Wellfleet, Truro, North Truro and Provincetown.

Line 96 starts at Wellfleet substation and extends along Route 6 going east to the tip of Provincetown. Due to its proximity to harsh Atlantic winds and weather conditions, Line 96 has poor reliability statistics, which made it an appropriate candidate for the BES project and the reliability improvements it is anticipated to provide to customers. In fact, customers on Line 96 and all tapped circuits and low voltage stations in Wellfleet, Truro, and Provincetown have experienced over 137,756 customer outage hours over the last five years. This is an average of 27,551 per year from 2015-2019. Since the beginning of 2019 there have been two events on Line 96 for which the BES would have avoided a total of 14,600 sustained customer outages.

One solution to improve this significant reliability issue for the Company’s customers on Line 96 would be to build a 13-mile redundant distribution line. This line would require construction through a significant portion of the Cape Cod National Seashore, which would generate potential environmental impacts.

The Eversource engineering team identified this area as a key target for a BES project. This recommendation was confirmed by Eversource’s expert consultant, Doosan, in its preliminary feasibility analysis. The Department approved the Company’s BES project proposal in D.P.U. 17-05, with a projected cost of \$40 million.

Design, Site Selection, and Outreach Activity

At the time of the preliminary feasibility analysis, Eversource expected to construct the BES project in Wellfleet, Massachusetts. However, Eversource and its experts confirmed as part of the final feasibility analysis that siting the BES project as close to the tip of Provincetown as possible would be the optimal solution to maximize potential benefits for customers on the Outer Cape.

Eversource now estimates that, during times when loading is at lower levels (particularly in the non-summer months), the BES project could provide back-up power for up to 10 hours. This is a duration that would cover most outages. Eversource further estimates that, during summer peak

loads, the BES project will provide between 1.5 to 3 hours of back-up power depending on the precise location of the outage.

In January 2018, Eversource met with the Town of Provincetown (the “Town”) to discuss the purpose of the BES project and to inquire whether there were any Town-owned locations on which Eversource could site the BES project. Eversource also examined privately-owned potential sites in the Town and North Truro but found no viable candidates.

The Town was a strong partner from the start. Starting in April 2018, the Town worked with the Eversource team to evaluate three potential sites. The sites were evaluated based on a set of criteria that would assure the BES project would be situated so as to: (1) minimize the visibility of the BES project for aesthetic purposes; (2) involve minimal sound impacts to surrounding properties from the BES project; (3) have approximately an acre and a half of space with limited or no environmental impact (*i.e.*, no wetlands, rare species habitat); (4) enable an optimal electrical connection to the distribution system; and (5) be supported by the Town’s residents and leadership.

Based on these criteria, one site proved infeasible due to lack of space and an environmental issue. A second site presented with potential visibility from a bike path. A third, on the Town Transfer Station, met all the criteria.

Accordingly, with the Town’s support, Eversource began a permitting-level design of the BES project with its expert consultant, TRC, in the late summer of 2018. A permitting-level design means that the first 30 percent of the project is designed, enabling Eversource to commence permitting and to solicit competitive bids through a request for proposals (“RFP”) process for engineering and construction services (more detail on this process is provided below).

During this time, Eversource continued extensive outreach with the Town leadership and its various departments. This included many face-to-face meetings and two publicly televised presentations to the Provincetown Select Board, which provided vital feedback and guidance on how to make the BES project the best possible project for Provincetown and its residents. The Town indicated the BES project would need to be constructed and housed in a building rather than in a container solution to conform to the Town’s aesthetic requirements and meet Town bylaw building height requirements. Eversource appreciated the collaboration with the Town. This construction standard was included as a new requirement in this part of the project-development phase.

The Town voted at its October 2018 Town Meeting to amend its zoning by-laws to make the project a permitted, special use at the Transfer Station. On April 2, 2019, Eversource appeared before more than 300 residents at the Town’s Annual Meeting to request approval to lease 1.4 acres of Town-owned land at the Transfer Station to construct the BES project. The warrant was presented by Town leadership and Eversource was called to the floor to answer multiple questions from Town residents about the BES project. Provincetown residents voted unanimously to authorize the Town to enter into a long-term lease with Eversource to construct the BES project at the Transfer Station. The lease to utilize the Transfer Station has been completed with the first payment to support the project made in March 2020. The Town’s cooperation was invaluable in the timely and cost-effective deployment of the BES project.

Permitting

The Outer Cape BES project permitting process is substantially complete. Local permits were secured from the Provincetown Planning Board, Zoning Board, Select Board and Conservation Commission. Permits were also secured from the Department of Transportation Highway Permit and the National Heritage & Endangered Species Program. Eversource has also secured a Landfill Post-Closure Minor Modification Permit.

B. Martha's Vineyard BES

Overview

The Martha's Vineyard BES project will be a 4.9 MW / 20 MWh lithium ion battery located on just over an acre of Eversource-owned land adjacent to its Area Work Center in Oak Bluffs.

The primary purpose of the Martha's Vineyard BES project is to significantly reduce reliance on five diesel-fired peaking generators on Martha's Vineyard that are used to supply power to the Island during high load conditions.

Martha's Vineyard is served by four undersea cables that connect into the mainland at Falmouth. The year-round population on the Island is around 15,000 but increases to approximately 125,000 residents in the summer. This causes electricity use on the Island to surge and the undersea cables become strained. When this happens, Eversource relies on five diesel-fired peaking units, providing approximately 12.5 MW of supplemental power. These units were constructed in the 1950s.

Eversource engineers identified Martha's Vineyard as a potential BES location due to the potential for the BES to significantly reduce reliance on the diesel-fired peaking generators, as well as to enable the interconnection of additional solar photovoltaics ("PV") on the Island (see DP.U. 15-122, Eversource response to DPU-ES-2-1). This recommendation was confirmed by Eversource's expert consultant, Doosan, and its preliminary feasibility analysis. The Department approved the Company's BES project proposal in D.P.U. 17-05, with a projected cost of \$15 million.

Eversource contemplates the Martha's Vineyard BES project as having two phases. The first phase would reduce reliance on two of the five peaking units. The second phase of the BES project (constructing additional battery capacity) will be evaluated for the feasibility of reducing reliance of all five peaking generators.

Design, Site Selection, and Outreach Activity

Since the issuance of the Department's final decision in D.P.U. 17-05, Eversource and Doosan completed a final feasibility study for the project. This study confirmed that the BES project would also help reduce the impact during an N-1 contingency condition on the Island, potentially deferring the construction of an additional undersea cable. The Eversource team also subsequently confirmed that the BES project could be used to shave yearly and monthly peaks when not needed to reduce reliance on the peaking units, resulting in additional capacity and transmission Regional Network Savings ("RNS") savings.

In January 2018, Eversource commenced outreach to the Town of Oak Bluffs (the “Town”) about the project and specific work with the Town began in April 2018. Eversource advised of its intent to construct the BES project on Company-owned land behind its Area Work Center in Oak Bluffs. This location met the Eversource siting criteria by: (1) minimizing the visibility of the BES project for aesthetic purposes; (2) involving minimal sound impacts to surrounding properties from the BES project; (3) offering approximately one acre of space with limited or no environmental impact (i.e., no wetlands, rare species habitat); and (4) enabling an optimal electrical connection to the distribution system. The Town indicated the BES project would need to be constructed and housed in a building rather than a container solution to meet the Town’s aesthetic requirements.

Eversource has worked closely with the Town, meeting multiple times in person with Town Select board members, the Town Manager, the Fire Chief and Building Inspector, and the Planning Board. The Town provided feedback on height of the BES facility, roof pitch, fire safety, and other design details that Eversource was able to incorporate into an updated design of the BES project. Using this feedback, in late summer 2018, Eversource performed a permitting-level design for the BES (i.e., 30 percent engineering).

Permitting

Eversource and the Town’s leadership spent a significant amount of time working through issues related to a parcel of land not related to the BES project. The Town’s bylaws did not authorize the Planning Board to grant Eversource the right to construct the project. Therefore, Eversource filed for a land-use permit (zoning relief) with the Department pursuant to G.L. c. 40-A (“Chapter 40-A”). The Oak Bluffs Planning Board expressed disappointment with this outcome, taking the view that it could have granted a variance.

Eversource filed a Chapter 40-A land-use permit with the Department in late November of 2018. Leading up to the filing, Eversource met multiple times with the Oak Bluffs Fire Chief and Building Inspector and incorporated their input into fire safety and other design aspects. Eversource also conducted abutter outreach and, since filing, has held a public hearing in Oak Bluffs.

Eversource and the Town continued to work together during the initial siting process. In May 2019, Eversource executed a Memorandum of Understanding (“MOU”) with the Town where the Town will work collaboratively with Eversource to facilitate progress of the BES project and Eversource will make certain public-health and safety and environmental commitments to assist the Town.

The Company has continued to provide information on the BES project to the Oak Bluffs Planning Board and to obtain substantive feedback, notwithstanding the zoning exemption process. The Company filed a site plan with the Planning Board and gave a presentation in April 2019, seeking recommendations from the Oak Bluffs Planning Board before filing the site plan with the Martha’s Vineyard Commission (“MVC”), which is the other required permit approval needed to construct the BES.

Eversource continues to work with the MVC on approvals and anticipates receiving final approval by August 2020. This effort has included coordination with Oak Bluffs Fire Department, as well

as Tisbury and Edgartown Fire Departments. A fire-safety plan and an evacuation plan are being developed in consultation with the three Fire Departments and the MVC. In addition to the fire safety plans, an analysis on groundwater has been completed and submitted to MVC and the Town. All parties have committed to maintaining continuous communication to keep the permitting process moving forward. The Company appreciates the commitment of the Town and its efforts to move the process forward.

C. Competitive Procurement

Eversource used a competitive procurement to select vendors for all aspects of the Outer Cape and Martha's Vineyard BES projects with significant emphasis on the major cost components of the projects. Specifically, Eversource competitively procured: (1) a vendor to perform the engineering, procurement, and construction ("EPC") of the BES project (batteries, inverters, balance of plant); and (2) the civil site work and building construction for both projects. This process was conducted by the Eversource procurement team, which is experienced in negotiation and evaluation of all of Eversource's purchasing contracts.

For the BES project, the process began with a field of over 80 leading BES vendors in Spring 2018. In October 2018, six bidders were short-listed. This selection was based on each vendor's safety record and financial solvency (particularly important given that the BES project will be relatively new technology, serving as a long-lived asset within the distribution system). The Company also considered experience with prior, similar BES projects completed on time and on budget, and engineering and project management expertise. Full and formal bids were received from three of these six vendors. A cross-functional Eversource team exhaustively reviewed and ranked the bids based on cost, technical design, and project plan strength. One vendor, NEC, a local Massachusetts company, rose to the top and Eversource has completed successful negotiations with NEC to construct both BES projects at a cost consistent with budget expectations for both projects, inclusive of ongoing operations and maintenance support. The Company also negotiated the agreement with strong warranties and other performance guarantees.

NEC is responsible for the full design of the BES portion of the projects. For the Outer Cape project, NEC has been released to order long lead material and advance final design work. For Martha's Vineyard, once the BES project receives all permits, Eversource will release NEC to order all equipment and final design work.

For the civil site work and building construction phases of the Martha's Vineyard and Outer Cape BES projects, an RFP was issued to four qualified vendors with established Terms & Conditions in the Eversource procurement program. These vendors all have experience building electrical facilities for Eversource. All four bidders responded to the Provincetown ESS project Civil and Building RFP. Only two vendors responded to the Martha's Vineyard Civil and Building RFP.

The bids received for the civil and building project scope were higher than expected and therefore, the Company reopened the bid to additional vendors in an attempt to lower the pricing and/or validate the bids that were received. The Company's internal engineering and external consulting groups also performed additional reviews and assessed whether any re-engineering would reduce costs. Following this effort, the initial low bidder, one of the few local companies that performed work on the Cape and Martha's Vineyard on a regular basis, provided the lowest revised bid and

best work plan for both the projects. The Company updated its PAF (project authorization form) to move from a conceptual-design estimate to an engineering-design estimate.

The unique site constraints and access challenges associated with relatively remote locations had an impact on project costs, determined only on the basis of the competitive bid process. Also, as the Outer Cape BES project progresses, the Company estimates that the site preparation work and building costs will be higher than expected due to changes after the conceptual-design phase. For example, at both locations, the costs will be higher than estimated due to the municipal requirements to house the BES unit in a building rather than using container housing. Similarly, in relation to site preparation for the Outer Cape BES project, the Company will ultimately remove approximately 18,700 cubic yards of sand and soil at the location and install retaining and sound walls to meet site requirements for the project. Other cost categories are occurring as planned.

D. Lessons Learned/Challenges and Successes

Eversource is immersed in the development of the BES projects and has developed a strong cross-functional team to develop these projects. Lessons learned to date include the following:

First, it is clear that municipal support is a critical aspect of developing BES projects encompassing a variety of stakeholders. Municipal coordination is an iterative process that requires careful attention to inputs. The Company has worked diligently to balance stakeholder input with the core obligation to provide safe and reliable service through the BES projects.

Second, there are unique challenges to permitting and site development for new technology projects, particularly in areas such as Martha's Vineyard and Provincetown where construction of large utility-scale projects on land adjacent to community land is not typical. Although the BES projects were welcomed in these communities, challenges had to be surmounted to progress forward due to the relatively remote locations and geographical attributes.

Third, by their nature, BES projects have to be situated at precise locations to have the beneficial impact associated with installation. This means that the Company will need to have a level of flexibility to make accommodations and adapt the conceptual design to incorporate requests by the hosting municipalities. Without this flexibility to work with, and incorporate input from, the municipalities, these projects will be difficult and challenging to install, rather than becoming easier to site. Detailed engineering and cost estimation can only be completed once there is agreement with a municipality on location and facility housing, among other details.

Fourth, the Company has learned a great deal about sound issues connected to BES. With respect to sound, the batteries require HVAC systems that have some sound impact. To attain the goal of ensuring the batteries will not be audible to the human ear from any surrounding residences or businesses, the Company has now developed plans to include sound walls, shrouds and to house some equipment within the battery building.

Fifth, regarding fire safety, the new NFPA 855 fire code has been issued since the approval of these projects in D.P.U. 17-05, and the Company has had to incur additional costs to construct the BES projects in compliance with the new code requirements. Eversource has consulted with industry experts to ensure the BES projects will immediately disconnect in the event of any trouble warning and will be equipped with the leading BES fire suppression equipment.

Eversource obtained information on a BES fire in Arizona in April 2019. Eversource has requested that its vendor give a complete fire safety analysis of the BES design for both projects; to incorporate lessons learned from Arizona and best practices more generally; and to make any further adjustments needed. Once completed, the Company will provide the Department with the outcome of the analysis.

Lastly, Eversource has identified that implementation of new technologies including BES projects must take into account requirements for complex engineering and design of new solutions such as islanding and advanced distribution automation schemes that require specialized technical input in areas such as protection and control and communications engineering, which will occur through the bid selection process for an engineering, design and construction vendor.

E. Project Costs

Through December 31, 2019, the Company has expended \$2,261,529 for the Martha's Vineyard BES project and \$2,347,571 for the Outer Cape BES project. The majority of this spending was related to engineering, procurement, siting and permitting efforts on the projects. Actual spend through 2019 is slightly over budget due primarily to the project permitting process.

F. Performance on Implementation/Deployment

Please see sections (A) and (B), above.

G. Description of Benefits Realized from Implementation

Please see sections (A) and (B), above.

H. Key Milestones

Key milestones through commissioning are listed below. The Company anticipates that all construction milestone dates are at risk due to restrictions associated with the Covid-19 pandemic. Delivery dates for the battery system are also at risk given that NEC has issued multiple force majeure warnings regarding implication to contract execution due to the pandemic. As currently estimated, upcoming milestones are:

- Obtain all permits for the Martha's Vineyard project by August 2020. Outer Cape permits are substantially complete as of March 2020.
- Construction on the Outer Cape Project began in March 2020. Martha's Vineyard start of construction is anticipated for September 2020.
- Complete civil and building construction, including battery installation of the Outer Cape BES project by October 2020. Complete construction of the Martha's Vineyard BES project is expected by May 2021.
- Commence operations of the Outer Cape BES project by December 2020. Commence operations of the Martha's Vineyard BES project by July 2021.

I. Updated Projections for Remainder of 2018-2020 GMP

The Company expects that expenditures related to the commencement of construction and the purchase of equipment will begin in the April 2020 timeframe for the Outer Cape project and September 2020 for the Martha's Vineyard project. Costs for the Outer Cape project remain on target relative to the initial, conceptual-level cost estimate of \$40 million presented in D.P.U. 17-05. Costs for the Martha's Vineyard project are currently estimated at \$22 million as compared to the conceptual-level cost estimate of \$15 million, with the differential necessitated by permitting requirements and revised construction costs determined through the competitive bid process for the civil and building portion of the project.

IX. Electric Vehicle Make Ready Program

Introduction

As part of Eversource’s proposed Electric Vehicle (“EV”) Make Ready program (the “Make Ready Program” or “Program”) that was approved by the Department of Public Utilities (the “Department”) in D.P.U. 17-05, the Company developed a robust two-part evaluation plan. The first phase, to be completed after the first two years of program implementation, focuses on site host recruitment and operational lessons learned that could be incorporated into the program going forward. Phase 2 will be focused on the analysis of all data captured as a result of these deployments. The Company intends to include a thorough and inclusive analysis of charging station data as part of its Phase 2 evaluation efforts. In preparation for this work, Eversource has engaged with a data analytics vendor to begin aggregating, analyzing, synthesizing, and reporting on this data. Quarterly, data and analyses are being prepared, reviewed and improved on in an iterative process to ensure that a quality final analysis will be available for all stakeholders once the program has been fully deployed. A preliminary data report is explained in Section E and provided as Exhibit 2.

This document, which serves as the Eversource EV Make Ready Phase 1 Evaluation, includes the following sections:

- 1) Program overview and summary of the work completed to-date;
- 2) Implementation metrics & site cost analysis;
- 3) Successes, challenges and lessons learned; and
- 4) Interim charging data analysis and findings.

A. Description of Work Completed:

Background

On November 30, 2017, the Department approved the Company’s proposal to spend up to \$45 million over five years on the EV Program. (D.P.U. 17-05, at 475-478, 501.)

Consistent with the Department’s findings and directives in D.P.U. 15-122 and D.P.U. 17-05, the Company is providing this report on the Make Ready Program’s status and achievements, as well as the lessons learned from the Program in 2019. This Program update contains operational information including: the number of EV charging stations and sites deployed; site host enrollment; number of EV supply equipment tools installed; costs; and deployment in or adjacent to disadvantaged communities. The Company’s progress report also provides information and ideas gathered from the Company’s targeted outreach with various stakeholders and work with environmental justice (“EJ”) communities and stakeholders.

As part of its proposal in D.P.U. 17-05, the Company proposed to track and report on six proposed performance metrics to evaluate the implementation and customer benefits of the Make Ready Program. D.P.U. 17-05, at 474. In D.P.U. 15-122, the Department noted that it would develop performance metrics for the Program through a separate EV metrics stakeholder

process. D.P.U. 15-122, at 187. In the interest of providing the Department and stakeholders with a robust review of the Company's 2019 progress under the Make Ready Program, the Company is providing its progress under the six proposed performance metrics first introduced in D.P.U. 17-05. The specific performance metrics include:

- (1) total number of "make ready" sites developed;
- (2) ten percent capital invested in direct charging ("DC") fast charging sites;
- (3) ten percent capital invested in EJ communities;⁹
- (4) utilization of EV charging stations separately for Level II chargers and DC fast chargers (measured in annual kWh per port);
- (5) the percentage of Eversource residential customers within the range of an Eversource "make ready" site constructed as part of the EV program (i.e., percentage within 20-mile range and within 40-mile range); and
- (6) available data on plug-in EV adoption and CO₂ emissions reductions

Program Overview

Launched in 2018, the Make-Ready Program seeks to help accelerate EV charging infrastructure development within its service territory, encourage EV purchases, and contribute to greenhouse gas ("GHG") emissions reduction in the Commonwealth. The Program is designed to help meet the Commonwealth's goal contained in the Global Warming Solutions Act ("GWSA") and support the campaign of the EEA to encourage zero emissions vehicles ("ZEVs") via a commitment for 300,000 ZEVs registered in Massachusetts by 2025.

The Make-Ready Program's primary component is increased investment in long dwell-time EV charging make-ready infrastructure in public and workplace settings and at multi-unit dwellings ("MUDs"). Under the Program, Eversource invests in infrastructure beyond the meter up to the charging station, specifically for the service panel and the associated conduit and conductor necessary to connect each piece of equipment.

The Make-Ready Program will be run in two phases: Phase I extended from January 1, 2018 through December 31, 2019; and Phase II will extend from January 1, 2020 through December 31, 2022. Over the course of five years, Eversource plans to support the deployment of up to 72 DC fast charging ports at 36 charging sites, and up to 3,500 Level II charging ports at 400

⁹ Generally, EJ communities are defined in terms of demographic and socioeconomic characteristics, with certain environmental policy implementation practices aimed at these communities because of race/ethnicity/class-based environmental inequities. The Department directed the Company to select EJ communities that meet two of the following three criteria established by the Massachusetts Executive Office of Energy and Environmental Affairs ("EEA") in Eastern Massachusetts and one of the following in Western Massachusetts: (1) 25 percent or more of the population in the communities must earn 65 percent or less than the Massachusetts median household income; (2) 25 percent or more of the population in the communities must identify as a race other than white; and (3) 25 percent of households lack a person over the age of 14 who speaks only English or speaks English very well.

charging sites, throughout its service territory in Massachusetts. Based on customer demand for the Program, in 2019 Eversource accelerated implementation of the Make-Ready Program.

Eversource will support the deployment of EV charging ports by installing electrical equipment and components necessary to connect EV chargers to its distribution system. Eversource will install the “Eversource-side Infrastructure,” and contract with third-party electrical contractors to install behind the meter “Participant-side Infrastructure.” Specifically, the EV infrastructure that Eversource is proposing to install and own includes the following: (1) distribution primary lateral service feed; (2) necessary transformer and transformer pad; (3) new service meter; (4) new service panel; and (5) associated conduit and conductor necessary to connect each piece of equipment.

Vendor Prequalification

In the Spring of 2018, Eversource issued a Request for Information / Proposal to begin the process to pre-qualify vendors to participate in the Make-Ready program. This process was undertaken to give EV charging station manufacturers, network integrators, and installers the opportunity to have their equipment and services pre-authorized for inclusion in the Program. Recognizing that new technologies and new vendors may emerge over the duration of the program, Eversource issued a subsequent Request for Proposal in April 2019, to further deepen its bench of partners. A complete listing of these vendors can be found on the program website: <https://www.eversource.com/content/ema-c/residential/save-money-energy/explore-alternatives/electric-vehicles/charging-stations/preferred-vendor-list>

Being selected indicates that Eversource has reviewed and approved the equipment and services and verified that they meet its specifications and standards, and that the vendors have signed Eversource qualification agreement terms and conditions. Site hosts are welcome to use equipment, installers, or network integrators not selected by Eversource for pre-approval, if those vendors agree to Eversource qualification agreement terms and conditions.

Contractor Qualification

Under the program, Eversource uses third-party electrical contractors for the installation of the “behind the meter” infrastructure. This infrastructure primarily includes the new service panel and enclosure and associated conduit and conductor necessary to connect each piece of equipment.

Eversource chose to use electrical contractors with proven track records already approved by the Company to work on Eversource Energy Efficiency programs. Those contractors include (but are not necessarily limited to):

- Maverick Construction Corporation (Boston, MA)
- J.&M. Brown Company, Inc. (Jamaica Plain, MA)
- Horizon Energy (Taunton, MA)

In 2019, a fourth contractor was added through a response to a Company issued RFP:

- Volta (Boston, MA)

Stakeholder Outreach

Throughout Phase 1 (2018-2019) Eversource presented updates and solicited continual program feedback from multiple stakeholders in the Make-Ready Program. Specifically, the Company met with the Massachusetts Department of Energy Resources (“DOER”); EEA; Department of Transportation; Massachusetts Bay Transportation Authority; Massachusetts Department of Environmental Protection; Environmental Business Council of New England; Sierra Club of Massachusetts; Union of Concerned Scientists; Natural Resources Defense Council; Acadia Center; the Zero Emission Vehicle Commission; Georgetown Climate Center, Green Energy Consumers Alliance; National Grid; Electrify America; Plug-In America; Nissan; General Motors; Tesla; multiple charging station vendors; multiple towns and municipalities in Massachusetts.

In addition to meeting with the various stakeholders identified above, Eversource presented at various forums to help its sight host recruitment and general raise awareness efforts. The Company attended and spoke at quarterly meetings hosted by the Advanced Energy Group to provide regular updates on program status and recent activities, and to solicit and incorporate feedback from the public.

Finally, Eversource maintained close coordination with National Grid through quarterly meetings to share lessons learned and discuss opportunities to collaborate jointly on the deployment of the companies separate yet similar EV programs.

Common themes from stakeholders included general support for the infrastructure program, a need for general market awareness, confirmation of the barriers to DC fast charging implementation, and suggestions regarding the application and legal agreements.

B. Implementation Metrics

Phase 1 Metrics

The following tables provide information on EV Make-Ready charging station projects as of December 31, 2019:

Figure 7 Station Profiles

	Level 2		DC Fast Charger		Total	
	2018	2019	2018	2019	2018	2019
Charging Ports Installed	60	398	0	3	60	401
Charging ports Enabled	85	900	0	5	85	905
Avg. # Ports Installed Per Site	5	4	n/a	3	5	4
Public Sites	8	65	0	1	8	66
Workplace Sites	4	41	0	0	4	41
Multi-Unit Dwelling Sites	0	6	0	0	0	6
Environmental Justice Sites	2	23	0	0	2	23
Annual kWh/port	n/a	1,976	n/a	n/a	n/a	1,976

Figure 8 Station Locations

	Level 2		DC Fast Charger		Total	
	2018	2019	2018	2019	2018	2019
Metro Boston	9	67	0	1	9	68
South Coast	1	7	0	0	1	7
Cape & Martha's Vineyard	0	12	0	0	0	12
Western MA	2	26	0	0	2	26
% of residential customers "within range" (40 miles)	100%	100%	n/a	~50%	100%	100%

Environmental

Operating under the assumption that each charging port installed incentivizes the adoption of six incremental electric vehicles,¹⁰ Phase 1 of the Make Ready Program enabled 2,766 EVs

¹⁰ Workplace Charging Challenge, U.S. Department of Energy,
https://www.energy.gov/sites/prod/files/2017/01/f34/WPCC_2016%20Annual%20Progress%20Report.pdf

(372 in 2018 and 2,394 in 2019), equating to an annual CO2 reduction of 9,681 MT, 1,302 MT in 2018, and 8,379 MT in 2019.

C. Lessons Learned/Challenges and Successes:

Phase 1 of the Make Ready Program implementation has provided numerous opportunities to learn and adjust processes to manage towards optimization. Lessons learned related to operational execution, site host recruitment and market segmentation are described below:

Operational Execution

Timelier Legal Agreements

To participate in the program and complete installation of charging station infrastructure, a customer must execute several documents. These include a Site Host Agreement, agreeing to the terms and conditions of participation in the Program, and an Easement granting permission to Eversource for construction and maintenance of the infrastructure that leads to the charging station. These documents can be long lead time items, leading to a delay in infrastructure deployment.

Eversource has taken steps to minimize delays from execution of these legal agreements to help ensure the timely installation of infrastructure. First, the Site Host Agreement is introduced to customers as one of the first steps in the enrollment process. Second, Eversource introduced a Site License Agreement, which grants the Company permission from the Site Host to access the site and perform the work of installing the charging infrastructure until a permanent easement for the facilities at the site is granted. Both steps have helped to reduce the time it takes for legal documents to be executed and facilitated timelier infrastructure deployment.

Modifying Use Cases based on Costs to Scale

The Make-Ready Program was designed to help customers avoid future costs of expansion while enabling future charging expectations. As originally envisioned, Eversource offered two primary level 2 charging station deployment use cases: 1) “Up to five ports” – if customers requested two to five ports, the infrastructure would be put in place to support up to five single, or two dual and one single port stations; and 2) “Ten ports” – if customers requested six or more charging ports, the infrastructure would be put in place to support up to ten potential ports.

As Eversource examined the actual implementation costs of both use cases, the Company determined that the cost to deploy the infrastructure to support 10 ports was only marginally more expensive than the cost to support five ports. Additionally, consolidating to a single level 2 use case allows the Company to standardize electrical infrastructure equipment and enable procurement efficiencies. Going forward, Eversource, where possible, will put in place the infrastructure to support 10 charging ports, with the expectation that customers will install additional charging stations as the market continues to develop.

Initial Ports Installed Per Site

Though Eversource has installed the infrastructure to support 10 charging ports at the majority of sites where feasible, the average number of ports installed in Phase 1 has been 4 per site.

Need for additional electrical contractors

Upon the program's inception in 2018, Eversource contracted with three vendors to install the behind the meter electrical infrastructure. While these contractors were instrumental in helping to get the program off the ground, it was determined that more partners will be needed to scale program implementation to the level anticipated in Phase 2. The project team issued a subsequent RFP in 2019 to establish a wider network of electrical contractors throughout the Commonwealth. On February 14th, 2019, Eversource issued an RFP to electrical contractors and EV charging network vendors. In total, 33 vendors were invited to participate in this RFP, and 22 vendors provided a formal response. Eversource ultimately contracted with 15 partners, including one electrical contractor.

Standardization

Owning and operating infrastructure on the customer side of the meter also provided an opportunity (and necessity) to standardize where possible the physical components, both to reduce costs through the ability to scale and to maximize deployment efficiency through the ability to order and inventory necessary equipment. Specifications were standardized for the EV Supply Cabinet (electrical panel), and Eversource contracted with Merrimac to design and construct the panels for this program.

Also, to the extent possible, site design and engineering has been standardized to provide consistent station configurations across the infrastructure that Eversource owns as part of the Make-Ready program.

Building channel and supply chain in the Northeast

To efficiently deploy the number of charging stations demanded by the program, Eversource needed to significantly grow the EV Infrastructure vendor channel in Massachusetts. The two RFPs were used to create a pre-qualified bench of contractors, vendors, installers and manufacturers for the program. In 2019, Eversource also conducted various vendor workshops with charging station manufacturers and electric distributors, designed to educate them on the program, Eversource standards and processes, and the local market conditions and value propositions.

Eversource has been in regular weekly conferences with charging station vendors to coordinate sales and installation support and optimize pipeline management.

Every site is unique

Understanding that every deployment is different and brings its own unique challenges has been a key learning in Phase 1. From both a scheduling and cost standpoint, site-specific

characteristics can make it difficult to determine an “average” or expected timeline and budget early in the project.

Permitting processes can be very different from one site to the next. Each town or municipality has its own permitting requirements and associated timelines and waiting on the necessary approvals to begin construction work has the potential to delay a project. Additionally, Eversource must also obtain the necessary rights to do work on customer property, and the execution of these legal agreements typically takes a substantial amount of time. Both of these elements are key inputs into the development of an electrification schedule.

The high standard deviation of costs across all of the sites that have been completed to-date can be tied back to a number of factors: distance from utility electrical supply to the charging stations, topography of the land being trenched, availability of capacity at the site transformer, and potential upgrades needed to enable charger electrification all result in some sites being relatively cheap and others being rather expensive to construct. Being diligent in upfront engineering and design work is key to limiting surprises and unexpected cost adders during the construction process.

Costs

As shown in the table below, average site costs on a per port basis are in line with or better than similar programs in other jurisdictions based on initial comparison with California utility programs.

Figure 9 California Utility EV Programs (Through 1Q19) and Eversource (Through 4Q19) Site Costs

Utility	Program	Average Cost per L2 Port (including To-the-Meter, Behind the Meter, Final Design, Permitting)
Pacific Gas and Electric	EV Charge Network ¹¹	\$17,956
San Diego Gas and Electric	Power Your Drive ¹²	\$24,000
Southern California Edison	Charge Ready Pilot ¹³	\$13,430
Eversource	Make Ready ¹⁴	\$12,100

¹¹ https://www.pge.com/pge_global/common/pdfs/solar-and-vehicles/your-options/clean-vehicles/charging-stations/program-participants/PGE-EVCN-Quarterly-Report-Q1-2019.pdf

¹² https://www.sdge.com/sites/default/files/regulatory/March%202019%20PYD%20Report%20Final_0.pdf

¹³ <https://www.sce.com/sites/default/files/inline-files/SCE%20Quarterly%20Charge%20Ready%20Pilot%20Program%20Report%202019%20Q1%20WCAG.pdf>

¹⁴ Detailed table referenced in Section E: Performance on Implementation / Deployment

In 2018, Eversource's average site cost per charging port enabled was \$17,404. In 2019, average cost per port enabled was \$11,563. To-date, the average site cost per port enabled is \$12,100.

Site Host Recruitment

Site Host Marketing

The Company's site host recruitment efforts revealed that customers are in various places on their education – some being very advanced and knowledgeable about EVs and EV charging, some just hearing about it for the first time, and every place in between.

Marketing the Make-Ready program to potential site hosts is a high touch sales effort supported by tailored marketing content. Eversource created coordinated Print, Social Media, and Mailing campaigns to appropriate Commercial & Industrial ("C&I") customers, and multi-unit dwelling property owners. The Company also conducted targeted outreach to various sectors, including EJ Community site hosts.

The Company developed a customer package and roadmap to completion of sites, including the Intake application, Site Host Agreements, License / Easement agreement, and Marketing pieces targeted to the facility.

Eversource also hosted a series of ride and drive events (funded outside the Make-Ready program) at various site host locations in both 2018 and 2019.

Early in the Program it became clear that customer education and stakeholder engagement would be imperative for program success. Beginning in 2019, the Company worked with Advanced Energy Boston to convene quarterly stakeholder events to solicit customer and community stakeholder feedback.

Equipment Incentives

Besides the ongoing operational costs, the primary cost for customers participating in the Make-Ready program is the purchase of EVSE – the charging stations themselves.

Rebates or incentives are helpful in defraying or eliminating the cost of the EVSE to the site host and eliminating barriers to participation in the program. The two primary sources of EVSE incentive have been 1) rebates on level 2 chargers to qualified site hosts in EJ Communities, and 2) level 2 charger incentives from the Mass EVIP program.

The Mass EVIP incentives have been very helpful, particularly to municipal customers, in encouraging them to apply and participate in the Make-Ready Program. The two programs are naturally complimentary. There can be timing issues, where customers wait to learn if they have been awarded Mass EVIP grants before committing to participate in the Make-Ready program. This has the potential, if not well coordinated, to slow down the deployment process of the Make Ready Program.

Understanding operational issues

Part of customer site host education is making sure customers understand the bill impacts of hosting EV charging stations. The electric bill is the largest ongoing operational cost of being an EV charging station host. Customers have looked to Eversource to help understand what to expect given various demand scenarios. Eversource has taken on a consultative role, describing different utilization scenarios and their impact. Customers have also looked to Eversource to understand the impact of what pricing levels might have on demand, and on their overall charging operations. The Company has provided guidance on strategies to increase utilization and manage demand.

Customer interest exceeded expectations

Eversource's site host recruitment efforts to date have been very successful for Level 2 charging. In 2018 the Company received 150 applications and signed site agreements with 55 customers. In 2019 the Company received over 450 applications and signed site agreements with 219 customers. The significant interest from customers in hosting EV charging stations has led to a very healthy backlog heading into Phase 2 of the program. The Company expects that the program will be fully subscribed by mid-2020.

Customer appetite for larger deployments

Several customers have expressed interest in hosting more than the 10 charging ports that the current program design allows. In some cases, there is an appetite for the deployment of 30 or more charging ports to be electrified at one location. While the Program was initially designed with the intention to spread customer dollars across as many sites as possible, having the flexibility to selectively choose exceptions where a greater number of chargers makes sense and helps to accelerate EV adoption is beneficial to advancing the Commonwealth's goals.

Market Segmentation

Multi-Unit Dwellings

Eversource's site host recruitment efforts have confirmed the experience of many other utilities that have implemented EV infrastructure programs – multi-unit dwellings are a challenging use case. Parking spaces in multi-unit dwellings tend to be a scarce resource and often building owners do not yet see EV charging as an amenity by which to increase property value and attract tenants. There are also logistical hurdles, such as payment, scheduling parking, and monitoring use. The Company was able to electrify 6 multi-use dwelling sites in 2019.

Customer Owned Distribution Networks

One of the requirements for participation in the Program is that the charging station site must be separately metered, and therefore must be wired directly to Eversource equipment. Several customers who own their own distribution network behind the meter, including universities,

airports, and other large campus customers, are not eligible for participation. Many customers who were initially flagged as good targets based on parking characteristics (large, publicly accessible, long dwell-time, highly utilized), were ineligible.

Low-Moderate Income (Environmental Justice) Communities

In Phase 1, the Company was successful in meeting its target of 10 percent of capital deployed at installations in EJ Communities. Of the 125 stations electrified in Phase 1, 25 were in EJs, accounting for approximately 20 percent of total Make Ready Program investment. Of the 25 sites installed in EJC's, 2 were deployed in 2018 and the remaining 23 were installed in 2019.

The Company actively participates in cross-jurisdictional internal groups with its affiliates and other utilities and collaborates with stakeholders representing disadvantaged and low-income communities.

It is too early to evaluate the impact on actual EV adoption in these communities, or the direct benefit of EV charging there. The Company anticipates being able to conduct this analysis by the end of the program implementation in its final report.

DC Fast Chargers

Eversource's site host recruitment efforts for DC fast chargers have not been successful. In Phase 1, only one DC fast charger site was electrified and 12 applications were received.

Eversource did have a strategy to recruit site hosts for this type of deployment. The Company targeted locations that meet a specified set of criteria to support electrification of main travel corridors. Selection of locations included: peak traffic areas, ensuring gap coverage between service territories, a 40-mile max distance to next station, more stations in higher traffic areas and off-exit deployment to enable easy access. The Company met with MA DOT and other stakeholders to try and identify appropriate sites.

The Company concluded that there are two primary barriers to customers willing to be site hosts for DC fast chargers: 1) the high upfront cost of the hardware/software; and 2) high anticipated operating costs.

DC Fast Chargers can cost between \$35,000 and \$50,000 for a 50kW charger and up to \$150,000 for a 150kW charger. Compared to the average \$3,500 per port for Level 2 chargers, the upfront cost of purchasing a DC Fast Charger is significant. Massachusetts, through Appendix D of the Volkswagen Settlement, has allocated more than \$11 million to EV charging infrastructure. This provides a good opportunity to leverage non-taxpayer, non-ratepayer funds to help advance the deployment of this much needed infrastructure. Eversource will work together with the Massachusetts Department of Environmental Protection ("DEP") to better understand plans for the remaining VW funding and explore ways to synergize between the two programs.

Operating expenses, particularly related to the bill impacts associated with powering DC fast chargers, are an additional concern for potential charging station site hosts. Demand charges for these installations can be significant, in some cases accounting for 80 percent of the

monthly electric bill. The operating profile of these assets, resulting from the combination of higher power and lower utilization, has resulted in several customers that initially expressed an interest in deploying this equipment at their facilities being hesitant to move forward. Eversource continues to explore potential rate solutions that could be tailored to the unique load curve of DC fast chargers.

Barriers to Adoption

As part of the original proposal, Eversource identified several barriers to EV adoption including the upfront cost of EVs, lack of available charging infrastructure and EV range. Recent market studies continue to affirm the same barriers to EV adoption exist today.¹⁵

D. Actual v. Planned Implementation and Spending:

Phase 1 Milestones Achieved

January 2018: Project and Construction leads assigned to Eversource implementation team

March 2018: Presented DC Fast Charger Deployment Plan to EEA/DOER/DOT

April 2018: Request for Information / Proposals issued to qualify EV charging station vendors

April 2018: Site host recruitment efforts initiated

May 2018: Site host agreement / license forms finalized

June 2018: Pre-qualified vendors selected

June 2018: Third-party electrical contractors selected

July 2018: First site host contract executed

October 2018: First charging station site electrified

December 2018: Launched web-site: <https://www.eversource.com/content/ema-c/residential/save-money-energy/explore-alternatives/electric-vehicles>

April 2019: Additional charging station vendors qualified through subsequent Request for Proposal

June 2019: Finalized development of standardized panel enclosure

September 2019: Received 500th customer intake application

December 2019: Electrified 1st Multi-Unit Dwelling

December 2019: Electrified 100th customer site

¹⁵ https://www.greencarreports.com/news/1121698_poll-suggests-more-americans-might-buy-an-ev-if-only-they-had-a-place-to-charge

E. Performance on Implementation/Deployment:

Exhibit 1 summarizes the investments in the 125 charging station sites placed in service in Phase 1 of the Make Ready Program.

F. Description of Benefits Realized from Implementation:

As detailed in Section B (Implementation Metrics), the deployment of the 125 charging station sites with 461 installed ports in Phase 1 supports 2,766 incremental EVs on the road, resulting in an annualized CO₂e reduction of 9,681 MT.

G. Summary of Interval Charging Data:

As indicated in Eversource's Make Ready Program filing in D.P.U. 17-05, the Company intends to include a thorough and inclusive analysis of charging station data as part of its Phase 2 evaluation efforts. In preparation for this work, Eversource has engaged with a data analytics vendor to begin aggregating, analyzing, synthesizing, and reporting on this data. Quarterly, data and analyses are being prepared, reviewed and improved on in an iterative process to ensure that a quality final analysis will be available for all stakeholders once the program has been fully deployed.

Attached as Exhibit 2 is a report ("Eversource Massachusetts Electric Vehicle Infrastructure Program Charging Station Analysis Report 2019") that captures data for 198 of the 461 ports that have been installed through December 31, 2019. Data for the remaining 263 ports exists, however Eversource is still working on establishing the necessary protocols with charging station manufacturers to gain visibility to this information. This has been a key learning from Phase 1 and the goal is to develop a seamless process that will improve the efficiency and speed of data access moving forward. It is also important to note that 70 of the 125 sites were energized in the fourth quarter of 2019 and therefore have limited data associated with station usage.

Given the truncated sample size and short time duration the data covers, any conclusions drawn are preliminary. The exhibit is provided as an illustrative example and preview of the more robust analysis that will be performed once the Make Ready program has concluded.

Some of the preliminary conclusions include but are not limited to:

- Stations at Business Offices experience some longer plug-in times (workday durations of 8-10 hours) than other venues, although stations at Leisure Destinations had some long durations. At all venues, most charging is completed after 4 hours.
- A large portion of charging events at Business Offices start earlier in the day, around 7-9 am, most likely when employees arrive for work. Stations at other locations also have many charging events starting during the morning hours, but show flatter distributions, indicating charging events starting throughout the day. Charging events at Multi-unit Dwellings also appear to mostly start at the beginning of the day.

- Weekday peak is during the late morning hours, whereas the weekend has a less defined peak with high periods around mid-day.
- The total number of unique users at Program charging stations has consistently increased over time.
- Each market segment appears to have unique load curves.

	Town	Year Electrified	Environmental Justice Community	Site Type	Charger Type	Ports Installed	Ports Enabled	Total Site Cost
1	Pittsfield	2018	Y	Workplace	L2	4	5	\$ 87,449
2	Greenfield	2018	Y	Municipal	L2	8	10	\$ 104,446
3	Newton	2018	N	Municipal	L2	8	10	\$ 184,061
4	Westwood	2018	N	Workplace	L2	8	10	\$ 172,997
5	Lincoln	2018	N	Destination	L2	6	10	\$ 157,425
6	Bedford	2018	N	Workplace	L2	6	5	\$ 105,654
7	Lexington	2018	N	Workplace	L2	10	10	\$ 143,049
8	Medway	2018	N	Municipal	L2	2	5	\$ 74,321
9	Medway	2018	N	Municipal	L2	2	5	\$ 71,269
10	Milton	2018	N	Municipal	L2	2	5	\$ 98,094
11	Plymouth	2018	N	Municipal	L2	2	5	\$ 99,635
12	Winchester	2018	N	Municipal	L2	2	5	\$ 126,824
13	Boston	2019	N	Education	L2	6	10	\$ 121,329
14	Burlington	2019	N	Destination	L2	2	10	\$ 120,715
15	Framingham	2019	N	Retail	L2	2	10	\$ 141,180
16	Amherst	2019	Y	Workplace	L2	4	10	\$ 118,633
17	Springfield	2019	Y	Workplace	L2	4	10	\$ 67,375
18	Pittsfield	2019	N	Workplace	L2	4	10	\$ 152,043
19	Pittsfield	2019	Y	Destination	L2	2	5	\$ 65,339
20	West Springfield	2019	Y	Destination	L2	4	10	\$ 77,399
21	Acton	2019	N	Workplace	L2	2	5	\$ 56,933
22	Hopkinton	2019	N	Workplace	L2	2	10	\$ 158,811
23	Bourne	2019	N	Hospitality	L2	2	5	\$ 15,393
24	Waltham	2019	N	Workplace	L2	9	10	\$ 91,974
25	Lexington	2019	N	Workplace	L2	10	10	\$ 97,161
26	Needham	2019	N	Workplace	L2	2	10	\$ 62,076
27	Needham	2019	N	Workplace	L2	2	10	\$ 111,089
28	Needham	2019	N	Workplace	L2	2	10	\$ 62,116
29	Needham	2019	N	Workplace	L2	4	10	\$ 69,039
30	Needham	2019	N	Workplace	L2	2	10	\$ 62,208
31	Waltham	2019	N	Workplace	L2	2	10	\$ 81,696
32	Needham	2019	N	Workplace	L2	6	10	\$ 25,600
33	Barnstable	2019	Y	Workplace	L2	4	10	\$ 73,274
34	Barnstable	2019	Y	Workplace	L2	4	10	\$ 69,177
35	Lexington	2019	N	Workplace	L2	2	10	\$ 84,962
36	Framingham	2019	N	Workplace	L2	2	10	\$ 73,742
37	Framingham	2019	N	Workplace	L2	2	10	\$ 114,236
38	Westwood	2019	N	Workplace	L2	2	5	\$ 63,199
39	Westwood	2019	N	Workplace	L2	2	10	\$ 99,000
40	Lexington	2019	N	Workplace	L2	2	10	\$ 132,335
41	Framingham	2019	N	Workplace	L2	2	10	\$ 140,578
42	Framingham	2019	N	Workplace	L2	2	10	\$ 90,700
43	Westwood	2019	N	Workplace	L2	2	5	\$ 31,071
44	Boston	2019	N	Workplace	L2	4	10	\$ 34,930
45	Barnstable	2019	Y	Destination	L2	10	10	\$ 125,788
46	Barnstable	2019	Y	Destination	L2	10	10	\$ 113,217

	Town	Year Electrified	Environmental Justice Community	Site Type	Charger Type	Ports Installed	Ports Enabled	Total Site Cost
47	Cambridge	2019	N	Hospitality	L2	8	10	\$ 150,417
48	Cambridge	2019	N	Hospitality	L2			
49	Cambridge	2019	N	Municipal	L2	2	5	\$ 211,723
50	Cambridge	2019	N	Municipal	L2	2	5	\$ 141,143
51	Chelsea	2019	Y	Municipal	L2	2	10	\$ 24,894
52	Newton	2019	N	Municipal	L2	4	10	\$ 123,802
53	Newton	2019	N	Municipal	L2	4	5	\$ 24,942
54	Newton	2019	N	Municipal	L2	4	5	\$ 22,857
55	Pittsfield	2019	Y	Municipal	L2	6	10	\$ 81,724
56	Waltham	2019	Y	Municipal	L2	6	10	\$ 77,036
57	Woburn	2019	N	Municipal	L2	4	5	\$ 23,816
58	Acton	2019	N	Destination	L2	2	10	\$ 115,329
59	Waltham	2019	N	Workplace	L2	2	10	\$ 63,203
60	Waltham	2019	N	Workplace	L2	2	10	\$ 68,614
61	Boston	2019	N	Residential	L2			
62	Boston	2019	N	Residential	L2	30	30	\$ 159,193
63	Boston	2019	N	Residential	L2			
64	Somerville	2019	N	Destination	DCFC	3	5	\$ 32,931
65	Hadley	2019	N	Workplace	L2	4	5	\$ 76,939
66	New Bedford	2019	N	Workplace	L2	4	10	\$ 150,168
67	Plymouth	2019	N	Workplace	L2	4	10	\$ 21,984
68	Yarmouth	2019	N	Workplace	L2	6	10	\$ 306,627
69	Hadley	2019	N	Hospitality	L2	8	10	\$ 105,471
70	Lexington	2019	N	Workplace	L2	2	10	\$ 74,179
71	Falmouth	2019	N	Workplace	L2	2	5	\$ 137,665
72	Canton	2019	N	Destination	L2	2	5	\$ 71,272
73	Lincoln	2019	N	Destination	L2	4	5	\$ 63,720
74	Marshfield	2019	N	Destination	L2	2	5	\$ 84,710
75	Boston	2019	N	Destination	L2	2	5	\$ 64,628
76	Natick	2019	N	Destination	L2	2	5	\$ 61,968
77	Sharon	2019	N	Destination	L2	2	5	\$ 48,512
78	Wellfleet	2019	N	Destination	L2	2	5	\$ 74,468
79	Boston	2019	N	Destination	L2	10	10	\$ 44,658
80	Framingham	2019	N	Workplace	L2	10	10	\$ 89,096
81	Milton	2019	N	Education	L2	2	5	\$ 50,420
82	Springfield	2019	Y	Workplace	L2	4	10	\$ 117,675
83	Woburn	2019	N	Residential	L2	4	10	\$ 60,863
84	Woburn	2019	N	Residential	L2	2	10	\$ 62,641
85	Needham	2019	N	Workplace	L2	2	10	\$ 52,270
86	Springfield	2019	Y	Destination	L2	2	5	\$ 56,366
87	Springfield	2019	Y	Destination	L2	10	10	\$ 98,592
88	Eastham	2019	N	Hospitality	L2	2	10	\$ 164,513
89	Framingham	2019	N	Retail	L2	6	10	\$ 40,690
90	Springfield	2019	Y	Workplace	L2	4	10	\$ 94,905
91	Acushnet	2019	N	Education	L2	2	5	\$ 87,783
92	Acushnet	2019	N	Education	L2	2	5	\$ 58,187

	Town	Year Electrified	Environmental Justice Community	Site Type	Charger Type	Ports Installed	Ports Enabled	Total Site Cost
93	Acushnet	2019	N	Municipal	L2	2	5	\$ 52,697
94	Acushnet	2019	N	Municipal	L2	4	5	\$ 68,534
95	Agawam	2019	N	Destination	L2	4	5	\$ 73,830
96	Agawam	2019	N	Destination	L2	2	5	\$ 50,994
97	Agawam	2019	N	Destination	L2	2	10	\$ 75,920
98	Amherst	2019	Y	Municipal	L2	2	5	\$ 76,908
99	Amherst	2019	Y	Municipal	L2	4	10	\$ 67,012
100	Amherst	2019	Y	Municipal	L2	2	10	\$ 67,681
101	Arlington	2019	N	Municipal	L2	2	5	\$ 65,939
102	Arlington	2019	N	Municipal	L2	2	5	\$ 77,187
103	Becket	2019	Y	Municipal	L2	4	10	\$ 63,391
104	Bedford	2019	N	Municipal	L2	1	5	\$ 70,123
105	Bedford	2019	N	Municipal	L2	1	5	\$ 64,407
106	Bedford	2019	N	Municipal	L2	2	5	\$ 62,759
107	Bedford	2019	N	Municipal	L2	1	5	\$ 74,359
108	Bedford	2019	N	Municipal	L2	2	5	\$ 89,830
109	Lexington	2019	N	Municipal	L2	4	5	\$ 71,491
110	Lexington	2019	N	Municipal	L2	6	10	\$ 77,112
111	Milton	2019	N	Municipal	L2	2	5	\$ 64,877
112	Montague	2019	Y	Municipal	L2	2	10	\$ 111,147
113	Montague	2019	Y	Municipal	L2	2	5	\$ 54,788
114	Natick	2019	N	Municipal	L2	2	5	\$ 46,325
115	Shelburne	2019	N	Municipal	L2	2	10	\$ 64,524
116	Shelburne	2019	N	Municipal	L2	2	10	\$ 52,965
117	Stoneham	2019	N	Destination	L2	4	10	\$ 64,009
118	Wellfleet	2019	N	Municipal	L2	4	5	\$ 342,016
119	Amherst	2019	Y	Residential	L2	2	10	\$ 63,234
120	Springfield	2019	Y	Destination	L2	4	5	\$ 91,390
121	Falmouth	2019	N	Workplace	L2	2	10	\$ 184,760
122	Falmouth	2019	N	Workplace	L2	2	10	\$ 138,671
123	Somerville	2019	N	Workplace	L2	4	5	\$ 101,065
124	Montague	2019	N	Municipal	L2	4	10	\$ 117,768
125	Woburn	2019	N	Municipal	L2	4	10	\$ 55,334