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May 15, 2019

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 2018 Grid Modernization Cost Recovery – D.P.U. 19-23

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 2019 GMF rate adjustment and reconciliation filing comprised of: (1) actual, eligible preauthorized expenditures from the prior GMP investment year; 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, Jennifer A. Schilling, Director of Grid Modernization for Eversource Energy, 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 2018; and

(2) The Joint Direct Testimony and Exhibits of Ashley N. Botelho, Manager, 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 2018, for rates effective July 1, 2019.

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

Sincerely,

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 2018 Grid Modernization Plan Cost Recovery Filing	)	D.P.U. 19-23

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, 2018, the Company submitted its 2018 Grid Modernization Plan Cost Recovery Filing (the "Filing") for rates effective July 1, 2019. 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 Exhibit ES-JGG-5, which contains

the summaries and supporting invoices for the GMF (the "Confidential Exhibit"). The invoices relate to costs involving external contractor and vendor costs.

The Company has provided an un-redacted version of the Confidential Exhibit to the Hearing Officer pursuant to this Motion and a redacted version of the Confidential Exhibit for the public record.

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

The Company seeks protection from public disclosure of negotiated pricing and financial terms contained in the Confidential Exhibit. The terms contained in the Confidential Exhibit are negotiated and proprietary to the Company and its counter-parties. 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 Exhibit 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 Exhibit. 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 Exhibit is not otherwise available in the public domain.

V. CONCLUSION

The Company respectfully requests that the competitively sensitive pricing information contained in the Confidential Exhibit, 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 Exhibit 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.
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99 High Street, 29th Floor
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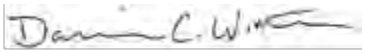
Dated: May 15, 2019

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource Energy 2018 Grid Modernization Plan Cost Recovery Filing	)	D.P.U. 19-23

APPEARANCE OF COUNSEL

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



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Dated: May 15, 2019

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource Energy 2018 Grid Modernization Plan Cost Recovery Filing	)	D.P.U. 19-23

APPEARANCE OF COUNSEL

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

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Dated: May 15, 2019

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 19-23

JOINT DIRECT TESTIMONY OF

GIUSEPPE A. PERNICIARO
JENNIFER A. SCHILLING
KEVIN M. BOUGHAN

EXHIBIT ES-GAP/JAS/KMB

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

2019 GRID MODERNIZATION
COST RECOVERY FILING

May 15, 2019

I. INTRODUCTION

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

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

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

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

Q. What is your educational background?

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

Q. Please describe your employment history.

A. I am a former Civil Engineer Corps, US Naval Officer holding various positions, such as Department of Public Works Operations Officer overseeing day-to-day public works 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.

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

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

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

Q. Have you previously testified before any regulatory bodies?

A. No, I have not.

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

A. I am responsible for the overall delivery of the approved Massachusetts GMP portfolio of projects and investments. In this role, I coordinate the efforts of multiple teams within Eversource to ensure all planning, engineering, design, construction, commissioning, tracking and reporting tasks are implemented such that internal and

external grid modernization portfolio commitments are met with respect to scope, schedule and budget. I am responsible for identification and mitigation of potential risks to program execution. I also work closely with those responsible for planning and execution of the overall Eversource distribution capital plan to support coordinated, efficient and cost-effective execution of the Company's GMP.

Q. Ms. Schilling, please state your name and business address.

A. My name is Jennifer A. Schilling. My business address is 107 Selden Street, Berlin, Connecticut 06037.

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

A. I am employed by Eversource Energy Service Company ("EES") as the Director of Grid Modernization for Eversource Energy. I am responsible for GMP investment portfolio management, as well as the coordination and implementation of the GMP investment programs.

Q. What is your educational background?

A. I graduated with a Bachelor of Arts degree in environmental science and political science from Barnard College, Columbia University in 1995. In 2011, I earned a Master of Business Administration from Duke University.

Q. Please describe your employment history.

A. From 2001 to 2008, I held a number of positions at Reliant Energy in Houston Texas, ending my tenure in the position of Director, Corporate Strategy. In 2008, I joined the Northeast Utilities System as the Director of Business Planning for WMECO. I

subsequently accepted the role of Director, Asset Management for WMECO and then Director, Distribution Engineering for the Company. Currently, I am the Director of Grid Modernization for Eversource Energy.

Q. Have you previously testified before any regulatory bodies?

A. Yes. I have previously testified before the Department in Western Massachusetts Electric Company, D.P.U. 09-34 (WMECO's Smart Grid Pilot Plan). Most recently, I testified on behalf of the Company in its most recent base distribution rate case, D.P.U. 17-05, specifically regarding the Company's Grid Modernization Base Commitment ("GMBC") Plan.

Q. What is your involvement and responsibility with respect to the Company's GMP portfolio?

A. As the Director of Grid Modernization, I am responsible for developing strategies to increase the capacity of the Eversource Energy electric distribution system to optimize the integration of distributed energy resources, while improving the safety, security, reliability and cost-effectiveness of the system. I am also responsible for grid-modernization portfolio management, as well as coordination and implementation of grid-modernization technology programs.

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

A. My name is Kevin M. Boughan. My business address is 56 Prospect Street, Hartford, Connecticut, 06103.

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

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

Q. What is your educational background?

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

Q. Please describe your employment history.

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

Q. Have you previously testified before any regulatory bodies?

A. Yes. I have previously testified before the Connecticut Public Utilities Regulatory Authority ("PURA") in PURA 17-10-46 RE01 (Application of The Connecticut Light and Power Company d/b/a Eversource Energy to Amend its Rate Schedules – EV Rate

Rider) and PURA 17-12-03 (PURA Investigation into System Distribution Planning of the Electric Distribution Companies).

Q. What is your involvement and responsibility with respect to the Company's GMP portfolio?

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

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

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

On May 1, 2019, the Company filed its 2018 Grid Modernization Annual Report ("2018 Report") consistent with the Department's directives. Id. at 112; D.P.U. 15-122 Memorandum at 2 (March 29, 2019). The 2018 Report provides a detailed

summary of the Company's implementation of the GMP during 2018 following the issuance of the D.P.U. 15-122 order on May 10, 2018. The 2018 Report also provides an overview of planned GMP work in 2019 and 2020. The 2018 Report is being provided as Exhibit ES-GAP/JAS/KMB-1.

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

A. Yes. Company witnesses Ashley N. Botelho and John G. Griffin are presenting testimony regarding the Company's revenue requirement associated with plant in service for GMP investment year 2018, along with supporting project documentation and exhibits.

Q. How is your testimony organized?

A. As indicated herein, Section I of this joint testimony presents the introduction. Section II discusses the overview of the filing as well as a timeline of filings due. Section III discusses the overall implementation of the GMP investment portfolio. Section IV discusses the overall implementation of the EV infrastructure program. Section V presents the 2018 implementation activities associated with the Company's battery storage demonstration projects. Section VI presents the conclusion.

II. OVERVIEW

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

A. In October 2012, 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). Eversource, which has always been at the forefront of implementing technologies to further improve service to customers and lessen/mitigate the impact of outages on customers, was an active and engaged partner in the Department's long-running investigation.

Over the course of several orders incorporating Eversource and other stakeholder input, the Department set out a Grid Modernization framework for Eversource, as well as the other EDCs, to develop and invest in an innovative and comprehensive 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. On May 10, 2018, the Department issued its order in D.P.U. 15-122 approving in part and modifying in part the Company's GMP. 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,

[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.

186-187. The Department also determined that it was appropriate for Eversource to recover the costs of its energy storage demonstration projects and its EV infrastructure program approved in the Company's 2017 base distribution rate case, D.P.U. 17-05, through the GMF. Id. at 186-187.

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

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

- May 1, 2019 – Grid Modernization Annual Report (for plan year 2018)[3]
- May 15, 2019 – Annual GMF Filing (for plan year 2018)
- May 1, 2020 – Grid Modernization Annual Report (for plan year 2019)
- May 15, 2020 –Annual GMF Filing (for plan year 2019)
- July 1, 2020 –GMP which will present GMP investments for plan years 2021, 2022 and 2023 and a five-year (2021 through 2025) strategic plan
- May 15, 2021 – Annual GMF Filing (for plan year 2020)
- April 1, 2021 – Grid Modernization Term Report (for the 2018-2020 GMP)

[3] 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. The Grid Modernization Annual Report Templates have not yet been finalized. Additionally, final performance metrics are currently pending before the Department. Once finalized, the Department will set a deadline for filing the Company's performance under the Grid Modernization performance metrics. D.P.U. 15-122, March 29, 2019 Memorandum.

As described above, this filing presents the Company's first 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 2018 plan year, as well as the work planned for completion in the remaining two years of the GMP.

III. GMP IMPLEMENTATION

Q. Please explain the initial steps that Eversource took to support its GMP implementation following the issuance of the D.P.U 15-122 order?

A. In 2018, the Company made substantial progress towards achievement of its 2018-2020 GMP objectives. Much of the work executed in 2018 was focused on building the organizational capacity to efficiently and cost-effectively scale up the Company's operations to incorporate incremental grid modernization projects. In order to accomplish this, the Company initiated a GMP implementation strategy based on the following key principles:

- **Maximize cost-effectiveness of GMP implementation** - Many of the decisions made in the first year of GMP implementation will drive cost-effectiveness in achieving overall plan objectives. One of the important 2018 activities undertaken by the Company was the prioritization of equipment locations through the creation of a prioritization methodology ranking potential locations to maximize value of the GMP deployment. Deployment strategies were also established to ensure construction efficiency. The Company's labor strategy for GMP implementation will

also drive cost-effectiveness relative to the use of internal versus outsourced resources for engineering, construction and project management.

- **Leverage proven, established processes** - the Company's ability to execute its 2018 GMP work plan was largely attributable to its ability to leverage existing processes and organizational capabilities. The Company leveraged its existing work management systems and processes to create dedicated work orders for GMP 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.
- **Establish a dedicated team for portfolio management and financial tracking** - Ensuring accurate and timely tracking and reporting of GMP implementation is critical to ensure the appropriate actions are taken to manage GMP 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.
- **Engage senior Operations leadership to provide implementation guidance and support** – the Company's leadership recognizes the direct

customer benefit and importance in enabling the continued transition to the grid of the future. Periodic meetings to review progress were established, and leadership feedback continues to guide GMP implementation.

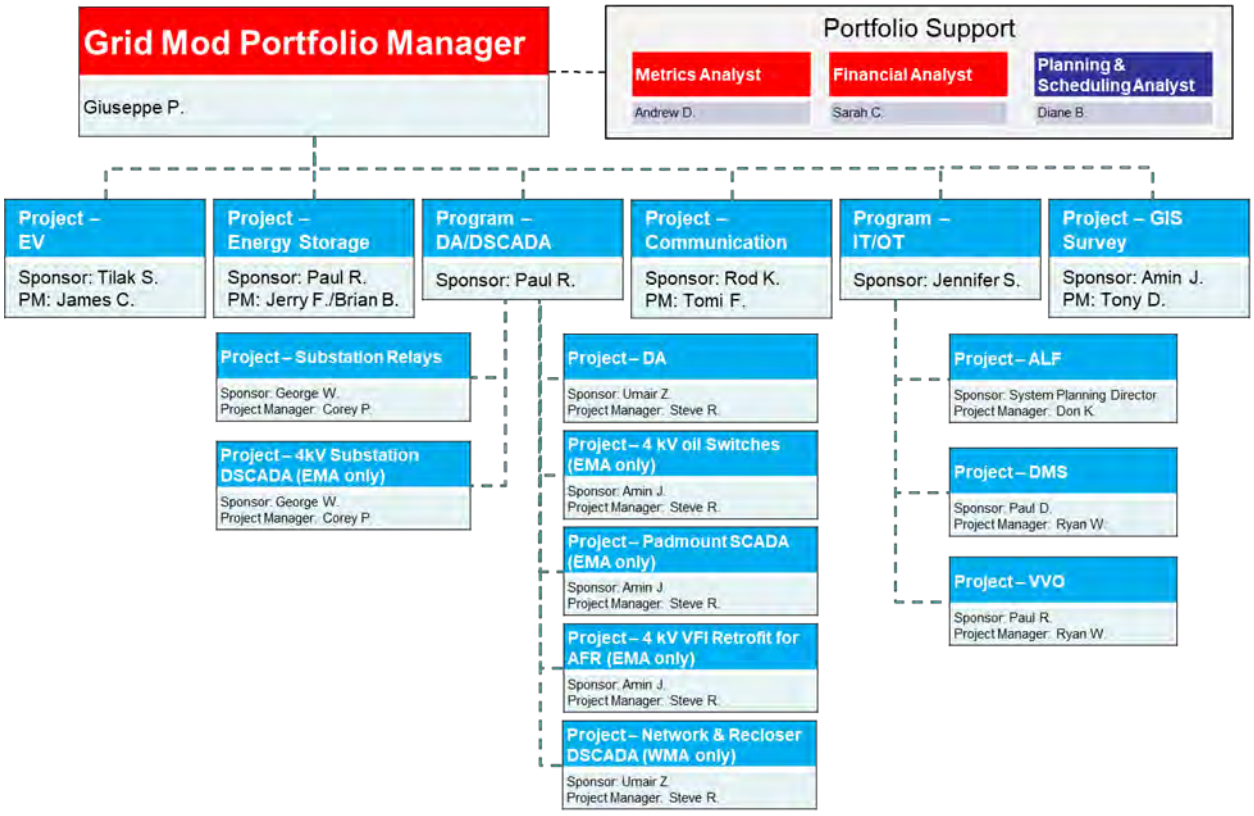
As described in greater detail in the 2018 Report, the Company leveraged and developed organizational structures and operations to establish a process framework to undertake the necessary preparatory work to commence GMP implementation in 2018. These preparatory steps, which are described in more detail in Exhibit ES-GAP/JAS/KMB-1 at pages 4 through 6, involved, but were not limited to:

- Identifying investment deployment locations that would maximize the investment's value to customers;
- Selecting the appropriate technology relative to the GMP investment portfolio;
- Ensuring that each GMP investment category had the requisite spending authorization in accordance with the Company's Capital Authorization Policy; and
- Establishing specific and dedicated cost control processes to isolate and monitor all costs associated with the GMP, including an accounting process to specifically track GMP costs and expenditures separately from other capital projects undertaken by the Company.

These preparatory steps represent critical foundational stages that needed to be developed and deployed in order to ensure that the 2018 GMP investments were undertaken in a deliberate, efficient and cost-effective manner. This framework will be utilized over the remainder of the 2018-2020 GMP, and the Company will continue to monitor the process to identify and implement necessary changes to continue to improve GMP investment deployment for the benefit of customers.

In order to utilize the process framework described above to efficiently and effectively deploy its GMP investments, the Company assembled a multi-disciplinary team to oversee implementation. Section II of the 2018 Report contains further detail on the GMP portfolio management team and processes. 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. Specifically, the positions consist of one Financial Analyst, one Program Analyst, and one Program Manager. Figure 1 below provides an organizational chart of the GMP management team.

Figure 1 Grid Modernization Management Team



Q. Please provide a summary of Eversource's progress in 2018 under the GMP.

A. Table 2 below provides Eversource's GMP plan for 2018 and the progress made during that timeframe. Exhibit ES-GAP/JAS/KMB-1 provides further detail regarding both planned and actual 2018 unit deployment and associated expenditures.

Table 2 2018 Unit Status

Investment Categories	Preauthorized Device Types	Plan Units (2018)	Construction Complete Units (2018)	Commissioned Units (2018)	2018 Unit Carry Over (2019)
Monitoring & Control (SCADA)	Microprocessor Relays (SS)	13	10	10	3
	4kV Circuit Breaker SCADA (SS)	0	n/a	n/a	n/a
	Recloser SCADA	18	18	15	3
	Padmount Switch SCADA	21	3	3	18
	Network Protector SCADA	0	n/a	n/a	n/a
Distribution Automation	Overhead DA	29	31	25	4
	Overhead DA w/Ties	0	n/a	n/a	n/a
Distribution Automation	4kV Oil Switch Replacement	10	8	0	10
	4kV VFI Retrofit for DA	0	0	n/a	n/a
Volt-Var Optimization	VVO - Regulators	15	0	0	15
	VVO - Capacitor Banks	0	n/a	n/a	n/a
	VVO - LTC Controls	4	4	4	0
	VVO - Line Sensors	0	n/a	n/a	n/a
	VVO - IT Work	n/a	n/a	n/a	n/a
Advanced Distribution Management System (ADMS)	Advanced Load Flow	n/a	n/a	n/a	n/a
	GIS Verification	n/a	n/a	n/a	n/a
	Distribution Management System	n/a	n/a	n/a	n/a
Communications	Communication - FAN	0	n/a	n/a	n/a
	Communication - Fiber	5	0	0	5

As can be seen in Table 2, the Company undertook an aggressive approach to implementing the 2018 GMP, due, in part, to the timing of the D.P.U. 15-122 order, which was issued at the mid-point of the Company's fiscal year. The timing of the D.P.U. 15-122 order and the need to undertake the preparatory work described above prior to any actual construction of grid modernization investments presented some challenges in meeting the 2018 grid modernization investments targets. Through significant efforts and due to the comprehensive processes and procedures that were developed as part of the GMP preparatory efforts, Eversource made significant strides in implementing the 2018 GMP as shown in Table 2.

Despite these accomplishments, at the end of 2018, certain 2018 GMP targets were not met and were instead scheduled for implementation in 2019 as carry-over work[4]. Exhibit ES-GAP/JAS/KMB-1 provides a detailed narrative as to the Company's progress under each GMP investment category and device type, including information on the work completed in 2018, lessons learned and successes/challenges associated with each category, actual versus planned GMP implementation and spending, the benefits realized as a result of the GMP investment implementation, key milestones and projections for deployment under the remainder of the 2018-2020 GMP.

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

A. 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

[4] As of April 1, 2019, all carry-over work from the 2018 GMP, with the exception of the Miles of Fiber and VVO-Regulator programs, has been constructed and commissioned. At the end of 2018, the Company established an internal target to complete all 2018 GMP carry-over work in the first quarter of 2019. The Company's progress in achieving this target along with concurrently maintaining focus on 2019 GMP and base capital work is a reflection of the organizational emphasis placed on meeting GMP targets.

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

- **Commissioned**: once a GMP unit 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 classifies the units that have completed the commissioning step as communicating and functioning consistent with the specifications set out in the GMP.

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 and is functioning to help advance the grid modernization goals. Section III of Exhibit ES-GAP/JAS/KMB-1 provides both the Construction Complete and Commissioned status of the 2018 GMP investment units in order to provide a complete and transparent overview of the Company's progress during the 2018 GMP investment year.

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

recovery through the GMF. 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.

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

A. The Company budget for the GMP was established in the Fiscal Year 2018 (FY 2018) capital budgeting process conducted at the end of 2017. Initially, the GMP budget was based on the Company's original five-year plan as filed in D.P.U. 15-122. The Company revised the budget consistent with the Department's approval of a three-year GMP and the year-end projection for the total GMP budget was updated throughout 2018 as more information became available. Following approval of the Company's GMP, the Company managed each pre-authorized device type budget based on unit cost targets. Section III of Exhibit ES-GAP/JAS/KMB-1 contains additional information regarding the Company's actual spending in 2018 relative to these unit cost targets for each GMP device. Company Witnesses Botelho and Griffin's

testimony and related exhibits provide the requisite support for the costs incurred during the 2018 GMP investment year.

Q. How did the Company develop its unit deployment schedule for the 2018 GMP investment year?

A. The total quantity of units was derived from the authorized investment category amounts in D.P.U. 15-122. The engagement and coordination efforts with the various Eversource departments discussed above, as well as the truncated 2018 investment year drove the deployment schedule. Section III of Exhibit ES-GAP/JAS/KMB-1 contains additional information regarding the planned 2018 units for investment, the 2018 Construction Complete units, the 2018 Commissioned units and the 2018 units that were carried over for implementation as part of the 2019 GMP investment year.

Q. Please provide a summary of the Company's progress in relation to the infrastructure and performance metrics established in D.P.U. 15-122.

A. As part of its approval of the Company's GMP, the Department approved specific statewide and company-specific infrastructure metrics. Regarding statewide infrastructure metrics, the Department required Eversource, National Grid and Unitil 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.[5] Id. at 200-201.

Section IV of Exhibit ES-GAP/JAS/KMB-1 provides the Company's performance under the statewide and Company-specific infrastructure metrics. Regarding the statewide infrastructure metrics, the Company's 2018 GMP investments resulted in it performing over and above the established baseline for each metric. Regarding the Eversource-specific infrastructure metrics, the shortened 2018 GMP investment year necessarily impacted the Company's performance against established baselines.

In D.P.U. 12-76-B, the Department directed the Company and the other EDCs 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 the other EDCs. 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.

[5] 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.

D.P.U. 15-122, at 95-106. The Department ordered the Company and the other EDCs 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 Company, along with National Grid and Unitil, filed revised proposed performance metrics. On February 13, 2019, the Department held a technical conference to aid its review of the revised proposed performance metrics. Following the technical conference, the Department issued a Memorandum on March 19, 2019, ordering Eversource, National Grid and Unitil to file further revised performance metrics consistent with the directives set out in the Memorandum. March 19, 2019 Memorandum at 2-5. The revised proposed performance metrics were submitted on April 9, 2019.

The April 9, 2019 revised proposed performance metrics are still pending before the Department. The Company, following its review of the final performance metrics and all necessary steps to compile, review and finalize the necessary data, will file its achievements under the 2018 Grid Modernization performance metrics consistent with any Department directives.

IV. EV INFRASTRUCTURE PROGRAM

Q. Please briefly describe the Eversource EV Infrastructure Program.

A. On November 30, 2017, the Department approved the Company's proposal to spend up to $45 million over five years on an EV infrastructure program (the "Make-Ready Program" or "Program"). D.P.U. 17-05, at 475-478, 501. In 2018, Eversource launched the Make-Ready Program with the goals of helping accelerate EV charging infrastructure development within its service territory, encouraging EV purchases, and contributing 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 is investing in infrastructure beyond the meter up to the charging station. Eversource is supporting 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."

The Make-Ready Program will be run in two phases: Phase I will extend 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 direct charging ("DC") fast charging ports at 36 charging sites, and up to 3,500 Level II charging ports at 450 charging sites, throughout its service territory in Massachusetts.

In 2018, Massachusetts saw a 93 percent year-over-year jump in EV sales to 9,044 from 4,677 in 2017. As charging stations established by the Eversource Make-Ready Program gain in number throughout the Program duration, the Company expects this number to increase. Eversource made great strides in 2018 to establish the documentation, systems and processes to successfully launch the Make-Ready Program and begin site host recruitment to develop a strong backlog of customers ready to install charging infrastructure. Specifically, the Company saw the following progress under the Program in 2018:

- 150 applications received
- 57 site host agreements executed
- 12 charging station sites electrified
- 62 charging station ports installed
- 87 charging station ports enabled.

Table 3 below summarizes the investments in the 12 charging station sites placed in service in 2018.

Table 3 2018 Make Ready Program Deployment

Site Address	Town	Environmental Justice Community	Site Type	Charger Type	Ports Installed	Ports Enabled
1000 Commonwealth Ave	Newton	No	Public	Level 2	8	10
208 S Great Road	Lincoln	No	Public	Level 2	6	10
200 Shire Way	Lexington	No	Workplace	Level 2	10	10
47 Station Drive	Westwood	No	Workplace	Level 2 / DC Fast	8	11
1 Laraway Road	Winchester	No	Public	Level 2	2	5
125 Bedford St	Bedford	No	Workplace	Level 2	6	6
5 Russell St	Plymouth	No	Public	Level 2	4	5
525 Canton Avenue	Milton	No	Public	Level 2	2	5
5 Wahconah Street	Pittsfield	No	Public	Level 2	4	5
26 High Street	Medway	No	Public	Level 2	2	5
155 Village Street	Medway	No	Public	Level 2	2	5
Olive Street	Greenfield	Yes	Public	Level 2	8	10
Total		1			62	87

Section IX of Exhibit ES-GAP/JAS/KMB-1 contains additional detail on the Company's progress under the Program in 2018, including information on vendor and contractor prequalification, stakeholder outreach, site host acquisition strategy, and pilots/partnerships being pursued by the Company.

In D.P.U. 17-05, the Company proposed to track and report on six 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.[6] D.P.U. 15-122, at 187. In the interest of providing the Department and stakeholders with a robust review of the Company's 2018 progress under the Make Ready Program, the Company provided in Exhibit ES-GAP/JAS/KMB-1 its progress under the six proposed performance metrics first introduced in D.P.U. 17-05. The specific performance metrics include:

6 The stakeholder process has not yet been commenced.

(1) total number of "make ready" sites developed;

(2) ten percent capital invested in DC fast charging sites;

(3) ten percent capital invested in Environmental Justice ("EJ") communities;[7]

(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 CO_2 emissions reductions.

Tables 4 through 7 below provide the Company's progress under the proposed performance metrics.

[7] 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 of 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.

Table 4 Program Cycle

	Level 2	DC Fast Charger	Total
Applications	141	9	150
Contracts Signed	55	2	57
Under Construction	37	1	38
Projects Completed	**12**	**0**	**12**

Table 5 Station Profiles

	Level 2	DC Fast Charger	Total
Charging Ports Installed	62	0	62
Charging ports Enabled	86	1	87
Avg. # Ports Installed Per Site	5	n/a	5
Public Sites	9	0	9
Workplace Sites	3	0	3
Multi-Unit Dwelling Sites	0	0	0
Environmental Justice Sites	1	0	1
Average Station Utilization (kWh/month)*	160.3	0	160.3
Port Utilization (kWh/port)*	209.1	0	209.1

* These figures represent small sample size of stations, most of which were electrified late in 2018

Table 6 Station Locations

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

Table 7 Environmental

	Total
ZEVs Enabled	372
CO2 Emissions Reductions (annualized MTCO2e)	1302

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

V. BATTERY ENERGY STORAGE PROJECTS

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

A. In D.P.U. 17-05, the Department approved two BES demonstration projects proposed by the Company. NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 17-05, at 461-65 (2017). The Department also determined that it was appropriate for Eversource to recover the costs of its BES demonstration projects through the GMF.

The Outer Cape BES will be a 25 MW / 38 MWh lithium ion battery, housed in a Cape-style building on approximately 1.4 acres at the Provincetown transfer station on land

leased from the Town of Provincetown. The Outer Cape BES's primary purpose will be to provide back-up power during outages on Line 96, the single, three-phase distribution line that serves as many as 11,000 customers from the Towns of Wellfleet, Truro, and Provincetown. In 2018, the Company made significant strides in developing and moving towards construction of the Outer Cape BES, including but not limited to partnering with the Town of Provincetown regarding BES site location and permitting level design of the project, as well as working to secure all necessary permits.

The Martha's Vineyard BES will be a 5 MW / 20 MWh lithium ion battery, housed in a Cape-style building on just over an acre of Eversource-owned land, adjacent to its Area Work Center in Oak Bluffs. The Martha's Vineyard BES's primary purpose will be enable significantly reduced reliance on two out of five diesel-fired peakers that are used to supply power to Martha's Vineyard during high load conditions. The Martha's Vineyard BES will also enable the interconnection of additional solar photovoltaics ("PV") on Martha's Vineyard. Similar to its progress on the Outer Cape BES, the Company has made significant progress in partnering with the Town of Oak Bluffs regarding site selection and securing necessary permits.

Exhibit ES-GAP/JAS/KMB-1 provides additional detail as to the Company's 2018 progress on its BES projects.

Q. Is the Company seeing to recovery any costs associated with the BES projects through the 2019 GMF?

A. No. Given the nature of the BES projects and the multitude of foundational steps that need to be taken prior to the construction and commissioning of the projects, the BES projects were not placed in service in 2018. Following these projects being placed in service for the benefit of customers, the Company will include the costs associated with the BES projects in a future GMF filing.

VI. CONCLUSION

Q. Does this conclude your testimony?

A. Yes, it does.

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, 215, 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

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[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 require 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.[3] 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.

After the May 10, 2018 the 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 Report, including the development of templates to comprehensively and clearly provide data demonstrating the Company's annual progress under its GMP. The Grid Modernization Annual Report Templates have 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.

Consistent with the Department's directives, Eversource hereby files its 2018 Grid Modernization Annual Report.

B. 2018 Progress Toward Grid Modernization Objectives

1. 2018 Overview

In 2018, the Company made substantial progress towards achievement of its 2018-2020 GMP objectives. Much of the work executed in 2018 was focused on building the organizational capacity to efficiently and cost-effectively scale up the Company's operations to incorporate incremental grid modernization projects. The Company's ability to deliver meaningful progress between May and December of the 2018 GMP investment year was largely attributable to its ability to leverage established, robust and proven processes for executing a multitude of large, complex capital projects. Given the timing of a mid-year start, the Company was challenged to start up the GMP portfolio implementation without impacting existing plans for the 2018 base capital plan, including non-discretionary new customer, emergency response and equipment repair work, as well as the Company's reliability programs. The fact that the Company was able to complete construction and commissioning of multiple GMP devices while successfully executing its 2018 base capital plan reflects the scalability of the Company's processes and the dedication of the organization to expedite delivery of benefits of grid modernization to customers.

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[3] Final performance metrics are currently pending before the Department. Once finalized, the Department will set a deadline for filing the Company's performance under the Grid Modernization performance metrics. D.P.U. 15-122, March 29, 2019 Memorandum.

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 worked to stand up its grid modernization implementation capability, the distribution system continued to evolve with even higher levels of DER penetration. In 2018, the Company interconnected an additional 4,800 solar generation facilities representing over 106 MW of incremental capacity. Further, the size of the interconnection queue grew from 620 MW to over 1,000 MW. 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 support 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 2018 GMP work plan was largely attributable to its ability to leverage existing processes and organizational capabilities. Using its existing project approval processes, the Company ensured consistency with its overall policies for capital budget spending authorization. The Company also leveraged 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 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 will drive cost-effectiveness in achieving plan objectives. One of the important 2018 activities undertaken by the Company was the prioritization of equipment locations. As described in Section III of this Report regarding Distribution Automation investments, for instance, the Company

established a prioritization methodology ranking potential locations to maximize value of the GMP deployment. Deployment strategies were also established to ensure construction efficiency. With respect to underground work, decisions were made to replace oil switches on a circuit basis to minimize customer impact and operational inefficiencies associated with outage planning and permitting. Efforts relative to labor strategy will also drive cost-effectiveness relative to the use of internal versus outsourced resources for engineering, construction and project management.

- **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. Specifically, the positions consist of one Financial Analyst, one Program Analyst, and one Program Manager. More details on the Company's GMP portfolio management team and process are provided in Section II of this Report.
- **Engage senior Operations leadership to provide implementation guidance and support.** From approval of the Company's GMP, senior Operations leadership 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 established, and leadership feedback continues to guide the approach to implementation.

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 Volt VAR optimization ("VVO") and Advanced Distribution Management System ("ADMS") investment categories require more of an innovative approach. In order to implement these new programs, the Company was required to establish organizational structures and assess workforce needs without the same established background of implementation requirements as it had for deployment of existing technologies. Additional work was also required relative to competitive procurement of new technologies. In 2018, extensive competitive procurement processes were established for the advanced load flow and VVO projects.

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. First, Engineering staff implemented prioritization methodologies to identify investment deployment locations that would maximize the investment's value to customers. For example, a methodology was implemented to analyze all overhead customer isolation zones in order to rank the opportunities to reduce the customer isolation zone size with appropriate consideration for historical reliability performance. This methodology was utilized by Engineering to develop prioritized locations in order to deploy overhead sectionalizing devices in locations that would

provide the most benefit to customers. See Section III for a more detailed description of prioritization methodologies.

In addition, Engineering teams initiated multiple technology selection efforts. For certain technologies, the Company's existing work practices and standards were comprehensive and utilized without the need for modification. For instance, in the case of overhead automation, the Company leveraged its expertise to utilize existing practices and standards in relation to recloser technology for all locations. In other cases, additional work was required to develop and complete technology standards and initiate the procurement process for equipment not previously deployed on the Eversource system. For example, the Company modified its existing voltage regulator standards to account for the incorporation of Supervisory Control and Data Acquisition ("SCADA") capability.

Second, 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 2018 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.

Third, the Planning and Scheduling team conducted an analysis to estimate the number of labor hours required to engineer, construct and commission the 2018 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 2018 GMP work plan. This strategy is consistent with the Company's overall labor resource strategy that allows for hiring external resources to execute work plans such as the GMP portfolio. As noted above, 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.

Fourth, the Eversource Investment Planning team established specific and dedicated cost control processes to isolate and monitor all costs associated with the GMP. The Company established an accounting process to specifically track GMP costs and expenditures, including setting up a work order process to track grid modernization investments separately from other capital projects undertaken by the Company. All grid modernization work orders link to a specific grid modernization project, which in turn links to a specific line of business. The Company will provide

additional information on these efforts in its May 15, 2019 filing regarding recovery of 2018 grid modernization investment costs through the GMF.

These preparatory stages represent critical foundational steps that needed to be developed and deployed in order to ensure that the 2018 GMP investments were undertaken in a deliberate, efficient and cost-effective manner. This framework will be utilized over the remainder of the 2018-2020 GMP, and the Company will continue to monitor the process to identify and implement necessary changes to continue to improve GMP investment deployment. Additionally, these foundational actions have 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.

C. Summary of 2018 GMP Investment Deployment (Actual vs. Planned)

Drawing upon the implementation strategy described above, the Company initiated execution of its GMP. Planning efforts recognized the importance of 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 at page 15).[4]

The 2018 GMP unit targets from the Baseline and Targets filing is reproduced below *Table 1: 2018 Units Status* in column "Plan Units (2018)." In Table 1, the Company has reflected its progress relative to 2018 targets in the columns "Construction Complete Units (2018)" and "Commissioned Units (2018)". If the unit was not both constructed and commissioned, Table 1 provides the units to be installed in the 2019 GMP year under the column, "2018 Unit Carry Over (2019)".

[4] This filing is still pending before the Department.

Table 1: 2018 Units Status

Investement Categories	Preauthorized Device Types	Plan Units (2018)	Construction Complete Units (2018)	Commissioned Units (2018)	2018 Unit Carry Over (2019)
Monitoring & Control (SCADA)	Microprocessor Relays (SS)	13	10	10	3
	4kV Circuit Breaker SCADA (SS)	0	n/a	n/a	n/a
	Recloser SCADA	18	18	15	3
	Padmount Switch SCADA	21	3	3	18
	Network Protector SCADA	0	n/a	n/a	n/a
Distribution Automation	Overhead DA	29	31	25	4
	Overhead DA w/Ties	0	n/a	n/a	n/a
Distribution Automation	4kV Oil Switch Replacement	10	8	0	10
	4kV VFI Retrofit for DA	0	0	n/a	n/a
Volt-Var Optimization	VVO - Regulators	15	0	0	15
	VVO - Capacitor Banks	0	n/a	n/a	n/a
	VVO - LTC Controls	4	4	4	0
	VVO - Line Sensors	0	n/a	n/a	n/a
	VVO - IT Work	n/a	n/a	n/a	n/a
Advanced Distribution Management System (ADMS)	Advanced Load Flow	n/a	n/a	n/a	n/a
	GIS Verification	n/a	n/a	n/a	n/a
	Distribution Management System	n/a	n/a	n/a	n/a
Communications	Communication - FAN	0	n/a	n/a	n/a
	Communication - Fiber	5	0	0	5

In order to appropriately assess the Company's performance under its 2018 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: 2018 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.[5] 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 standard costs recovery rules. 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 2018, the Company will include the costs associated with the investment in its 2018 cost recovery filing to be submitted on May 15, 2019.

As can be seen in *Table 1: 2018 Unit Status* above, the Company undertook an aggressive approach to implementing the 2018 GMP, due, in part, to the timing of the D.P.U. 15-122 order, which was issued at the mid-point of the Company's fiscal year. The timing of the D.P.U. 15-122 order and the need to undertake the preparatory work described above prior to any actual construction of grid modernization investments did present some challenges in meeting the 2018 grid modernization investments targets. Through significant efforts and due to the comprehensive processes and procedures that were developed as part of the GMP preparatory efforts, Eversource made significant strides in implementing the 2018 GMP. Despite these accomplishments, at the end of 2018, certain 2018 GMP targets were not met and were instead scheduled for implementation in 2019 as carry-over work. Throughout the remainder of the 2018 Grid Modernization Annual Report, the Company has provided a detailed narrative as to its progress under each investment category and device type.

As of April 1, 2019, all carry-over work from the 2018 GMP, with the exception of the Miles of Fiber and VVO-Regulator programs, has been constructed and commissioned. At the end of 2018, the Company established an internal target to complete all 2018 GMP carry-over work in the first quarter of 2019. The Company's progress in achieving this target along with concurrently maintaining focus on 2019 GMP and base capital work is a reflection of the organizational emphasis placed on meeting GMP targets.

The Miles of Fiber program is a component of the Company's communications infrastructure program. The Miles of Fiber program, which is designed to enhance fiber and radio penetration across the service territory and upgrade communications capabilities to support the Company's suite of grid modernization investments, is a very complex program which was challenging to

[5] The Company will also provide a similar summary of grid modernization devices and systems categorization in its May 15, 2019 cost recovery filing.

accelerate given the truncated 2018 GMP investment year. Initially, the Company anticipated undertaking several short, shovel-ready projects under the 2018 GMP. However, after further review, all but one of those projects was more appropriately allocated to other business initiatives and was therefore not appropriate for inclusion in or recovery under the GMP. The Company is re-evaluating appropriate Miles of Fiber projects for construction during the 2019 GMP. Currently, 1.5 miles of fiber optics have been installed but not commissioned.

With respect to the VVO Regulators, given that the VVO program is a new initiative for the Company, the timeframe to engineer, design and plan the unit installations took longer than anticipated. Despite the truncated 2018 GMP investment year, the Company did complete the locational engineering with internal resources and designs were initiated with external resources. However, the timing associated with the shipment of the materials in addition to local the duration of the town planning and zoning petition process, precluded installation in 2018. The team did prepare for the installation of the 15 units in 2019 and, as of April 1, 2019, nine of the 15 units were categorized as "Construction Complete".

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 initiated extensive competitive procurements for advanced load flow software, advanced load flow engineering support and VVO software. The Company also engaged expert information technology program management support for the advanced load flow and VVO programs to augment the engineering program management capabilities established in the Company's Grid Modernization organization. Additionally, over one-quarter of the eastern MA overhead infrastructure has been surveyed as a part of the GIS verification project.

D. Summary of Spending (Actual v. Planned)

In *"Table 2: 2018 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: 2018 Capital and In-Service Spend Summary

Grid Modernization		2018					
		Capital Spend	Budget	Variance	Plant in Service	Budget	Variance
		Actual	Actual	Actual	Actual	Actual	Actual
		12,536,080	62,200,000	(49,663,920)	3,694,645	–	3,694,645
Investment Category	**Preauthorized Device Type**						-
Monitoring & Control (SCADA)	Microprocessor Relay	3,363,115	–	3,363,115	–	–	-
	4kV Circuit Breaker SCADA	83,747	–	83,747	–	–	-
	Recloser SCADA	963,353	–	963,353	700,660	–	700,660
	Padmount Switch SCADA	105,723	–	105,723	–	–	-
	Network Protector SCADA	–	–	–	–	–	-
	OMS/AMI Integration	–	–	–	–	–	-
Distribution Automation	OH DA w/o Ties	2,267,503	–	2,267,503	932,834	–	932,834
	OH DA w/Ties	–	–	–	–	–	-
	4kV Oil Switch Replacement	932,307	–	932,307	764,965	–	764,965
	4kV VFI Retrofit for DA	–	–	–	–	–	-
Volt-Var Optimization	VVO - Regulators	–	–	–	–	–	-
	VVO - Capacitor Banks	–	–	–	–	–	-
	VVO - LTC Controls	377,157	–	377,157	–	–	-
	VVO - Line Sensors		–	–	–	–	-
	VVO - IT Work	–	–	–	–	–	-
Advanced Distribution Management System (ADMS)	Advanced Load Flow	–	–	–	–	–	-
	GIS Survey (Expense)	–	–	–	–	–	-
	Dist. Management System	–	–	–	–	–	-
Communications	Numbers of Nodes	–	–	–	–	–	-
	Miles of Fiber	–	–	–	–	–	-
Workforce Management	Mobile Damage Assessment	–	–	–	–	–	-
Electric Vehicles	Electric Vehicles	2,859,831	–	2,859,831	1,296,186	–	1,296,186
Energy Storage	Martha's Vineyard	958,654	–	958,654	–	–	-
	Provincetown	624,690	–	624,690	–	–	-

Below are several aspects of the 2018 GMP implementation that impact the financial performance under the 2018 GMP:

- The Company budget for the GMP was established in the Fiscal Year 2018 (FY 2018) capital budgeting process conducted at the end of 2017. The $62.2 million capital budget reflected in *Table 2* was based on the Company's original five-year plan as filed in D.P.U. 15-122. Internally, the year-end projection for the total GMP budget was updated throughout 2018 as more information became available. Following approval of the Company's GMP, the Company managed each pre-authorized device type budget based on unit cost targets. Further description of the Company's actual spending relative to unit cost targets for each device type investment is included in Section III.
- Pre-Authorized Device Types with no spending in 2018 reflect the fact that no design or construction work had been completed under Company-authorized GMP projects. For several projects, including advanced load flow and VVO, 2018 engineering labor was charged to non-GMP work orders to enable progress prior to formal internal project authorization.
- In some cases, including microprocessor relays and overhead distribution automation, administrative delays prevented transferring capital spending into the Plant in Service status. In other cases, the difference between Capital Spend and Plant in Service is due to the timing difference associated with the investment being categorized as Construction Complete in 2018 and the investment being moved to Account 101 in 2019 following the completion of the review of the relevant work orders and costs associated with the investment Given the Company's comprehensive review of costs in order to ensure that

they are appropriate for recovery, this timing difference occurs in the normal course of business with all capital investments.

- Table 2 above includes capital spending only. The Company spent an additional $$706,267.56 in expense associated with the GIS verification project.

II. Program Implementation Overview

A. Organizational Changes Designed to Support Program Implementation

In order to ensure successful and efficient implementation of the GMP, 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 as shown in red 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 mange cross-functional responsibilities. Under this process framework, the Company has undertaken the following steps in order to successfully implement and manage the GMP.

- **Evaluate/Inventory:** The team studied 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 and the Primavera P6 scheduling systems. 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 allows 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 enable the Company to identify potential issues as early as possible during a given investment and develop and apply a resolution before program impact.

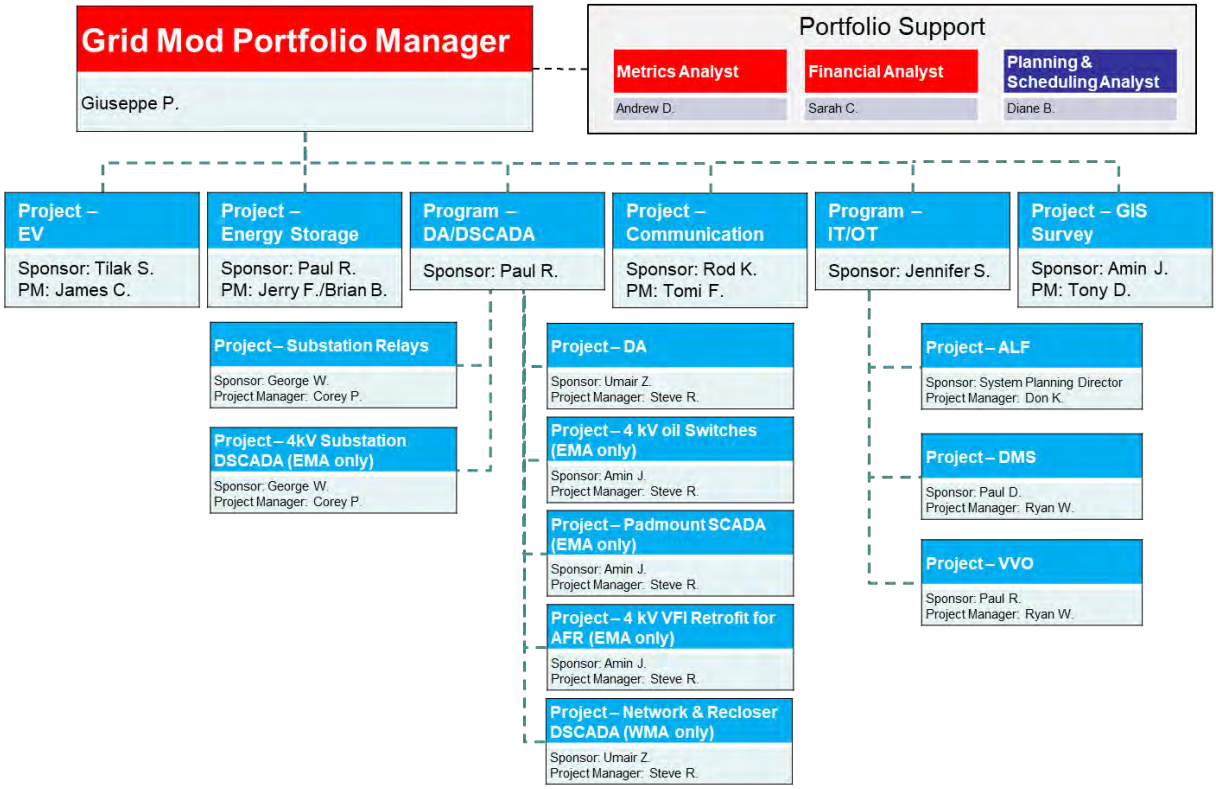
- **Align:** The GMP represents incremental work that was overlaid onto and integrated with Eversource's existing controls and processes. Therefore, the core team coordinated and facilitated a blended oversight and engagement of the various departments responsible for the execution of the GMP, such as 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.

Core Grid Mod Team	
Name	**Title**
Jennifer Schilling	Director - Grid Mod
Ryan West	Manager - Grid Mod
Don Kane	Lead Engineer
Akhil Punnoose	Lead Engineer
Emilio Cepeda	Engineer
Giuseppe Perniciaro	Portfolio Manager - MA
Andrew DelGaudio	Program Analyst - MA
Sarah Carey	Financial Analyst - MA

- **Manage:** Through the use of cross-functional GMP project managers, recurring status and coordination meetings, and recurring reporting, the core GMP team developed and utilizes a 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.

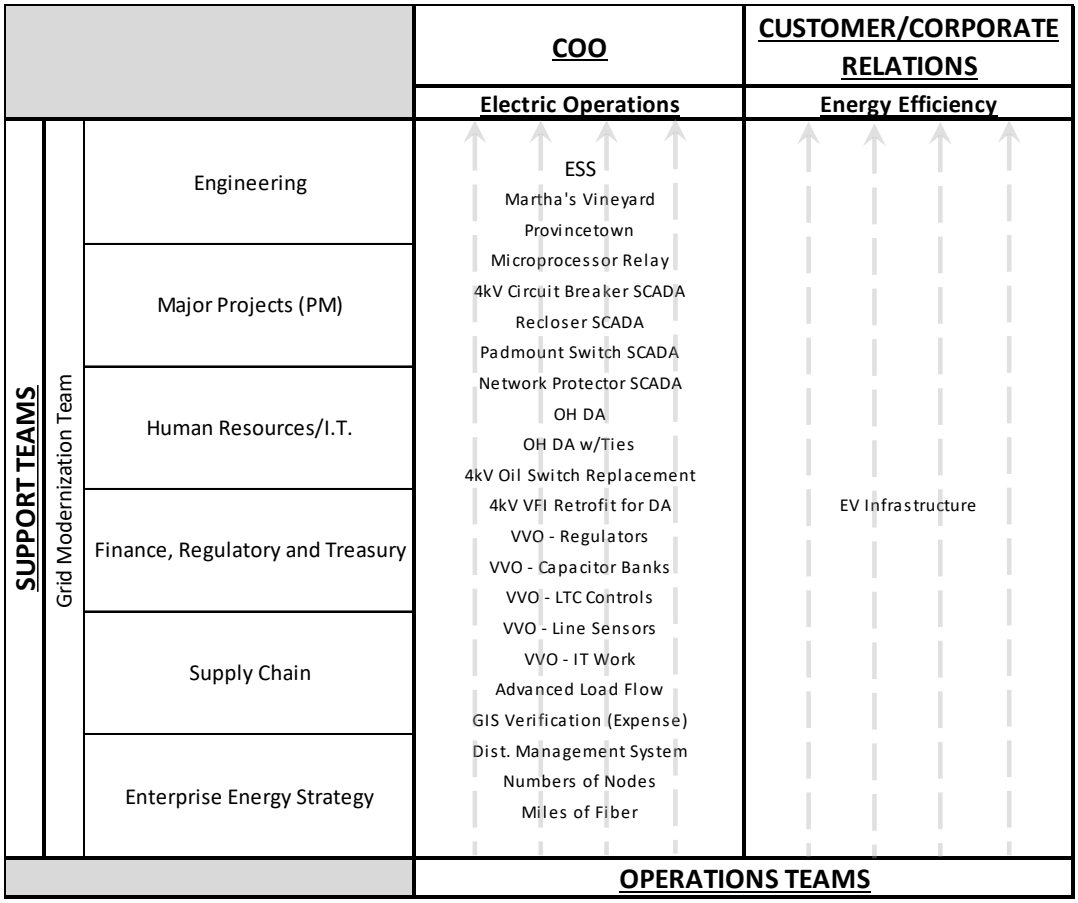
These steps represent critical foundational steps that needed to be developed and deployed in order to ensure that the 2018 GMP investments were undertaken in a deliberate and efficient manner. This framework will be utilized over the remainder of the 2018-2020 GMP.

Figure 3 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 2 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 4 Eversource Organizational Structure



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. A specific work order (GMPLBR21) 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. 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 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. The goal was to create a process that was accurate, repeatable, and 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, TM1, that contains only GMP projects and lines of business. The view contains monthly Actuals, Budget, Variance, and Projection information that are automatically populated in TM1.

- Actuals – numbers feed into TM1 directly from Eversource's other financial reporting system, PowerPlan.
- Budget – numbers are input into TM1 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 new year so that there cannot be any changes to the budget throughout the year.
- Variance – automatically calculated in TM1 (Actuals-Budget).

- Projection – numbers are input into TM1 monthly, based on historical performance and Actuals from the prior month.

As Actuals accrue for each project, the Projections are manually entered into TM1 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 TM1 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 TM1 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 TM1 Actuals is also performed to further ensure that the TM1 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 TM1 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 TM1 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 group 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 detail 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 continually 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 Authorization Policy and procedures, all GMP projects that were placed in service in 2018 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 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, Recloser SCADA, Padmount SCADA)

A. Description of work completed

MICROPROCESSOR RELAYS: Under the 2018 GMP, the Company replaced 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.

RECLOSER SCADA: Under the 2018 GMP, the Company identified existing overhead recloser devices in the field that were 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 System Operations Center ("SOC").

PADMOUNT SWITCH SCADA: Under the 2018 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.

B. Lessons-Learned/Challenges and Successes

MICROPROCESSOR RELAYS:

- Work completed within a substation typical requires a very significant coordination between Company departments. Due to the truncated timeframe for implementation of the 2018 GMP, the speed at which the GMP was scheduled put stain on the ability of the organization to quickly complete this incremental work. Given that the Company will have the benefit of a full investment year in 2019 and 2020, similar scheduling issues are not anticipated to impact the GMP. Obtaining the right mix of internal and external resources was initially a challenge.

- 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.

- 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 can pose a challenge, particularly given the shortened 2018 GMP investment year and potential competition for these skilled resources. The Company continues to work with the appropriate vendors, utilizing the 2018-2020 GMP to help secure these contracts, when/where needed.

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.

- Commissioning resources was identified as an area of opportunity identified by the Company. The Company has placed an emphasis on planning and monitoring for the Commissioning team and is developing a plan to solicit for external resources.

- The Company has 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 has elected to modify this GMP program into a "replace, in-place" program where locations utilizing older, oil-filled equipment have the entire recloser replaced with new, SCADA-capable equipment.

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 this report, the Company has successfully validated all the previously selected 2018, 2019 and 2020 locations, designed the projects and is ready to construct.

C. Actual vs. Planned Implementation and Spending

Refer to Tables 5 and 6 below for the Company's 2018 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 5: 2018 Implementation Summary

Investement Categories	Preauthorized Device Types	Plan Units (2018)	Construction Complete Units (2018)	Commissioned Units (2018)	2018 Unit Carry Over (2019)
Monitoring & Control (SCADA)	Microprocessor Relays (SS)	13	10	10	3
	Recloser SCADA	18	18	15	3
	Padmount Switch SCADA	21	3	3	18

Table 6: 2018 Implementation Cost Summary

		2018					
		Capital Spend	Budget	Variance	Plant in Service	Budget	Variance
		Actual	Actual	Actual	Actual	Actual	Actual
Investment Category	Preauthorized Device Type						-
Monitoring & Control (SCADA)	Microprocessor Relay	3,363,115	-	3,363,115	-	-	-
	Recloser SCADA	963,353	-	963,353	700,660	-	700,660
	Padmount Switch SCADA	105,723	-	105,723	-	-	-

MICROPROCESSOR RELAYS:

- The Company's implementation of the microprocessor relays was short of its 13-unit target by three units in 2018. Significant effort was taken to build a team, validate locations, execute the 2018 plan to install the microprocessor simultaneously at multiple locations at once and fully commission the devices. This was a major success to the organization.

  Additionally, all equipment/material, planning and resources were in place and ready for the completion of the remaining three relays within 2018. However, the Company, through assemblage of the correct group of personnel, made the decision not to execute on the remaining three devices based on the single-contingency outage condition that would have been created by this project over the long Christmas holiday. Though the project team had a contingency restoration plan, in the event that an outage occurred over the holiday, the team felt that this customer risk was too great and opted to delay the installation of the last three relays until January 2019. As of April 1, 2019, all 2018 carry-over relays have been completed and commissioned.

- For the Total Capital Spend, costs for year one of the three-year GMP averaged higher than budgeted unit costs. Despite this, the Company is still consistent with its three-year GMP budget. As it manages to the three-year GMP budget,

the Company is reviewing the costs in real-time and working to mitigate the cost increases, such as by providing for adequate time to engineer, plan and resource the project, and bring costs back in line with the budget. As of the date of this Annual Report, the Company has not made any changes to this 2018-2020 GMP program. Several factors contributed to this decision, namely the impacts associated with: (1) the truncated 2018 GMP investment year; (2) the need for a significant amount of preparatory work to be undertaken prior to investment, as discussed above; and (3) the limited time available to plan and execute investments in 2018. The Company anticipates that, given the robust organizational and operational processes that have been developed and implemented and that 2019 and 2020 represent full investment years, unit costs will reflect and be consistent with the 2018-2020 GMP budget.

There is no Plant In-Service for 2018 due to the timing difference between when the microprocessor relay investments were categorized as Construction Complete and when the Company completed its review of the relevant work orders and costs and moved the investments into Account 106. The Company is not seeking to recover any of the relay costs through the 2018 GMF, even through 10 were categorized as Construction Complete within the 2018 GMP investment year.

- In analyzing the cost increases from budget to actual, the Company has identified several drivers of the increases, as discussed below.
    a. The microprocessor relay program has relatively significant start-up costs that have a tendency to normalize as the Company streamlines and standardizes its implementation of these devices.
    b. The Department's approval and modifications of the Company's 2018-2020 GMP in May 2018 impacted planning and scheduling of this GMP program. This timing required the Company to rely more heavily on external resources to implement the program. Many of these resources have limited availability, such as Lead Commissioning Engineers ("LCEs") and Substation Test Engineers. Additionally, the resource limitations in the market have led to increased negotiated rates over the last several years.

RECLOSER SCADA:

- The implementation of the recloser SCADA program has been very efficient and cost-effective over the course of 2018. 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. However, though all units completed their construction in the field, the Company fell short of the goal by 4 units, which were not commissioned. The "Lessons Learned" placed emphasis on incremental strain that the program has placed on the Commissioning department. As of April 1, 2019, all 2018 carry-over Recloser SCADA devices have been commissioned.

- As discussed in the "Lessons Learned" section above, the Company is shifting 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 below budgeted unit costs. The Company is modifying the implementation of this GMP program as described above. As demonstrated by the 2018 actual unit costs, this necessary modification will ultimately increase the current unit-cost as the Company will be replacing, as opposed to simply upgrading, the entire recloser. 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. Due to the timing difference between when the recloser SCADA investments were categorized as Construction Complete and when the Company completed its review of the relevant work orders and costs, the Company is not seeking to recover costs for three of the units through the 2018 GMF although they were categorized as Construction Complete within the 2018 GMP investment year.

PADMOUNT SWITCH SCADA:

- The implementation of the Padmount switch SCADA proved to be a challenge for the Company to complete in the timeframe remaining in 2018 following the Department approval of the 2018-2020 GMP. Field validating to ensure that both the equipment type and communications infrastructure was adequate took significantly longer to complete than initially estimated. This delay had a cascading effect, particularly on the Company's commissioning teams, on the Company's ability to meet the 2018 targets within the allotted timeframe. As a result, the Company missed the 2018 target by 18 units. As of April 1, 2019, all 2018 carry-over Padmount switch SCADA devices have been completed and commissioned.

- The Total Capital Spend for this program indicates that the unit costs for year one of the three-year GMP averaged higher than budgeted. As it manages to the three-year GMP budget, the Company is reviewing the costs and working to mitigate the cost increases to bring the costs back in line with the three-year budget. 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 communications package that was installed. At this time, without a full year of experience in this GMP program, the Company has determined to maintain the original unit quantities under the 2018-2020 GMP. Based on its efforts in 2018 to identify the appropriate locations for these investments, as well as determining the manner of upgrade, the Company anticipates that, for the remaining years of the GMP, that the unit costs will come back in line with, or under, the three-year GMP budget.

- Due to the timing difference between when the Padmount switch SCADA investments were categorized as Construction Complete and when the Company completed its review of the relevant work orders and costs, there is no Plant In-Service for 2018. The Company will not be seeking to recover any of these unit costs through the 2018 GMF, even though three installations were classified as Construction Complete within the 2018 GMP investment year.

D. Performance on Implementation/Deployment

Performance data cannot yet be ascertained due to the limited installation time in the field. Additionally, the Distribution Companies' proposed GMP performance metrics are still pending before the Department. Following the issuance of the final performance metrics, the Company will report on its performance against the metrics consistent with the Department's directives.

E. Description of Benefits Realized as the Result of Implementation

Although there will be immediate benefits to the Company by having visibility and control of additional devices in the field, such as insight into emergent conditions, remote switching and acquisition of load data, measurable benefits will not be realized until substation and circuit level reporting is completed, in accordance with the proposed performance metrics currently pending before the Department.

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 network[1]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

[6] The 2018 GMP investment plan did not include "Network SCADA" switches.

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 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 and 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.

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 2018 milestones follows:

- Selection of all device types and locations (COMPLETE)
- Engineering and design for devices installation:
    - Line-devices (Reclosers/Padmounts) (COMPLETE)
    - Substation (Microprocessor Relays) (COMPLETE)
- Commissioning of devices (COMPLETE)

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 7: Three*

Year Term Projections provided below provides the projections for 2019 and 2020 for those investment categories actively worked in the 2018 GMP investment year.

Table 7: Three-Year Term Projections

Investment Category	Preauthorized Device Type	Units			
		Total	2018	2019	2020
			Plan	Plan	Plan
Monitoring & Control (SCADA)	Microprocessor Relay	213	13	100	100
	Recloser SCADA	37	18	11	8
	Padmount Switch SCADA	62	21	24	17

III.A.2 Distribution Automation
(OH DA, 4kV Oil Switch)

A. Description of Work Completed

Overhead Distribution Automation ("OH DA"): Under the 2018 GMP, the Company worked to identify suitable locations for OH DA and installed 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.

4kV Oil Switches: Under the 2018 GMP, the Company worked to identify locations and replace 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 VFI Retrofit" program when it comes online.

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.

- Commissioning resources was identified as an area of opportunity identified by the company. The Company has placed an emphasis on planning and monitoring for the Commissioning team and is developing a plan to solicit for external resources.

- This program did somewhat strain the Company's commissioning personnel. The commissioning teams typically cover many aspects of the business and, because the Company's GMP is exclusively focused on ensuring that all equipment has remote visibility and/or control, the commissioning teams were challenged by an increased work load. Regardless of the challenges, the commissioning teams completed the targeted work set out in 2018.

4kV Oil Switches:

- Challenges arise when, given previously scheduled, planned work, the various relevant departments cannot be coordinated to complete the work at the same time, necessitating more than one visit to the site at different times. Multiple site visits increase the duration of the project, as well as costs. Due to the truncated 2018 GMP investment year, the Company was challenged to coordinate the various department schedules to complete the GMP installations,

a factor that prevented the Company from meeting its 2018 GMP planned unit installation. To address this issue, the Company undertook proactive steps early in 2019 and has had identified all of the locations for 2019 installation sufficiently early in order to effectively and efficiently plan for the work and coordinate the various Company department schedules.

- The replacement of the underground oil switches is a complex process. The challenge is due in part to the high customer density and the outage boundaries that need to be established in order to perform the work. The process complexity was further compounded by the truncated 2018 GMP investment schedule for the program. The teams responsible for these replacements need to:
  - closely coordinate, so that the work can be planned and executed as efficiently as possible to limit the extent and duration of the planned outage. The teams accomplish this balance by planning as much maintenance and/or non-GMP work as possible to occur during the outage. The teams ensure that GMP work is 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 are followed in order to maintain this strict separation.

  - in order to avoid having to schedule a second planned outage, the teams will identify all of the GMP switch locations in advance so that should an emergency outage occur that happens to overlap the GMP location, the installation team would 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 will 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.

C. Actual vs. Planned Implementation and Spending

Tables 8 and 9 below the implementation unit and spending summaries for the Distribution Automation work undertaken in 2018. 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 8: 2018 Implementation Summary

Investement Categories	Preauthorized Device Types	Plan Units (2018)	Construction Complete Units (2018)	Commissioned Units (2018)	2018 Unit Carry Over (2019)
Distribution Automation	Overhead DA	29	31	25	4
	Overhead DA w/Ties	0	n/a	n/a	n/a
	4kV Oil Switch Replacement	10	8	0	10
	4kV VFI Retrofit for DA	0	0	n/a	n/a

Table 9: 2018 Implementation Cost Summary

		2018					
		Capital Spend	Budget	Variance	Plant in Service	Budget	Variance
		Actual	Actual	Actual	Actual	Actual	Actual
Investment Category	**Preauthorized Device Type**						-
Distribution Automation	OH DA w/o Ties	2,267,503	-	2,267,503	932,834	-	932,834
	4kV Oil Switch Replacement	932,307	-	932,307	764,965	-	764,965

OH DA:

- The Company constructed all of its 2018 OH DA program target and completed an additional two units over and above the target. The additional two units were coordinated for completion very late in 2018. The team wanted to complete as many additional locations as possible to make up for the location shortcomings that occurred within the VVO-Regulator program (see Section III.C Volt-Var Optimization for additional detail). Due to commissioning resources, as previously noted in the "Lessons Learned", six of the units (inclusive of the 2 additional units) were not fully commissioned at the close of 2018. As of April 1, 2019, all 2018 carry-over Overhead Distribution Automation devices have been commissioned.

- The Total Capital Spend for this program is below budgeted unit costs. Plant In-Service for 2018 is significantly less than Total Capital Spend due to two specific reasons:

    - The timing difference between when the OH DA investments were categorized as Construction Complete and when the Company completed its review of the relevant work orders and costs.
    - Through the QA/QC process administered across the portfolio, it was determined that several work orders had been initiated against an incorrect Line of Business. This situation was inadvertent, and the team rectified the mis-match and linked the work orders to the appropriate Lines of Business. The timing of these revisions relative to the year-end close precluded them from the 2018 actuals.

- The Company will not be seeking to recover through the 2018 GMF the costs associated with 18 of the units completed within the 2018 plan year.

4kV Oil Switches:

- The implementation of the 4kV oil switch replacements for 2018 was impacted by the complexity of the installation and the pace of the program, as noted in the "Lessons Learned" section above. Eight units were installed as "Construction Complete" and placed in service in 2018. As of 1 April 2019, all 2018 carry-over Padmount switch SCADA devices have been completed and commissioned.

- The Total Capital Spend for this program is below budgeted unit costs. Plant In-Service for 2018 is less than Total Capital Spend due to installation work not being completed on additional locations, which had not yet reached the in-service status.

D. Performance on Implementation/Deployment

Performance data cannot yet be ascertained due to the limited installation time in the field. Additionally, the Distribution Companies' proposed GMP performance metrics are still pending before the Department. Following the issuance of the final performance metrics, the Company will report on its performance against the metrics consistent with the Department's directives.

E. Description of Benefits Realized as the Result of Implementation

Although there will be immediate benefits to the Company by having visibility and control of additional devices in the field, such as insight into emergent conditions, remote switching and acquisition of load data, as well as safety and environmental benefits, measurable benefits will not be realized until substation and circuit level reporting is completed, in accordance with the proposed performance metrics.

F. 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 (former NSTAR Electric service territory) were prioritized. Circuit reliability based on historical SAIDI and 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 to100 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.

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.

2018 GMP investments in 4 kV switches were prioritized using the same zone size and reliability ranking methodology as described above for the overhead circuit.

EXPECTED CAPABILITY IMPROVEMENT:

Distribution automation 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 distribution automation 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 distribution automation 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 Vacuum Fault Interrupter 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.

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, commissioning resources, and material availability. However, a sampling of the key milestones from 2018 follows:

- Selection of all device types and locations:
  - Line-devices (COMPLETE)
  - 4kV Oil Switch Replacement (COMPLETE)
- Engineering and design for devices installation:
  - Line-devices (OH DA) (COMPLETE)

  - 4kV Oil Switch Replacement (COMPLETE)
- Commissioning of devices
  - Line-devices (OH DA) (COMPLETE)
  - 4kV Oil Switch Replacement (COMPLETE – as of April 1, 2019)

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 10: Three Year Term Projections* provides the projections for 2019 and 2020 for those investment categories actively worked in the 2018 GMP investment year.

Table 10: Three-Year Term Projections

Investment Category	Preauthorized Device Type	Units			
		Total	2018	2019	2020
			Plan	Plan	Plan
Distribution Automation	OH DA	196	29	100	67
	OH DA w/Ties	38	0	23	15
Distribution Automation	4kV Oil Switch Replacement	105	10	57	38
	4kV VFI Retrofit for DA	78	0	16	62

III.A.3 Volt-Var Optimization

(Regulators, LTC's, I.T.)

A. Description of Work Completed

REGULATORS: Under the 2018 GMP, the Company installed 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 the central VVO IT system.

LOAD TAP CHANGERS: Under the 2018 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 IT system located in the SOC.

B. Lessons-Learned/Challenges and Successes

LOAD TAP CHANGERS: The lessons learned with the LTC program were similar to that of the microprocessor relay program.

- Work completed within a substation typically requires a very significant coordination between Company departments. Due to the truncated timeframe for implementation of the 2018 GMP, the speed at which the GMP was/is scheduled put strain on the ability of the organization to quickly complete this incremental work. Given that the Company will have the benefit of a full investment year in 2019 and 2020, similar scheduling issues are not anticipated to impact the GMP. Obtaining the right mix of internal and external resources was initially a challenge.

- 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 can pose a challenge, particularly given the shortened 2018 GMP investment year and potential competition for these skilled resources. The Company continues to work with the appropriate vendors, utilizing the 2018-2020 GMP to help secure these contracts, when/where needed.

REGULATORS:

- Since the VVO program is a new initiative for the Company, it took additional engineering time to locate and design where the specific field components should be installed. This was compounded by the truncated 2018 GMP investment year.

The Company completed the engineering for all regulator locations in late 2018. Due to this delay, the design requirements for the type of equipment selected for installation were delayed, thereby pushing back the procurement schedule. Given these factors, the Company faced challenges in meeting its ambitious targets in 2018.

VVO I.T.

- 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 I.T. 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. Since the installation and deployment of this software package is still pending, the Company will document any lessons-learned from the Eversource-specific experience in the 2019 Grid Modernization Annual Report.

C. Actual vs. Planned Implementation and Spending

Refer to Tables 11 and 12 below for the Company's 2018 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 Annual Report, Plant In-Service is triggered by a device being "Construction Complete" and therefore cost recoverable.

Table 11:2018 Implementation Summary

Investement Categories	Preauthorized Device Types	Plan Units (2018)	Construction Complete Units (2018)	Commissioned Units (2018)	2018 Unit Carry Over (2019)
Volt-Var Optimization	VVO - Regulators	15	0	0	15
	VVO - LTC Controls	4	4	4	0

Table 12: 2018 Implementation Cost Summary

		2018					
		Capital Spend	Budget	Variance	Plant in Service	Budget	Variance
		Actual	Actual	Actual	Actual	Actual	Actual
Investment Category	Preauthorized Device Type						-
Volt-Var Optimization	VVO - Regulators	-	-	-	-	-	-
	VVO - LTC Controls	377,157	-	377,157	-	-	-
	VVO - IT Work	-	-	-	-	-	-

REGULATORS:

- There were no regulators implemented in 2018. Given that the VVO program is a new initiative for the Company, the timeframe to engineer, design and plan the filed unit installations took longer than anticipated. Despite the truncated 2018 GMP investment year, the Company did complete the necessary engineering, design and planning and was preparing to install the units for the end of 2018. However, the timing associated with the shipment of the materials precluded installation in 2018. The team did prepare for the installation of the 15 units[1] in 2019 and, as of April 1, 2019, nine of the 15 units were categorized as "Construction Complete." The Company does not anticipate 2019 installations having these same issues discussed above since the engineering of the installations is complete. The majority of the designs have been finalized and all necessary material has been ordered.

- The Total Capital Spend for this program is slightly above budgeted unit costs. However, since this conclusion is based on a small sample set of actual costs, the Company anticipates that the actual unit costs will come in line with the budget. There was no work completed in 2018 and, accordingly, there is no cost recovery associated with this program in 2018.

LOAD TAP CHANGERS:

- The Company met its 2018 GMP target for LTCs with all four units commissioned. As was the case with the microprocessor relays, there was a significant effort to build up the team, coordinate with the necessary Company departments and vendors and get the work engineered, designed, installed and commissioned.

- The Total Capital Spend for this program indicates that the unit costs for year one of the three-year GMP averaged higher than budgeted. As it manages to the three-year GMP budget, the Company is reviewing the costs and working to mitigate the cost increases to bring the costs back in line with the three-year budget. As of the date of the Annual Report, the Company has not made any changes to the 2018-2020 GMP given that this program is in its initial stages and the Company does not yet have a full year of data to utilize to determine if changes are warranted. This program is integral component of VVO, and the Company is working within the flexibility of the three-year budget to complete the program.

[8] As provided in Table 2.4.7 of the Baseline and Targets Filing, any VVO Regulators installed prior to the activation/commissioning of the VVO I.T. software were counted as "complete" when they were installed and electrically in-service but not commissioned. The rationale behind this determination is based on the fact that the VVO I.T. commissioning platform will not be ready until the end of 2019. This method of treating a device as "complete" is atypical of all other GMP devices for which the Company took credit for completed work when the device was commissioned.

- There is no Plant In-Service for 2018 due to the timing difference between when the LTC investments were categorized as Construction Complete and when the Company completed its review of the relevant work orders and costs. The Company will not be seeking to recover any of the LTC costs in the 2018 GMF, even though the installations were classified as Construction Complete within the 2018 GMP investment year.

- In analyzing the cost increases from budget to actual, the Company has identified several drivers of the increases, discussed below:

    a. The LTC program has relatively significant start-up costs that have a tendency to normalize as the Company streamlines and standardizes its implementation of these devices.
    b. The accelerated nature of the program for 2018 required the Company to rely more heavily on external resources to implement the program. Additionally, the Department's approval of and modifications to the 2018-2020 GMP in May 2018 impacted planning and scheduling for this GMP program.

VVO - I.T.

- Consistent with the 2018 GMP developed by the Company, the Company did not undertake any I.T. implementation in 2018. The procurement process described the Lessons Learned section above started in 3Q 2018, with a sizeable portion of the evaluation of bids completed by the end of the year. The Company expects implementation of the VVO I.T. system in late 2019.

    - There were no costs incurred in relation to this program in the 2018 GMP investment year and therefore there will be no costs associated with this program in the Company's May 15, 2019 GMP cost recovery filing.

D. Performance on Implementation/Deployment

The Company's VVO program consists of several interrelated components, all of which must be in place and commissioned before the Company is able to collect and analyze its performance. Performance data cannot yet be ascertained due to the limited installation time in the field. Additionally, the Distribution Companies' proposed GMP performance metrics are still pending before the Department. Following the issuance of the final performance metrics, the Company will report on its performance against the metrics consistent with the Department's directives.

E. Description of Benefits Realized as the Result of Implementation

Although there will be immediate benefits to the Company by 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, measurable benefits will not be realized until substation and circuit level reporting is completed, in accordance with the proposed performance metrics.

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.

I.T.:

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 bill, without any adverse impact to their power quality or change in their normal electric use.

I.T.:

As described in the previous section, the overall VVO deployment is expected to lower peak demand, reduce line losses, and, lower energy supply costs, and reduced GHG emissions. The

Company also expects that customers in the VVO area potentially could see a reduction in their bill, 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:

- Selection of all device types and locations (COMPLETE)
    - Engineering and design for devices installation: (COMPLETE)
- Commissioning of devices (VARIOUS STAGES – IN-PROGRESS to NOT-STARTED)
    - LTC's (COMPELTE)
    - 9 of 15 Regulators (CONSTRUCTION COMPLETE/NOT COMMISSIONED)

VVO – I.T.

- Detailed project plan (Q2-2019)
- Build Complete (Q3-2019)
- Acceptance Testing (Q4-2019)
- Full Commissioning (system operational) (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 13: Three Year Term Projections* provides the projections for 2019 and 2020 for those investment categories actively worked in the 2018 GMP investment year.

The VVO control software is expected to be installed and commissioned in 4Q 2019, 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 the 1Q 2020 with the measurement and verification ("M&V") commencing in 1Q 2020.

Table 13:Three-Year Term Projections

Investment Category	Preauthorized Device Type	Units			
		Total	2018	2019	2020
			Plan	Plan	Plan
Volt-Var Optimization	VVO - Regulators	105	15	80	10
	VVO - Capacitor Banks	84	0	76	8
	VVO - LTC Controls	10	4	6	0
	VVO - Line Sensors	140	0	125	15
	VVO - IT Work	100%	0%	66%	34%

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 2018 GMP investment year, beginning with the solicitation and selection of a vendor to perform the field work. As part of the contract, the Company established a set of protocols and designed a pilot scenario which tested the data acquisition and transfer to the Eversource system. Following successful completion of the pilot, Eversource authorized its vendor to continue field data collection activities for the remainder of the eastern MA overhead system. At the end of 2018, survey work for 24 percent of the eastern MA overhead system had been completed. As the pace of field survey work and the volume of data collected increased, the Company experienced some issues with the process of uploading data into the Company's GIS system. Steps were taken to address the issues with the upload process that have improved throughput significantly.

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 2018 GMP investment year, the Company:

- Finalized requirements for ALF software.
- Completed the competitive selection process for the vendor and load flow software tool. The process involved three vendors, all of which provided in-person demonstrations of their tools' capabilities. The tools were evaluated by representatives of the Information Technology and Engineering groups. Engineering disciplines represented included System Planning, DER Engineering, Grid Modernization and Distribution Engineering. The Company ultimately selected the Synergi Electric product offered by DNV GL. Upon selection of the software tool, the Company commenced negotiations regarding the final statement of work.
- Began detailed data assessment of GIS and other supporting data sources to enable the building of accurate, detailed distribution models. Some of the other data sources for which the Company began the assessment process

include: distributed generation facility information; equipment settings; customer load estimates; feeder peak loads as measured by substation meters; and source impedances.

B. Lessons-Learned/Challenges and Successes

GIS VERIFICATION: The Company found that conducting a pilot of the survey and upload process was a useful exercise to ensure the proper data was collected and captured in the Company's systems. Additional work to ensure the scalability of the upload process would have prevented delays in transferring the information to the Company's GIS system.

ALF: Early focus on determining data requirements to support an accurate distribution model provided significant help in establishing a coordinated plan of action for assessing the Company's data sources.

C. Actual vs. Planned Implementation and Spending

Neither the GIS Verification program or the ALF program had any capital spending during the 2018 GMP investment year. 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 2018 GMP investment year, the Company completed 24 percent of its circuit miles and has a verified and functional process in place to complete the remaining work.
- The Total Capital Spend for this program is zero because this is an expense-only initiative. The Company was schedule to spend 25 percent of the total $6MM budget for 2018. Though 22 percent of the budget was expended, only ~11 percent ($706.267.56) will be sought for recovery in 2018. This is due to the timing and of year-end invoicing of the Company's contracted resource. Though the Company was short of the budgetary target, based on the Company's review of the program's progress, the Company has determined that the program tracking well against estimated milestone.

ALF:

- This program was in its initial planning and engineering stages during 2018, and the work completed utilized internal resources in order to put the detailed program

requirements in place, so that the program could be transitioned into the execution phase of design and implementation.

- The Total Capital Spend for this program is zero with significant work to occur in the remaining GMP years.

		2018					
		Capital Spend	Budget	Variance	Plant in Service	Budget	Variance
		Actual	Actual	Actual	Actual	Actual	Actual
Investment Category	Preauthorized Device Type						-
Advanced Distribution Management System (ADMS)	Advanced Load Flow	-	-	-	-	-	-
	GIS Survey (Expense)	-	-	-	-	-	-
	Dist. Management System	-	-	-	-	-	-

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.

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 platforms. Some of the benefits of the GIS Verification and ALF are:

- Greater accuracy in customer outage communications.
- Improved ability to optimize capital asset deployment and system reconfiguration.
- Better contingency scenario planning.
- Support increased integration of DER on the distribution system, including the ability to build hosting capacity maps, and ultimately provide the possibility of "value of DER" calculation at any point on the system.

F. Description of Capability Improvement by Capability/Status Category

Given that the Company is still in the design phase of the ALF project the Company has not yet achieved incremental capabilities in the DMS Power Flow and Control capability category.

G. Key Milestones

GIS VERIFICATION:

- Project Kick-off meeting (COMPLETE)
- Requirements Definition Workshop(s) for Pilot & Full Deployment (COMPLETE)
- Pilot (COMPLETE)
- Full Crew Training (COMPLETE)

- Full Deployment (In Progress)
- Data Deliveries [Pilot, 25 percent, 50 percent, 75 percent and 100 percent] – during the 2018 GMP investment year, the Company completed 24 percent of the data deliveries under the GIS Verification.

ALF: The ALF program represents a major improvement from prior load flow capability in 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 2018 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 (Data/Application) Updates Complete (Q2-2020)
  - Testing Complete (Q2-2020)
    Phase 2 Commissioning (Q2-2020)

H. Updated Projections for Remainder of the Three-Year Term

GIS Verification:

- All work for the GIS Verification program is scheduled to be completed in 2019.

ALF:

- 2019: Phase 1 will include implementation of required hardware and base software, including automation of the model build process from GIS. Additional data source enhancement will continue 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 fully automated load flow capability for all non-mesh circuits by year-end.

III.A.5. Communications (Miles of Fiber)

A. Description of Work Completed

In developing the miles of fiber program for 2018, the Company anticipated utilizing a subset of existing "last mile" installations to deliver fiber optics from street-side infrastructure into several different substations. In operating under this assumption, the Company targeted "last mile" installations that had originally been slated for construction under the Company's OPGW (Optical Ground Wire) program. However, in finalizing its investment plan under the 2018 GMP, the Company determined that the OPWG does not qualify for recovery under the GMP because it's a Transmission Asset. Based on this determination and within the already time-constrained 2018 GMP investment year, the Company shifted its plan and was able to complete 1.5 miles of fiber installation to substation STA 60. "STA 60" is a substation that is planed for 4kV SCADA upgrades under one of the Monitoring and Control preauthorized device type programs. The 1.5 miles of fiber optic cable was installed but not placed in service due to the complexity of the conduit work associated with the installation, permitting delay, and additional work required under the "STA 60" 4kV SCADA upgrade project.

B. Lessons-Learned/Challenges and Successes

There must be Constructing the 1.5 miles of fiber optic cable from the street into the substation was more expensive than originally anticipated.

C. Actual vs. Planned Implementation and Spending

Refer to Tables 14 and 15 below for the Company's 2018 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 14: 2018 Implementation Summary

Investement Categories	Preauthorized Device Types	Plan Units (2018)	Construction Complete Units (2018)	Commissioned Units (2018)	2018 Unit Carry Over (2019)
Communications	Communication - FAN	0	n/a	n/a	n/a
	Communication - Fiber	5	0	0	5

Table 15: 2018 Implementation Cost Summary

		2018					
		Capital Spend	Budget	Variance	Plant in Service	Budget	Variance
		Actual	Actual	Actual	Actual	Actual	Actual
Investment Category	Preauthorized Device Type						-
Communications	Numbers of Nodes	-	-	-	-	-	-
	Miles of Fiber	-	-	-	-	-	-

MILES OF FIBER: As discussed in section a. above, the Company determined, prior to implementation of the 2018 GMP, that its initial workplan involving last mile fiber installations to certain designated substations required significant adjustment. Working to support the Monitoring and Control, 4kV SCADA GMP program, the team designed and installed 1.5 miles of fiber to substation, STA 60. The 1.5 miles of fiber optics, though installed, was not placed in service. The timing of the 4kV SCADA GMP program schedule for STA 60 was adjusted to 2019 and the final terminations of the fiber optics will be completed in conjunction with the installation of the Relays.

Through the QA/QC process administered across the portfolio, it was determined that several work orders had been initiated against an incorrect Line of Business. This situation was inadvertent, and the team rectified the mis-match and linked the work orders to the appropriate Lines of Business. The timing of these revisions relative to the year-end close, precluded them from the 2018 actuals. The Company will not be seeking to recover through the 2018 GMF, the costs associated with any of the Communications work completed within the 2018 plan year.

D. Performance on Implementation/Deployment

Performance data cannot yet be ascertained due to the limited installation time in the field. The Distribution Companies' proposed performance metrics are currently pending before the Department. Following the issuance of the final performance metrics, the Company will report on its performance against the metrics consistent with the Department's directives.

E. Description of Benefits Realized as the Result of Implementation

There are no benefits realized from this program in 2018. Once installed and commissioned, the benefits of the GMP fiber optic installations will allow for increased and more robust field communication capabilities and/or will allow the Company to directly own the communications infrastructure, in areas that are currently leased from 3rd party providers.

F. Description of Capability Improvement by Capability/Status Category

The overall increase in both ownership (i.e. control) and coverage and bandwidth, as related to the Communications infrastructure of the Company, has direct bearing on the ability to receive, transmits and process the ever-increasing data streams that are required to operate the grid of

the future. Careful master-planning and deployment of the Communication infrastructure is being administered by the Company so as to provide maximum benefits to the existing and newly installed GMP devices and technologies. There was little physical deployment of communications equipment in 2018, but significant planning and engineering are setting the stage for the remainder of the 2018-2020 GMP.

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 2018 milestones follows:

- Masterplan Engineering and Design (Rolling throughout 2018, based on segmented routes, started Q1-2019)
- Construction (Rolling throughout year, based on segmented routes, start Q2-2019)
- Commissioning Rolling throughout year, based on segmented routes, start Q3-2019)

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 16: Three Year Term Projections* provided below provides the projections for 2019 and 2020 for those investment categories actively worked in the 2018 GMP investment year.

Table 16: Three-Year Term Projections

Investment Category	Preauthorized Device Type	Units			
		Total	2018	2019	2020
			Plan	Plan	Plan
Communications	Numbers of Nodes	10	0	6	4
Communications	Miles of Fiber	250	5	125	120

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 2018 the Company installed microprocessor relays and converted, or replaced, 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, in order to undertake the Microprocessor Relay program, the Company undertook significant efforts to develop and implement the project management structure and then design, install and commission the devices. While the GMP team overcame significant challenges, these critical early-stage efforts exerted pressure on the budget, namely due to the need to complete the work within the truncated 2018 GMP investment year. Under the 2019 and 2020 GMP investment years, the Company will manage the Microprocessor Relay program to elicit customer benefits and cost savings.

The Recloser SCADA program was successful in its design and construction, although challenges arose with the commissioning resources. As discussed in Section III, the Company is working to augment the commissioning resources. Additional challenges occurred when the GMP team exhausted the population of locations on the system that could be upgraded with communications devices only. The Company modified the Recloser SCADA program to encompass a 'replace, in-place' alternative that allowed for continued successful implementation of the program.

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. A significant amount of time was spent coordinating these requirements and, although the Company did not make its goal for 2018, it did successfully locate suitable locations that will fulfill the entire 2018-2020GMP commitment.

A. 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 and 4kV vacuum fault interrupter switches installed in 2018 contribute 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, 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

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 2018 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. Although this presented a challenge, the Company's management of the current and future system environment and planning efforts will result in an efficient and effective roll-out of these devices.

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. The Company is adept at undertaking this level of coordination and these tasks, but the volume of incremental work under the GMP placed a strain on its resources and required a significant amount of time to complete the requisite coordination, which put further pressure on achievement of the 2018 goals.

The lesson learned from the Company's experience with the 2018 GMP implementation is the need for careful and upfront planning to ensure that all the right tasks are done at the right time. This planning will enable the Company to identify situations (emergent or planned) that may exist in areas adjacent to the work area in question, allowing the Company to leverage those ancillary projects and obtain data while other work is 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 may utilize that outage to collect data or perhaps even perform pre-work on the GMP device location. Efforts such as this will require close coordination and separation of GMP and non-GMP project costs.

B. Volt-Var Optimization

1. Highlights of Feeder Level Implementation

The VVO program is completely new to Eversource. In 2018, the team completed the analysis, consistent with the criteria discussed above in Section III.A.3., and selection of substations and circuits, which allowed the Company to commence the engineering and design of the relevant VVO investments. In 2018, the Company identified the specific field device locations and selected the software platform.

In 2018, the Company installed LTC controls on four of ten feeder heads. Given the complexity of this installation, this represented a significant accomplishment given the shortened 2018 GMP investment year.

2. Feeder Level Lessons Learned/Challenges and Successes

As with the implementation of any new program, the Company encountered unanticipated challenges in the roll-out of the 2018 Volt-Var Optimization program, contained within the Distribution System Network Operator investment category. For 2018, specific challenges arose with respect to the location of many of the field devices. Many device locations are located within the Verizon pole-set areas of the Commonwealth. Although the Company and Verizon have a process and procedure in place to request and have pole work completed, the quantity of pole sets for Verizon's team is abnormally high due to the 3rd Party Make-Ready work for the state-sponsored Last-Mile fiber optic installation. Due to this competing call for Verizon's resources, the Company loses some of its flexibility to plan and execute work under the GMP. The Company can and will manage through this challenge, but it does pose an additional, outside constraint on the GMP.

Additionally, 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. For new locations, as a preliminary step to their installation, the Company must petition the local municipal siting authority for permission. These petitions can be denied 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 Company is managing this situation by proactively communicating with the towns on the rationale for and timing of the installations. This approach has been successful to date, but still presents a challenge that must be planned for and addressed.

C. Advanced Distribution Management System

1. Highlights of Feeder Level Implementation

The Advance Distribution Management System program was not administered on a feeder basis in the 2018 GMP investment year. As the GMP progresses, feeder level implementation will be incorporated into the Company's Grid Modernization Annual Reports.

2. Feeder Level Lessons Learned/Challenges and Successes

There are no "Feeder Level" lessons learned for the reasons described in 4.a above.

3. Communications

1. Highlights of Feeder Level Implementation

The Communications program will not be 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 will not be implemented on a "Feeder Level". Discussion about this program can be found in 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 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.

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.[1]

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 2018 results for this metric are summarized in the table below. The 40,374 facilities is an increase of 5,261 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.

[9] 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 2018	
a. Number of Facilities	
Technology Type	**Number of Facilities**
Fuel Cell	4
Gas Turbine	15
Hydro Electric Turbine	22
Internal Combustion Engine	221
Micro Turbine	5
Other	2
PV	39,984
Steam Turbine	4
Wind Turbine	117
Total	40,374

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 DSS 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 SCADA)		X		
Reclosers (including sectionalizers, single phase reclosers, intellirupters, ASU) (SCADA)			X	X
Padmount Switchgear (No SCADA)		X		
Padmount Switchgear (SCADA)			X	X
Network Transformer/Protector with full SCADA			X	X
Network Transformer/Protector 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 2018 was 200.3. This is an improvement of 46.8 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 sensors[2] 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 sensors 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 2018, Eversource's number and percentage of circuits with installed sensors has increased to 82.4 percent. Please see the table SI-3 below for further details.

SI-3 NUMBER/ PERCENTAGE OF CIRCUITS WITH INSTALLED SENSORS 2018

Sensor	Number of Feeders	Percent
Y	1,709	82.4%
N	366	17.6%

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

[2] Please see the previous matrix for devices that have been defined as "sensor" for the purpose of determining whether a circuit has a sensor.

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 2018.

Table S2-1

Grid Modernization - 2018 Unit Deployment		2018		
		Commissioned Units	Commissioned Units	Commissioned Units
		Actual	Plan	% Difference
		57	**115**	**50%**
Investment Category	**Preauthorized Device Type**			
Monitoring & Control (SCADA)	Microprocessor Relay	10	13	77%
	4kV Circuit Breaker SCADA	N/A	0	N/A
	Recloser SCADA	15	18	83%
	Padmount Switch SCADA	3	21	14%
	Network Protector SCADA	N/A	0	N/A
	OMS/AMI Integration	N/A	N/A	N/A
Distribution Automation	OH DA w/o Ties	25	29	86%
	OH DA w/Ties	N/A	0	N/A
	4kV Oil Switch Replacement	0	10	0%
	4kV VFI Retrofit for DA	N/A	0	N/A
Volt-Var Optimization	VVO - Regulators	0	15	0%
	VVO - Capacitor Banks	N/A	0	N/A
	VVO - LTC Controls	4	4	100%
	VVO - Line Sensors	N/A	0	N/A
	VVO - IT Work	N/A	N/A	N/A
Advanced Distribution Management System (ADMS)	Advanced Load Flow	N/A	N/A	N/A
	GIS Survey (Expense)	N/A	N/A	N/A
	Dist. Management System	N/A	N/A	N/A
Communications	Numbers of Nodes	N/A	0	N/A
	Miles of Fiber	0	5	0%
Workforce Management	Mobile Damage Assessment	N/A	N/A	N/A
Electric Vehicles	Electric Vehicles	N/A	N/A	N/A
Energy Storage	Martha's Vineyard	N/A	N/A	N/A
	Provincetown	N/A	N/A	N/A

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 2018.

Table S2-2

Grid Modernization - 2018 Deployment ($)		**2018**
		Capital Spend
		Actual
		12,536,080
Investment Category	**Preauthorized Device Type**	
Monitoring & Control (SCADA)	Microprocessor Relay	3,363,115
	4kV Circuit Breaker SCADA	83,747
	Recloser SCADA	963,353
	Padmount Switch SCADA	105,723
	Network Protector SCADA	-
	OMS/AMI Integration	-
Distribution Automation	OH DA w/o Ties	2,267,503
	OH DA w/Ties	-
	4kV Oil Switch Replacement	932,307
	4kV VFI Retrofit for DA	-
Volt-Var Optimization	VVO - Regulators	-
	VVO - Capacitor Banks	-
	VVO - LTC Controls	377,157
	VVO - Line Sensors	-
	VVO - IT Work	-
Advanced Distribution Management System (ADMS)	Advanced Load Flow	-
	GIS Survey (Expense)	-
	Dist. Management System	-
Communications	Numbers of Nodes	-
	Miles of Fiber	-
Workforce Management	Mobile Damage Assessment	-
Electric Vehicles	Electric Vehicles	2,859,831
Energy Storage	Martha's Vineyard	958,654
	Provincetown	624,690

As referenced in section I.2.D, the Company budget for the GMP was established in the Fiscal Year 2018 (FY 2018) capital budgeting process conducted at the end of 2017. The $62.2 million capital budget was based on the Company's original five-year plan as filed in D.P.U. 15-122 and did reflected a full calendar year of GMP investment. This budget was not at the detailed level that is shown in Table S2-2 above. Therefore, the Company was not able to fully address parts b and c in 2018. The Company will present a detailed budget by preauthorized device type in its 2019 Report.

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:

a. Number of devices or technology installed versus plan for a given year

b. Cost of devices or technologies installed versus plan for a given year

c. 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 - 2018 Unit vs. Cost Deployment		2018		
		Commissioned Units	Commissioned Units	Plant in Service
		Actual	Plan	Actual
		57	**115**	**3,694,645**
Investment Category	**Preauthorized Device Type**			
Monitoring & Control (SCADA)	Microprocessor Relay	10	13	-
	4kV Circuit Breaker SCADA	N/A	0	-
	Recloser SCADA	15	18	700,660
	Padmount Switch SCADA	3	21	-
	Network Protector SCADA	N/A	0	-
	OMS/AMI Integration	N/A	N/A	-
Distribution Automation	OH DA w/o Ties	25	29	932,834
	OH DA w/Ties	N/A	0	-
	4kV Oil Switch Replacement	0	10	764,965
	4kV VFI Retrofit for DA	N/A	0	-
Volt-Var Optimization	VVO - Regulators	0	15	-
	VVO - Capacitor Banks	N/A	0	-
	VVO - LTC Controls	4	4	-
	VVO - Line Sensors	N/A	0	-
	VVO - IT Work	N/A	N/A	-
Advanced Distribution Management System (ADMS)	Advanced Load Flow	N/A	N/A	-
	GIS Survey (Expense)	N/A	N/A	-
	Dist. Management System	N/A	N/A	-
Communications	Numbers of Nodes	N/A	0	-
	Miles of Fiber	0	5	-
Workforce Management	Mobile Damage Assessment	N/A	N/A	-
Electric Vehicles	Electric Vehicles	N/A	N/A	1,296,186
Energy Storage	Martha's Vineyard	N/A	N/A	-
	Provincetown	N/A	N/A	-

The Company is interpreting "devices or technologies installed" to mean devices that have been placed in service which has been provided in the table above. Similar to the budget referenced above, a detailed plant in service plan was not developed down to the specific device type for 2018 due to the timing of the planning process. Therefore, the Company will not be able to fully address parts b and c. For the 2019 Report, the Company will have a detailed plant in service plan that will have the ability to fully report on this metric.

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 2018. Most common among this was the accelerated schedule under which the programs needed to be initiated,

engineered, planned, construction and commissioned. This compressed timetable placed significant strain on the Company's commissioning process and resources. With very limit exceptions, all of the work not completed in 2018, was placed in-service and commissioned as of April 1, 2019.

As a final point, through the Company's portfolio-based QA/QC process, inconsistencies in allocation and reporting of information was identified and moved to remediation to ensure complete and accurate data was communicated throughout the organization and externally. This remediation delayed the formal allocation and recording of certain work orders in 2018. As a result, the Company will not be seeking cost recovery through the 2018 GMF for several programs, which explains why some program line items indicate fully commissioned units, but have limited, or no, plant in service costs associated with them. Further information can be found in Section III.A.

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 from 2019 to 2020.

Table S2-4

Grid Modernization - Total Deployment Plan (Cost vs. Units)		2018		2019		2020	
		Commissioned Units	Capital Spend	Commissioned Units	Capital Spend	Commissioned Units	Capital Spend
		Actual	Actual	Plan	Plan	Plan	Plan
		57	**12,536,080**	**822**	**101,593,952**	**518**	**118,869,967**
Investment Category	**Preauthorized Device Type**						
Monitoring & Control (SCADA)	Microprocessor Relay	10	3,363,115	100	20,319,438	100	10,227,731
	4kV Circuit Breaker SCADA	N/A	83,747	21	2,413,892	20	
	Recloser SCADA	15	963,353	11	1,024,000	8	
	Padmount Switch SCADA	3	105,723	24	299,000	17	
	Network Protector SCADA	N/A	-	50	2,200,000	33	
	OMS/AMI Integration	N/A	-	N/A	-	N/A	
Distribution Automation	OH DA w/o Ties	25	2,267,503	100	13,167,000	67	13,608,190
	OH DA w/Ties	N/A	-	23	3,135,000	15	
	4kV Oil Switch Replacement	0	932,307	57	10,010,000	38	
	4kV VFI Retrofit for DA	N/A	-	16	880,000	62	
Volt-Var Optimization	VVO - Regulators	0	-	80	5,223,000	10	1,370,009
	VVO - Capacitor Banks	N/A	-	76	-	8	
	VVO - LTC Controls	4	377,157	6	882,804	0	
	VVO - Line Sensors	N/A		125	-	15	
	VVO - IT Work	N/A	-	66%	5,147,030	34%	
Advanced Distribution Management System (ADMS)	Advanced Load Flow	N/A	-	56%	4,662,150	44%	10,278,059
	GIS Survey (Expense)	N/A	-	75%	-	0%	
	Dist. Management System	N/A	-	44%	2,059,791	56%	
Communications	Numbers of Nodes	N/A	-	6	974,299	4	3,575,379
	Miles of Fiber	0	-	125	13,450,322	120	
Workforce Management	Mobile Damage Assessment	N/A	-	N/A	-	N/A	-
Electric Vehicles	Electric Vehicles	N/A	2,859,831	N/A	6,378,693	N/A	35,761,476
Energy Storage	Martha's Vineyard	N/A	958,654	N/A	3,360,030	N/A	10,681,316
	Provincetown	N/A	624,690	N/A	6,007,503	N/A	33,367,807

The Company submitted its Baseline and Targets Filing in the Compliance Filing on August 15th, 2018, which included the 2018-2020 GMP baseline (Baseline and Targets Filing at 15, Table 2.4.7). As of the conclusion of 2018, the Company is not revising the GMP given that the projects are in their early stages of implementation and the Company does not yet have a full year of experience upon which to make revisions. However, the Company will maintain the flexibility to adjust its GMP budget across various programs or to vary its deployment schedule across remaining GMP years. Additionally, and as discussed in section I.B of this Report, the Company is continuously seeking opportunities to accelerate the preauthorized device type units deployments in an efficient and cost-effective manner. 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 continues to see high application activity.

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 and application tracks

2) Sub-Station upgrades
    a. Due to high saturation levels in certain areas of the system, studies are determining that sub-station upgrades are required to allow for project interconnection.
        i. This makes studies and construction activities more complicated and time-consuming.
            1. 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. NE-ISO is requiring studies for projects less than 5 MW in areas it deems saturated.
        i. This adds additional time, cost and engineering effort to many projects that historically did not have this extra layer of administrative and engineering complexity.
        ii. There is still ongoing uncertainty with which projects will be required by NE-ISO to undergo a study due to ISO-identified saturation.
        iii. 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 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 is currently hiring additional engineers, analysts, and program managers into the DER Planning organization 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 is funding research organizations such as the Electric Power Research Institute ("EPRI") and local universities 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 is 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 a utility's distribution system can play a useful role for both the utility 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 utilities time and money.

The Company has published the first version of the hosting capacity maps in its CT service territory. This version, which does not depend on the use of an advanced load flow tool, expeditiously provides key preliminary information to developers.

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 project 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

In D.P.U. 12-76-B, the Department directed the Distribution 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. 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 Company, along with National Grid and Unitil, 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. The Distribution Companies' April 9, 2019 proposed performance metrics are still pending before the Department.

Given that the performance metrics as well as the Grid Modernization Annual Report templates are not yet finalized, the Department indicated, in its March 29, 2019 Memorandum regarding the content and schedule for filing the 2018 Grid Modernization Annual Report, that the filing date for the remainder of the 2018 Grid Modernization Annual Report, which presumably includes reporting consistent with the to-be-issued final performance metrics, will be established in a subsequent procedural memorandum. March 29, 2019 Memorandum at 2.

The Company, following its review of the final performance metrics and all necessary steps to compile, review and finalize the necessary data, will file its achievements under the 2018 Grid Modernization performance metrics.

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 its 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 addresses all activity to date on Eversource's two battery energy storage ("BES") projects following the Department's final order in the Company's last rate case, D.P.U. 17-05.

A. Outer Cape BES

Overview

The Outer Cape BES will be a 25 MW / 38 MWh lithium ion battery, housed in a Cape-style building on approximately 1.4 acres at the Provincetown transfer station on land leased from the Town of Provincetown.

The Outer Cape BES's primary purpose will be to provide back-up power during outages on Line 96, the single, three-phase distribution line that serves as many as 11,000 customers from the Towns of Wellfleet, Truro, and Provincetown.

Line 96 starts at the downstream side of the 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. In fact, customers in Wellfleet, Truro, and Provincetown have experienced over 50,000 outage hours over the last five years.

One solution to this significant reliability issue for the Company's customers would be to build a 13-mile redundant distribution line. This line, however, would require construction through a significant portion of the Cape Cod National Seashore, which would have potential environmental impacts.

The Eversource engineering team identified this area as a key target for a BES. This recommendation was confirmed by Eversource's expert consultant, Doosan, in its preliminary feasibility analysis. The Department's approved the Company's BES proposal, as well as the $40 million budget, in D.P.U. 17-05.

Design, Site Selection, and Outreach Activity Since the 2017 Rate Case

At the time of the preliminary feasibility analysis, the Eversource team expected that it would construct the battery in Wellfleet, Massachusetts. Following the rate case, 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 extend the outage back-up duration of the BES.

In fact, Eversource now estimates that during the winter months, late fall, and early spring months, the BES (if sited in Provincetown) will provide approximately 10 hours of back-up power. This is the time period when most outages occur. Eversource further estimates that during the summer, when energy use is at its highest on the Cape, the BES will provide between 1.5 to 3 hours of back-up power depending on where the outage occurs.

For that reason, in January, Eversource approached the Town of Provincetown describing the BES's purpose and inquiring whether there were any Town-owned locations to site the BES. Eversource also examined privately-owned potential sites in Provincetown but found no viable candidates.

The Town of Provincetown was a strong partner from the start and working with the Eversource team, starting in earnest from April 2018 until present, evaluated three potential sites. The sites were evaluated based on the following criteria: (1) minimize the BES Project's visibility; (2) ensure that there will be no sound or other impacts to surrounding properties from the BES; (3) site the BES somewhere where the Town's employees and leadership wanted it; and (4) find a site that has approximately an acre and a half of space and is environmentally clean (i.e., no wetlands, rare species habitat).

One site proved unfeasible 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 (aka "the dump") met all the criteria.

Accordingly, with the Town's support, Eversource began a permitting level design of the 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 go out for competitive request for proposals ("RFP") for bids to construct the project (more detail on this process is provided below).

During this time, Eversource continued extensive outreach with the Town of Provincetown leadership and its various departments. This included many face-to-face meetings and two publicly televised presentations to the Provincetown Select Board, who offered feedback and guided Eversource on how to make the BES project the best possible project for their town and its residents. Eversource appreciated the collaboration with the Town of Provincetown.

The Town voted at its October Town Meeting to amend its zoning by-laws to make the project a specially permitted use at the Transfer Station. Then, on April 2, 2018, Eversource went before more than 300 residents at the Town of Provincetown'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 then Eversource was called to the floor to answer multiple questions from town residents about the BES. The evening culminated with the Provincetown residents voting unanimously to authorize the Town to enter into a long-term lease with Eversource to construct the BES at the Transfer Station.

Permitting

The Outer Cape BES will need a Special Permit from the Provincetown Planning Board, review by the Provincetown Conservation Commission, approval from the Cape Cod Commission, a Department of Transportation Highway Permit, minor review under the National Heritage & Endangered Species Program, and a Landfill Post-Closure Minor Modification Permit.

Eversource has done substantial work to develop filings for all these requirements. It is in final stages of advance review with the Provincetown Planning Board to prepare to file for its Special Permit, which will then trigger its Cape Cod Commission filing, with all others to follow. Eversource is targeting to have its Special Permit filing by end of May 2019 and to have all permits in hand by November 15, 2019.

B. Martha's Vineyard BES

Overview

The Martha's Vineyard BES will be a 5 MW / 20 MWh lithium ion battery, housed in a Cape-style building on just over an acre of Eversource-owned land, adjacent to its Area Work Center in Oak Bluffs.

The Martha's Vineyard BES's primary purpose will be enable significantly reduced reliance on two out of five diesel-fired peakers 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 swells to as many as 125,000 in the summer. This causes electricity use on the Island to surge and the undersea cables become strained. When this happens, Eversource calls on five diesel-fired peakers that provide approximately 12.5 MW of back-up power. These peakers date back to the 1950s.

Eversource engineers identified Martha's Vineyard as a potential BES location due to the ability to use a BES to significantly reduce (and ultimately eliminate) reliance on the diesel-fired peakers, as well as to enable the interconnection of additional solar photovoltaics ("PV") on the Island. This recommendation was confirmed by Eversource's expert consultant, Doosan, and its preliminary feasibility analysis. The Department approved the Company's proposed BES, as well as a $15 million budget, in D.P.U. 17-05.

Notably, Eversource contemplates the Martha's Vineyard BES as having two phases: the first will enable significantly reduced reliance on two of the five peakers, and, if the first is successful, a second phase of the BES (constructing additional battery capacity) will enable significantly reduced reliance (and over time elimination) of all five of the peakers.

Design, Site Selection, and Outreach Activity Since the 2017 Rate Case

Following the DPU's November 2017 order pre-authorizing the BES, Eversource and Doosan completed a final feasibility study for the project. This confirmed that the BES would also help address an N-1 contingency condition on the Island and defer construction of an additional undersea cable. The Eversource team also subsequently confirmed that the BES could be used to shave yearly and monthly peaks when not needed to reduce reliance on the peakers, resulting in additional capacity and transmission Regional Network Savings ("RNS") savings.

In January 2018, Eversource commenced outreach to the Town of Oak Bluffs about the project and specific work with the Town began in April 2018. Eversource advised of its intent to construct the BES on Company-owned land behind its Area Work Center in Oak Bluffs. This location met Eversource's criteria of: minimizing the BES Project's visibility; ensuring that there will be no sound or other impacts to surrounding properties from the BES; putting the BES somewhere where the Town's employees and leadership wanted it; and finding a site that has approximately an acre and is environmentally clean (i.e., no wetlands, rare species habitat).

Eversource has appreciated working with the Town of Oak Bluffs, meeting multiple times in person with Town Selectboard members, the Town Manager, the Fire Chief and building inspector, and, most recently, the Planning Board. They provided feedback on height of the BES facility, roof pitch, fire safety, and other design details that Eversource was able to incorporate. Using this feedback, in late summer 2018, Eversource performed a permitting level design for the BES.

Permitting

Eversource and Town of Oak Bluffs leadership spent a significant amount of time working through some issues related to a parcel of land not related to the BES. Eversource's land use attorneys also advised that the Town Bylaws would not permit its planning board to grant Eversource the right to construct the project, and so 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 has expressed disappointment with this outcome, taking the view that they do have the ability to grant 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, held a public hearing in Oak Bluffs.

The Company has remained interested in how it can find ways to present to the Oak Bluffs Planning Board and obtain its substantive feedback, despite the fact that it needed to file for a zoning exemption with the Department. It filed a site plan with the Planning Board and then did a brief presentation in April 2019 and is scheduled to do a full presentation in May 2019, seeking recommendations from the Oak Bluffs Planning Board before it refers the site plan filing on to the Martha's Vineyard Commission, which is the other required permit approval needed to construct the BES.

By November 15, 2019, Eversource hopes to obtain Department approval of its Chapter 40-A petition, Martha's Vineyard Commission approval, and to have incorporated the feedback of the Oak Bluffs Planning Board to its satisfaction.

C. Competitive Procurement

Eversource used a competitive procurement to select a vendor to perform the engineering, procurement, and construction of both BES projects. This disciplined process was conducted by

the same Eversource procurement team that leads negotiation and successful vetting of all of Eversource's contracts.

The process began with a field of over 80 leading BES vendors in the Spring of 2018. By October 2018, six bidders had been short-listed. This selection was based on each vendor's safety record, financial solvency (especially important given that the BES will be relatively new technology but long-lived assets), 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 vendors. A cross-functional Eversource team exhaustively reviewed and ranked the bids based on cost, technical design, and project plan strength. One vendor rose to the top and Eversource has completed successful negotiations with that vendor to construct both BES projects on terms that are extremely cost-effective for customers and with strong warranties and other protections.

The successful vendor will now complete in full the design portion of the BES projects. Once the BES projects receive all permits, Eversource will release the vendor to order all equipment and immediately commence construction.

Finally, Eversource was saddened to learn of the BES fire in Arizona. Eversource has requested that its vendor give a full fire safety analysis of the BES design for both projects, incorporate lessons learned from Arizona and best practices more generally, and make any further adjustments needed. Eversource is pleased to give a further report to the Department on the outcome of this request once this important work is completed.

D. Lessons Leaned/Challenges and Successes

Eversource is only just getting started on development of the BES projects. Over the last year the Company has developed a strong cross-functional team that can move swiftly and efficiently on these projects.

Eversource, consistent with other efforts throughout the Commonwealth, recognizes that Town support is a critical, often iterative, aspect of developing BES projects encompassing a variety of stakeholders. The Company works diligently to balance stakeholders' input with its core obligation to provide safe and reliable service.

Consistent with its chief obligation to provide safe and reliable service, the Company recognizes the importance of studying and understanding the impact that the BES projects may have on the distribution system. These lessons learned will be used to inform and influence future BES projects.

The Company has learned that Martha's Vineyard and Cape Cod are some of the more challenging areas to develop clean energy projects from a land availability standpoint.

The Company is also learning a great deal about sound and fire safety issues connected to BES. With respect to sound, the batteries require HVAC systems which do have some sound impact. To attain its goal of ensuring the batteries will not be audible to the human ear from any surrounding residences or businesses, the Company has developed plans to include sound walls,

shrouds, and to house some equipment in free-standing enclosed sheds. Regarding fire safety, Eversource has consulted with industry experts to ensure the BES will immediately disconnect in the event of any trouble warning and will be equipped with the leading BES fire suppression equipment. This is an evolving area and part of the Company's work is to stay up to speed with emerging trends.

Finally, the Company is pleased to see how cost-competitive the vendor bids to Engineer-Procure-Construct ("EPC") the BES projects were. The Company anticipates being able to construct the BES projects under budget as a result of these cost-competitive bids and the Company's disciplined and efficient project management.

E. Actual vs. Planned Implementation and Spending

Spending in 2018 was not material compared to budget, consisting of $958,654 for Martha's Vineyard and $624,690 for the Outer Cape. The Company expects material spend to commence in the November 2019 timeframe when it commences construction and orders equipment.

F. Performance on Implementation/Deployment

Please see above sections (A) and (B).

G. Description of Benefits Realized from Implementation

Please see above sections (A) and (B).

H. Key Milestones

Eversource's goal is to bring in both BES projects on-time and at- or below-budget. Key milestones through commissioning are as follows:

- Obtain all permits for both BES projects by November 15, 2019
- Start construction on both BES projects by December 2019
- Complete construction on both BES projects by November 2020.
- Commence operations on both BES projects by December 2020.

I. Updated Projections for Remainder of 2018-2020 GMP

The Company is targeting to hit the milestones described in Section (G) for both BES projects, barring unforeseen circumstances.

I.X. Electric Vehicles

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 an electric vehicle ("EV") infrastructure program (the "Make-Ready Program" or "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 2018. 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 idea; gathered from the Company's targeted outreach with various stakeholders and work with environmental justice 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.[1] D.P.U. 15-122, at 187. In the interest of providing the Department and stakeholders with a robust review of the Company's 2018 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 Environmental Justice ("EJ") communities;[2]

(4) utilization of EV charging stations separately for Level II chargers and DC fast chargers (measured in annual kWh per port);

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[1] The stakeholder process has not yet been commenced.

[2] 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 of 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.

(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 CO_2 emissions reductions

Program Overview

In 2018, Eversource the Make-Ready Program with the goals of helping accelerate EV charging infrastructure development within its service territory, encouraging EV purchases, and contributing 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 will extend 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 450 charging sites, throughout its service territory in Massachusetts. Based on customer demand for the Program, Eversource anticipates accelerating 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 electric vehicle charging station manufacturers, network integrators, and installers the opportunity to have their equipment and services pre-authorized for inclusion in the Program. 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.

The vendors selected for prequalification in the Spring 2018 procurement round are as follows:

Eversource EV Make Ready Preferred Vendors

Vendor	Type
ChargePoint	Manufacturer & Installer
EVBox	Manufacturer & Installer
AETNA	Installer
EV Launchpad	Installer
Horizon Energy	Installer
Voltrek	Installer
Greenlots	Network Integrator

Recognizing that new technologies and new vendors may emerge over the duration of the program, Eversource intends to issue subsequent rounds of pre-qualification requests, on a schedule to be determined.

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.

For 2018, 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)

Stakeholder Outreach

Throughout 2018 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.

Site Host Acquisition Strategy

To ensure that Eversource executes on its program commitments, the Company has developed strategies to target potential Level 2 and DC Fast Charging site hosts with a tailored approach. These two distinct segments each have a unique value proposition that must be understood to help determine the ideal type of EV charging infrastructure for different use cases.

Level 2 Sites

Eversource focused its attention in 2018 on Level 2 charging infrastructure as a way of making quick and meaningful progress under the Program. These chargers and the associated electric bills are less expensive than their DC Fast Charging counterpart and therefore create fewer barriers to adoption from the customer's perspective. The initial efforts related to this segment were driven by the Company's Energy Efficiency Account Executives and Community Relations Managers. Large customers were targeted first, including those that had previously expressed interest in deploying EV charging infrastructure onsite. This outreach included education on the Make Ready Program and ensuring a clear communication of responsibilities should the customer choose to become a site host (information available at: https://www.eversource.com/content/ema-c/residential/save-money-energy/explore-alternatives/electric-vehicles/charging-stations).

DC Fast Charger Sites

DC Fast Charging similarly requires the identification of a willing site host, however, the geographical location of this infrastructure is an additional consideration. To advance the electrification of travel corridors throughout the Commonwealth, the Company determined that these chargers should be located within close proximity to major routes and highways. Utilizing an Electric Vehicle Infrastructure Planning Tool developed by MJ Bradley & Associates to support the Transportation and Climate Initiative, and several other external data sources, Eversource identified specific sites that fell within a certain radius of existing exits and that were ideal candidates for Make Ready Program participation. Energy Efficiency Account Executives will use the map created from this exercise to target customers that meet the established criteria. This will be a specific area of focus in 2019.

Pilots/Partnerships

Eversource recognizes the importance of leveraging external partnerships to help deploy the EV charging infrastructure under the Program. As outlined below, the Company is developing relationships with various market players to execute its strategy.

In December 2017, Eversource signed a Memorandum of Understanding with Maven Drive LLC ("Maven"), a subsidiary of General Motors, and EVgo Services LLC ("EVgo") to deploy DC Fast Charging infrastructure throughout the city of Boston. Under the MOU, Eversource will install the enabling Make-Ready infrastructure for these charging stations, EVgo will provide the Electric Vehicle Supply Equipment, and Maven will make these chargers available to the drivers of its vehicles. The ultimate goal is to deploy six of these charging locations throughout the Greater Boston area prior to all program funds being expended.

In September 2018, Eversource entered into an agreement with Envoy Technologies, a community-based shared mobility service provider, to advance the deployment of EV charging infrastructure available to individuals residing in multi-unit dwellings or apartment buildings. Utilities throughout the country have found MUDs to be difficult deployment scenarios for charging equipment since parking is typically limited and tenants may not currently own an electric vehicle. Envoy provides landlords with the ability to offer their tenants an electric vehicle carsharing service as an additional amenity to existing offerings. In this partnership, Eversource is working with Envoy to identify market rate and above apartment complexes that are interested in this business model, and Eversource will provide the Make Ready infrastructure to power the associated charging stations. The Company intends to target a limited number of pilot locations in Boston, and to build on the success of this initial deployment by scaling throughout other areas of the Commonwealth.

Additionally, Eversource has engaged with community development organizations in East Boston (among other communities) and the DOER to begin discussing an EV carsharing service specifically targeted at residents of low-income communities. Eversource understands the importance of providing these disadvantaged neighborhoods with charging infrastructure, as evidenced by the commitment to deploy 10 percent of all program capital to Environmental Justice Communities, however the Company also realizes that individuals living within these areas do not typically have access to EVs. To help overcome this obstacle, Eversource is in the early stages of developing plans to locate 1-2 EVs at community locations accessible to the public via a mobile application.

B. Implementation Metrics

2018 Metrics

The following tables provide information on EV Make-Ready charging station projects as of December 31, 2018:

Program Cycle

	Level 2	DC Fast Charger	Total
Applications	**141**	9	**150**
Contracts Signed	55	2	57
Under Construction	37	1	38
Projects Completed	**12**	**0**	**12**

Station Profiles

	Level 2	DC Fast Charger	Total
Charging Ports Installed	62	0	62
Charging ports Enabled	86	1	87
Avg. # Ports Installed Per Site	5	n/a	5
Public Sites	9	0	9
Workplace Sites	3	0	3
Multi-Unit Dwelling Sites	0	0	0
Environmental Justice Sites	1	0	1
Average Station Utilization (kWh/month)*	160.3	0	160.3
Port Utilization (kWh/port)*	209.1	0	209.1

*figures represent small sample size of stations, most of which were electrified late in 2018

Station Locations

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

Environmental

	Total
ZEVs Enabled	372
CO2 Emissions Reductions (annualized MTCO2e)	1302

C. Lessons Learned/Challenges and Successes

Launching the Make-Ready program in 2018 provided several opportunities to learn and adjust Program implementation processes to manage towards optimization. Several of the most significant lessons learned are described below:

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. Going forward, Eversource, where possible, will put in place the infrastructure to support 10 charging ports.

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.

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 barred from participation.

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.

Recognizing these challenges, Eversource signed an MOU with Envoy (see additional details in the Pilots/Partnerships section above), a company that specializes in offering EV sharing as

an amenity. Eversource is continuing to refine its strategy towards multi-unit dwellings, including exploring other car-sharing opportunities, and focusing on EJ Communities.

D. Actual v. Planned Implementation and Spending

2018 Milestones Achieved

2018 was an exciting year for EVs across the country generally, and in Massachusetts specifically. The U.S. saw an 80.8 percent year-over-year jump in EV sales to 361,307 in 2018, from 199,826 in 2017,[3] driven largely by California, whose incentive policies and established EV charging programs have led the nation. Massachusetts saw a 93 percent year-over-year jump in EV sales to 9,044 in 2018, from 4,677 in 2017. As charging stations established by the Eversource Make-Ready Program gain in number throughout the Program duration, the Company expects this number to increase.

Eversource made great strides in 2018 to establish the documentation, systems and processes to successfully launch the Make-Ready Program and begin site host recruitment to develop a strong backlog of customers ready to install charging infrastructure.

Eversource EV Make Ready 2018 Key Site Metrics

- 150 applications received
- 57 site host agreements executed
- 12 charging station sites electrified
- 62 charging station ports installed
- 87 charging station ports enabled

E. Performance on Implementation/Deployment

The below table summarizes the investments in the 12 charging station sites placed in service in 2018:

10 https://insideevs.com/monthly-plug-in-sales-scorecard/

Site Address	Town	Environmental Justice Community	Site Type	Charger Type	Ports Installed	Ports Enabled	Capital Deployed
1000 Commonwealth Ave	Newton	No	Public	Level 2	8	10	$ 184,181
208 S Great Road	Lincoln	No	Public	Level 2	6	10	$ 158,053
200 Shire Way	Lexington	No	Workplace	Level 2	10	10	$ 143,085
47 Station Drive	Westwood	No	Workplace	Level 2 / DC Fast	8	11	$ 114,395
1 Laraway Road	Winchester	No	Public	Level 2	2	5	$ 107,613
125 Bedford St	Bedford	No	Workplace	Level 2	6	6	$ 105,238
5 Russell St	Plymouth	No	Public	Level 2	4	5	$ 99,635
525 Canton Avenue	Milton	No	Public	Level 2	2	5	$ 98,129
5 Wahconah Street	Pittsfield	No	Public	Level 2	4	5	$ 80,002
26 High Street	Medway	No	Public	Level 2	2	5	$ 73,582
155 Village Street	Medway	No	Public	Level 2	2	5	$ 68,081
Olive Street	Greenfield	Yes	Public	Level 2	8	10	$ 64,193
Total		1			62	87	$ 1,296,186

Total Capital Deployed: $1,296,186

Total Capital Deployed in EJC: $64,193 (5 percent)

F. Description of Benefits Realized from Implementation

As detailed in Section B (Implementation Metrics), the deployment of the 12 charging station sites with 62 installed ports in 2018 supports 372 incremental EVs on the road, resulting in an annualized CO2e reduction of 1,302 MT.

G. Summary of Interval Charging Data

In 2018, the majority of EV Make-Ready charging stations were electrified in the 4th Quarter, limiting the time in service to collect utilization data. The Company expects that as the program matures the additional data will provide more robust insights. The strong backlog of applications and projects under construction will lead to a significant ramp up in station electrification in 2019.

H. Key Milestones

Eversource EV Make Ready 2018 Key Milestones Timeline

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

I. Updated Projection for Remainder of Three-year Term

As the Make Ready Program enters its second year, Eversource intends to accelerate deployment of EV charging infrastructure by building on successes from 2018. The following key priorities are areas of focus in 2019:

- Electrify 200 additional sites (5 – 10 percent expected to be DC Fast Charger deployments)
- Establish momentum with DC Fast Charger deployments
- Execute on the partnerships currently under development
- Pursue other innovative methods to help the Commonwealth achieve its EV adoption goals

The Company will implement additional lessons learned over the course of 2019 and looks forward to continued collaboration with external stakeholders as the Program progresses.

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource Energy 2018 Grid Modernization Plan Cost Recovery Filing	)	D.P.U. 19-23

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 2019.

Giuseppe A. Perniciaro

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

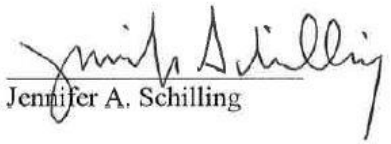
NSTAR Electric Company d/b/a Eversource Energy 2018 Grid Modernization Plan Cost Recovery Filing	)	D.P.U. 19-23

AFFIDAVIT OF JENNIFER A. SCHILLING

Jennifer A. Schilling does hereby depose and say as follows:

I, Jennifer A. Schilling, 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 2019.



Jennifer A. Schilling

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource Energy 2018 Grid Modernization Plan Cost Recovery Filing	)	D.P.U. 19-23

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 2019.

Kevin M. Boughan

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 19-23

JOINT DIRECT TESTIMONY OF

ASHLEY N. BOTELHO
JOHN G. GRIFFIN

EXHIBIT ES-ANB/JGG

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

2019 GRID MODERNIZATION
COST RECOVERY FILING

May 15, 2019

I. INTRODUCTION

Q. Ms. Botelho, please state your name and business address.

A. My name is Ashley N. Botelho. My business address is 247 Station Drive, Westwood, Massachusetts 02090.

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

A. I am the Manager, Revenue Requirements, Massachusetts for Eversource Energy Service Company ("EES"). In this capacity, I am responsible for managing the regulatory filings relating to the financial requirements of NSTAR Electric Company d/b/a Eversource Energy ("NSTAR Electric", "Eversource", or "the Company")[1] and NSTAR Gas Company d/b/a Eversource Energy ("NSTAR Gas"). In this proceeding, I am testifying on behalf of NSTAR Electric. As Manager, Revenue Requirements, Massachusetts, my responsibilities include the coordination and implementation of revenue-requirement calculations for the Company, among other duties.

Q. What is your educational background?

A. I graduated from Drexel University in Philadelphia, Pennsylvania in 2010 with a Bachelor of Science in Business Administration with a concentration in finance. In 2013, I graduated from Bryant University's Graduate School of Business with a Master of Business Administration.

Q. Please describe your employment history.

A. I began working for the Company in July 2010 in support of NSTAR Electric's Smart Grid Programs. In October 2011, I was hired as a Smart Grid Associate Project Manager. In December 2012, I took the role of an Analyst in Revenue Requirements for Massachusetts. In July 2014, I was promoted to a Senior Revenue Requirements Analyst, and I was subsequently promoted to my current role of Manager, Revenue Requirements, Massachusetts in January 2018.

Q. Have you previously testified before any regulatory bodies?

A. Yes. I have sponsored testimony in several proceedings relating to Energy Efficiency, including the Company's Three-Year Energy Efficiency Plan for 2016-2018, as well as the 2011 and 2012 Energy Efficiency cost recovery filings. I have also sponsored testimony in several storm cost recovery proceedings, with the most recent filing docketed as D.P.U. 18-125. Lastly, I sponsored testimony in the Company's Resiliency Tree Work Program Annual Compliance Filing, docketed as D.P.U. 18-102.

[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.

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

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

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

A. I am the Director of Corporate Performance Management for the Eversource Service Company.

Q. What is your educational background?

A. I graduated from Plymouth State College (now Plymouth State University) in 2001 with a Bachelor of Science degree in Accounting. I earned a Master of Science in Accountancy from Stonehill College in 2005. I am also a Certified Public Accountant in the Commonwealth of Massachusetts.

Q. Please describe your employment history.

A. I have been employed by Eversource and its predecessors for the past 16 years and have held roles of increasing responsibility in Budgeting & Forecasting, Investment Planning and currently in Corporate Performance Management. In 2018, I assumed my current role.

Q. Have you previously testified before any regulatory bodies?

A. I have testified in the NSTAR Electric and NSTAR Gas Annual Service Quality proceedings.

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

A. In this filing, the Company presents its first grid modernization cost recovery filing in accordance with the Department's approval of the Company's 2018-2020 Grid Modernization Plan ("GMP"). NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15-122 (2018)("D.P.U. 15-122). In D.P.U. 15-122, the Department required the Company, as well as the other electric distribution companies, to file annual Grid Modernization Factor ("GMF") rate adjustment and reconciliation filings comprised of: (1) actual, eligible preauthorized expenditures from the prior GMP investment year; and (2) a reconciliation component in the second year and beyond. D.P.U. 15-122, at 225.

The purpose of this testimony is to present the revenue requirement and supporting documentation associated with plant-in-service for investment year 2018, for rates effective July 1, 2019, in accordance with the Department's directives in D.P.U. 15-122.

Q. Please describe the exhibits accompanying this joint testimony.

A. The exhibits accompanying this testimony are as follows:

Exhibit	Description
Exhibit ES-ANB/JGG	Joint Direct Testimony of Ashley N. Botelho 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	Project Master Summary
Exhibit ES-JGG-4	Project Documentation
Exhibit ES-JGG-5	O&M Invoices
Exhibit ES-ANB-1	Revenue Requirement Calculation
Exhibit ES-ANB-2	O&M Overhead Test
Exhibit ES-ANB-3	Incremental Labor Documentation
Exhibit ES-ANB-4	Bill Impacts

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

A. Yes. Company witnesses Giuseppe A. Perniciaro, Jennifer A. Schilling and Kevin M. Boughan are presenting testimony regarding the Company's overall implementation of the approved GMP. Their testimony summarizes the Company's progress in implementing the GMP in 2018 following the Department's approval of the 2018-2020 GMP on May 10, 2018. Additional detailed implementation information is contained in the Company's 2018 Grid Modernization Annual Report ("2018 Report") consistent with the Department's directives. D.P.U. 15-122, at 112; D.P.U. 15-122 Memorandum at 2 (March 29, 2019). The 2018 Report is being provided as Exhibit ES-GAP/JAS/KMB-1.

Q. How is this filing organized?

A. As indicated herein, Section I of this joint testimony presents the introduction. Section II discusses the accounting and cost tracking for the GMP in accordance with D.P.U. 15-122. Section III discusses the Company's capital authorization policy and documentation associated with plant-in-service for 2018. Section IV discusses the revenue requirement and rate to be effective July 1, 2019. Section V presents the typical bill impacts. Section VI discusses the GMF tariff. Section VII presents the conclusion.

II. ACCOUNTING AND COST TRACKING

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

A. Upon receipt of the D.P.U. 15-122 order authorizing implementation of the GMP, the Company worked to implement an accounting process to specifically track grid modernization costs. Prior to actual investment in grid modernization technologies, a number of foundational processes were developed and deployed in order to ensure that the 2018 GMP investments were undertaken in a deliberate, efficient and cost-effective manner. This framework will be utilized over the remainder of the 2018-2020 GMP, and the Company will continue to monitor the process to identify and implement necessary changes to continue to improve GMP investment deployment.

As an initial step, the Engineering teams drafted Project Approval Forms ("PAFs") for each investment category in accordance with the Company's Capital

Authorization Policy ("Authorization Policy"), which is provided as Exhibit ES-JGG-1 and discussed in greater detail below, in order to ensure that all 2018 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.

The Company also established specific and dedicated cost control processes to track and monitor all costs to ensure that all GMP costs were segregated from all other capital project costs and were incremental to existing or business as usual investments. In developing these cost tracking protocols, the Company created 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 set up lines of businesses for each investment type to track grid modernization projects and work orders separately from base capital work and ensure segregation of incremental costs from base capital work. Lines of business ensure incremental spending is accounted for distinctly and separately from base capital spending.

The lines of business that were created are as follows:

- 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.

All grid modernization work orders, which are set up in STORMS and Passport, the Company's work management systems, and PowerPlan, the Company's financial repository system, link to a specific grid modernization project, which are themselves linked to a specific line of business. The project approval process remains consistent with that of normal base capital work, which involves adhering to the Accounting Policy Statement ("APS") 1 Project Authorization Policy including review of the project process and associated cost incurrence at project governance meetings.

The GMP cost tracking process tracks total spending for the entire GMP portfolio. The process enables accurate, repeatable reporting and requires minimal manual effort to ensure data consistency and that the GMP spending was incremental. Customized reporting was created in Eversource's budgeting and financial application that is specific to GMP projects and lines of business. These reports contain monthly actuals, budget, variance, and projection information.

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

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

GMP investments that are classified as in-service are eligible for cost recovery through the GMF. Following the device being placed in service in the field, the Company continues to accumulate charges to the project work order associated with the grid modernization investment until invoices are reviewed and paid and field personnel finalize the project documents. The completion of the work order occurs shortly after the work order is placed in service when all work order charges have been incurred. Consistent with the Company's August 14, 2018 Compliance Filing in D.P.U. 15-122, eligible GMP investments are the cumulative capitalized costs of eligible GMP projects recorded as in-service, including cost of removal, at the end of the GMP Investment Year, which in this case is 2018. As described in the Company's Annual Report, certain devices were placed in service in the field at the end of 2018 but were not classified as plant-in-service in 2018 and therefore are not included in the 2019 GMF. The Company will include these costs in the 2020 GMF to be filed on May 15, 2020.

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

A. Similar to the processes put in place to track and assess GMP spending, the Company also created a process for properly tracking all grid modernization labor charges. As an initial step in laying the foundational groundwork for implementing the GMP in 2018, the Company's Planning and Scheduling team conducted an analysis to estimate the number of labor hours required to engineer, construct and commission the 2018 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 2018 GMP work plan. This strategy is consistent with the Company's overall labor resource strategy that allows for hiring external resources to execute work plans such as the GMP portfolio. As a result of this process, the Company established three positions, a Financial Analyst, a Program Analyst, and a Program Manager, dedicated solely to GMP program and financial management and developing and executing the integration plan for the GMP portfolio.

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. Various departments are 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 programs and enables more effective and efficient planning of work and resources.

Given the cross-cutting department responsibilities associated with the implementation of the GMP, rigorous labor reporting and tracking processes are utilized. All Eversource internal labor was instructed to direct charge their time when appropriate to GMP work orders. In the event that an internal employee's time cannot be direct charged, their time is charged to Engineering & Supervision ("E&S") and spread across all grid modernization work orders consistent with Eversource accounting practice for all capital work. For existing employees supporting the grid modernization program who were hired prior to May 10, 2018, all labor expense and productive and non-productive time will remain as an expense in the employee's home cost center. For employees hired after May 10, 2018, a specific work order, GMPLBR21, was created to track all new external hires who are dedicated to the Company's grid modernization initiatives, i.e., these new hires do not perform any work on other Eversource programs or initiatives and assign only those hours associated with the execution of the program to the Grid Modernization work order. All outside services, or external contractors, procured

to assist in the design, implementation, and construction the GMP capital units of property charge the relevant grid modernization capital work orders, which roll up to the relevant grid modernization lines of business, and are eligible for recovery through the GMF.

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

A. 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. An initial step was to create a mechanism to track GMP portfolio operational performance and analyze GMP work order activity. The reporting combines both financial and operational information on 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.

Additionally, 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 against the Company's financial reporting tool, PowerPlan. Data is organized by project and by the GMP-specific

lines of business discussed above. 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.

In addition to regular meetings to discuss GMP performance and data tracking, informal processes also exist to ensure robust tracking and monitoring of all aspects of the GMP projects. 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 from these various departments work cross-functionally and collaboratively to meet GMP portfolio performance expectations. Stakeholders within these various departments also maintain their own tracking mechanisms, which are cross checked periodically to the formal GMP source document maintained by the Grid Modernization Program Analyst.

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

III. CAPITAL AUTHORIZATION POLICY & DOCUMENTATION OF THE COMPANY'S 2018 GRID MODERNIZATION INVESTMENTS

Q. Please describe the Company's Capital Authorization Policy and procedures that apply to the grid modernization projects placed in service in 2018.

A. Exhibit ES-JGG-1 is a copy of the Company's 2018 Capital Authorization Policy ("Authorization Policy"). Consistent with the Company's Authorization Policy and procedures, all grid modernization projects that have been placed in service in 2018 have received the requisite spending authorization. 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. However, given the nature and cost of the GMP investments, this type of authorization will rarely occur. For GMP projects where the total cost exceeds $100,000, a specific project identification number is assigned and a PAF is written and approved through the PowerPlan system (the Company's accounting system) following the delegation of authority described in the Authorization Policy. The PAFs contain relevant details regarding the GMP project, including but not limited to a project need statement, project objectives, and a project costs summary. If a GMP project is expected to exceed the original authorized dollar amount, then a supplemental PAF 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.

Supplemental PAFs contain supplemental costs summary information, as well as a cost breakdown, and a justification for additional resources. The Company authorized initial PAFs for many of the Grid Modernization initiatives following the Department's approval of the GMP on May 10, 2018 to allow for work on the grid modernization initiatives to begin immediately following the issuance of the order. As the Company's operations and engineering personnel were gearing up to execute the 2018 plan, the Company's investment planning personnel worked to finalize the detailed supplemental PAFs.

Q. Please describe Exhibit ES-JGG-2.

A. Exhibit ES-JGG-2 provides the investment summary by month for the preauthorized GMP projects that were placed in service and classified as Construction Complete in investment year 2018. Page 1 of the exhibit includes a summary view of capital additions and cost of removal categorized by plant account and line of business. In 2018, there were $3,884,422 of grid modernization projects originally placed in service, with cost of removal totaling $142,258 as shown on lines 18 and 39 respectively[2]. Page 2 presents detailed cost information for

[2] The Company originally recorded $3,884,422 for grid modernization projects placed in service for Investment Year 2018, with cost of removal totaling $142,258. Due to the Company's rigorous review and controls associated with the GMP, the Company determined that there were capital costs charged to the GMP work orders that were not related to the GMP. This resulted in an adjustment of $189,777 and $30,693 to be removed from the plant in service amounts for 2018. The Company reflected this adjustment in the revenue requirement and as calculated on Exhibit ES-ANB-1, Schedule 2A.

additions by contractor, indirect/overheads, labor, materials, and other. Page 3 presents detailed cost information for cost of removal by contractor, indirect/overheads, labor, material, and other.

Q. Please describe Exhibit ES-JGG-3.

A. Exhibit ES-JGG-3 contains the Project Master Summary, which provides a summarized list of all 2018 GMP investments placed in service and classified as Construction Complete. The Project Master Summary provides the following information: the project number; the project description; line of business; line of business description; the direct, indirect, and total costs of the job; the estimated direct, indirect, and total cost estimate of the job as reported on the PAFs; and the total cost broken down by additions, cost of removal and construction work in progress ("CWIP"). The summarized list also includes the documentation page number in which the documentation is provided for each project in Exhibit ES-JGG-4, described in more detail below.

Q. Please describe Exhibit ES-JGG-4.

A. Exhibit ES-JGG-4 contains the 2018 GMP project documentation for the projects listed in Exhibit ES-JGG-3 and summarized in Exhibit ES-JGG-2. The project documentation includes variance analyses if required under the Authorization Policy. For each GMP project placed into service and classified as Construction Complete in 2018, Exhibit ES-JGG-4 includes the grid modernization cover sheet,

a closing report showing a table of the actual charges booked to the job, and, if necessary, the PAF with the PowerPlan system generated authorization screen. In the event that a GMP project exceeded the authorized spending threshold provided in the Authorization Policy, a supplemental PAF with appropriate approvals has been provided. The supplemental PAF also contains the project variance explanations. As described above, the Company authorized initial PAFs in order to begin work immediately.

Q. Please describe the unique format associated with the project documentation provided in Exhibit ES-JGG-4.

A. Due to the presence of multi-year projects in this annual filing, the process for assembling project documentation for Exhibit ES-JGG-4 was changed to provide transparency to plant-in-service progress, as well as capital expenditures for each project included in Exhibit ES-JGG-4. For this filing, changes were made to the cover sheet and the closing report for each project included in Exhibit ES-JGG-4 to explicitly identify the components of total capital spend including additions, cost of removal, and CWIP. This new layout is organized to facilitate ease of review between documentation and exhibits in this filing. For example, the additions and cost of removal presented for each project are included for recovery in this proceeding, therefore the amounts presented for additions and cost of removal on each cover sheet in Exhibit ES-JGG-4 can easily be traced through to Exhibit ES-JGG-3 at the project level, and then through to Exhibit ES-JGG-2 at a summarized

plant account level. Lastly, Exhibit ES-JGG-2 can easily be traced through to the investment costs included in the revenue requirement, Exhibit ES-ANB-1, Schedule 2A, which is explained in more detail below.

Q. Please describe Exhibit ES-JGG-5.

A. Exhibit ES-JGG-5[3] provides the external contractor invoices supporting the Operations & Maintenance ("O&M") expense charged to the GMP, that are eligible for recovery through the GMF. Itemized cost detail supporting the invoices is provided as Exhibit ES-ANB-1, Schedule 7, explained in more detail below.

IV. REVENUE REQUIREMENT

Q. What is the Company's proposed 2019 grid modernization revenue requirement?

A. Schedule 1 of Exhibit ES-ANB-1 summarizes the Company's 2019 grid modernization cumulative revenue requirement through December 31, 2019 of $1,496,776. This total is comprised of: (1) the 2018 monthly revenue requirement and 2019 annual revenue requirement for investments made under the 2018 investment year totaling $668,577, and O&M expenses incurred in the 2018 investment year totaling $828,199, as shown on Schedule 1, Lines 1 and 3, respectively.

[3] The Company is providing both a confidential and redacted versions of Exhibit ES-JGG-5.

Q. Please describe how rate base was calculated.

A. Exhibit ES-ANB-1, Schedule 2, lines 111 to 115 show the calculation of rate base for the 2018 eligible grid modernization investments. Schedule 2, line 111 shows the cumulative incremental net additions, which is the sum of net plant additions and cost of removal. The values for net plant additions and cost of removal are based upon the actual 2018 grid modernization investments. Accumulated depreciation and deferred income taxes are subtracted from cumulative incremental net additions to arrive at the month-end/year-end rate base for Year to Date ("YTD") 2018 and 2019. Rate base is then averaged on Schedule 2, line 118 before applying the pre-tax rate of return to arrive at the return and taxes component of the grid modernization revenue requirement.

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

A. The values for net plant additions and cost of removal are based upon the actual 2018 grid modernization investments. As detailed in Exhibit ES-ANB-1, Schedule 2A, the Company's starting point is the actual per book investment, as shown on Lines 2 through 7, as well as related cost of removal as shown on Lines 27 through 32. These values are as reported on Exhibit ES-JGG-2, Page 1. As previously described above, the Company originally recorded $3,884,422 for grid modernization projects placed in service for Investment Year 2018, with cost of removal totaling $142,258. Due to the Company's rigorous review and controls associated with the GMP, the Company determined that there were capital costs

charged to the GMP work orders that were not grid modernization related. This resulted in an adjustment of $189,777 and $30,693 to be removed from the plant in service amounts for 2018. The Company reflected this adjustment in Exhibit ES-ANB-1, Schedule 2A, Lines 10 through 15 and Lines 35 through 40, for plant additions and cost of removal, respectively. As a result, the revised 2018 monthly plant additions total $3,694,645 with revised cost of removal totaling $111,565, as shown on Lines 18 through 23 and 43 through 48 for additions and cost of removal, respectively. This revised total then carried through to the revenue requirement calculation presented in Exhibit ES-ANB-1, Schedule 2.

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

A. Exhibit ES-ANB-1, Schedule 5 derives the pre-tax rate of return used and is based upon the cost of capital approved in the Company's most recent base distribution rate case, D.P.U. 17-05. The calculation is based on the approved debt/equity ratio of 45.67 percent for debt, 0.74 percent for preferred stock, and 53.59 percent for equity. The calculation is also based on a weighted cost of long-term debt rate of 4.21 percent, cost of preferred stock of 4.56 percent, and cost of equity of 10 percent. The resulting pre-tax rate of return for vintage year 2018 is 9.34 percent.

Q. What did you use for book depreciation rates?

A. The book depreciation rates for investment year 2018 are listed by plant account in Exhibit ES-ANB-1, Schedule 2, lines 71 to 75. These depreciation rates represent the per book depreciation rates that were approved in D.P.U. 17-05.

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

A. Yes. Retirements related to the GMP are monthly actuals as shown in Exhibit ES-ANB-1, Schedule 2, lines 54 to 58.

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

A. In accordance with D.P.U. 15-122, property tax expense for the first year's revenue requirement shall be set to zero. The second year's revenue requirement will be calculated by first applying the effective property tax rate approved in the Company's most recent base rate case to the eligible net plant as of the end of the applicable investment year and then taking one-half of that amount. D.P.U. 15-122, at 228. Therefore, Exhibit ES-ANB-1, Schedule 6, shows a vintage year 2018 property tax expense of zero for 2018, and $61,138 for 2019 which is shown in the calculation of the revenue requirement on Schedule 2, line 124.

Q. Have you included operations and maintenance ("O&M") expense in the calculation of the revenue requirement?

A. Yes. O&M expenses, totaling $828,199, are itemized on Schedule 7. Eligible O&M expenses are defined as the actual monthly grid modernization plan-related O&M expenses incurred throughout the prior twelve-month investment year related

to grid modernization plan implementation and proven to be incremental, preauthorized, and reasonable. O&M expenses that are supported with appropriate documentation are eligible for recovery through the GMF. D.P.U 15-122, at 228-229. The O&M expenses itemized on Schedule 7 are for incremental payroll-related expense and incremental external contractor expense totaling $104,708 and $723,490, respectively, as shown on Schedule 7, Page 1, Lines 1 and 3.

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

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

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

expenses otherwise recovered in base distribution rates. The Department held a technical conference to discuss the FTEs test that was submitted jointly by the electric distribution companies on December 20, 2018 and requested initial and reply comments on the proposed FTEs test by January 14, 2019 and January 25, 2019, respectively. This issue is currently pending before the Department.

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

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

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

A. As detailed in Exhibit ES-ANB-1, Schedule 7, Page 2, the Company incurred $723,490 in external contractor expense in the 2018 Investment Year. Most of the

expenses are related to the Company's Geographical Information Systems ("GIS") verification project totaling $706,268. This project is explained in detail in Exhibit ES-GAP/JAS/KMB-1. The remaining external contractor expenses totaling $17,223 are related to the Company's Electric Vehicle ("EV") program. The incremental external contractor expense included for recovery in this filing was incurred by the Company as a result of implementing the GMP and is solely attributable to preauthorized grid modernization investments, including incremental GMP development and evaluation costs, the cost of which is not being recovered in base distribution rates or through another cost recovery mechanism.

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

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

Q. Did the Company perform an analysis of its overhead (indirect) costs to ensure that they are properly accounted for in the Company's 2018 GMP Investment Year?

A. Yes. The Company has reviewed its total direct costs and overhead cost burdens assigned to all 2018 GMP and non-GMP capital projects placed in service. In addition, the percentage of capitalized overhead and burdens assigned to GMP projects has been set equal to the ratio of GMP to non-GMP direct costs in 2018. This analysis is provided in Exhibit ES-ANB-1, Schedule 4 and reflects how the capitalized indirect costs assigned to GMP projects were normalized by setting

them equal to the ratio of GMP to non-GMP direct costs. The normalized annual indirect charges calculated in Exhibit ES-ANB-1, Schedule 4 are carried forward to Exhibit ES-ANB-1 Schedule 2 lines 17 to 21 and converted to normalized monthly indirect charges.

Q. Did the Company confirm that it will not be double-recovering O&M overhead-related expenses through base rates approved in D.P.U. 17-05 and the 2018 GMP Investment Year?

A. Yes. Similar to the capital test, Exhibit ES-ANB-2 confirmed that the Company did not double-recover overhead and cost burdens charged to O&M and Payroll Tax expense in 2018 as compared to the O&M overhead and burdens base line amount established in D.P.U. 17-05. In the event the actual O&M expenses for any year as compared to the base line amount are less, the under base line difference amount would be subtracted from the normalized Capital amounts in Exhibit ES-ANB-1 Schedule 4 column (g). This adjustment, if it were to occur, is to ensure the Company's O&M overhead and cost burdens being recovered through base rates are not also included in the annual GMF.

Q. Please describe the information in Exhibit ES-ANB-2.

A. Exhibit ES-ANB-2 provides a summary of the comparison of the O&M overhead–related costs in base rates established in D.P.U. 17-05 as shown in column (b) and the actual costs charged to O&M and payroll taxes in 2018 in column (a). Column (c) reflects the difference between the actual 2018 O&M and payroll taxes and the

D.P.U. 17-05 O&M baseline amount. As noted in column (c), the 2018 expenses were $13M higher than the base line amount allowed in the D.P.U. 17-05 base rate calculation. Therefore, no adjustment is required and $0 is reflected in Exhibit ES-ANB-1, Schedule 4 column (g), O&M Adjustment to Overheads.

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

A. The Company's 2019 grid modernization revenue requirement is multiplied by the distribution revenue allocator, approved in the Company's most recent base distribution rate case, D.P.U. 17-05, for each rate class to derive the revenue requirement by rate class. This class-specific revenue requirement is divided by forecast kilowatt hours ("kWh") sales for each rate class to arrive at the proposed GMFs as shown in Exhibit ES-ANB-1, Schedule 8.

V. TYPICAL BILL IMPACTS

Q. Have you prepared illustrative typical bill impact analyses?

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

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

A. Under the Company's proposed GMF rates, a typical residential customer would see an increase of zero percent of the total bill on an annual basis. Bill impacts for other customer classes are shown in Exhibit ES-ANB-4.

VI. PROPOSED GMF TARIFF

Q. Please describe the status of the Company's GMF tariff.

A. As part of its approval of the GMP, the Department directed the Company to file a GMF tariff within 90 days of the issuance of D.P.U. 15-122 on May 10, 2018. On August 8, 2018, and then subsequently on August 14, 2018, the Company filed its proposed tariff, M.D.P.U. No. 73. The Company filed responses to information requests from the Department and the Office of the Attorney General ("Attorney General" or "AGO") regarding the tariff on September 21, 2018 and September 25, 2018. The Department has not yet approved the Company's proposed GMF tariff.

Q. What is the Company's proposal regarding the GMF tariff in this proceeding?

A. In this proceeding, the Company requests the Department to approve the Company's GMF tariff. Approval of M.D.P.U. No. 73 will allow recovery of the GMF effective July 1, 2019, in accordance with the Order in D.P.U. 15-122.

VII. CONCLUSION

Q. Does this conclude your testimony?

A. Yes, it does.

2019 Grid Modernization Cost Recovery

TABLE OF CONTENTS

2019 Grid Modernization Cost Recovery
Revenue Requirement Summary thru December 31, 2019

Line #		Reference		Grid Modernization Revenue Requirement (a)
1	Revenue Requirement on Vintage 2018 Grid Modernization Investment	Schedule 2, Page 1, Line 125	$	668,577
2				
3	Operations & Maintenance Expense	Schedule 7, Page 1, Line 5		828,199
4				
5	Total 2019 Grid Modernization Revenue Requirement	Line 1 + Line 3	$	1,496,776

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

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)	Cumulative Revenue Requirement YTD 12/31/18 (m)	Cumulative Revenue Requirement YTD 12/31/19 (n)	Annual Revenue Requirement Reference (p)
	Depreciable Plant Additions																	
1	Monthly Plant Additions: Line of Business																	
2	12170, 12175, 12190	Sch. 2A, Line 18	364	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 39,452	$ 140,194	$ 61,917		$ 241,563	
3	12170, 12175, 12190	Sch. 2A, Line 19	365	-	-	-	-	-	-	-	-	5,219	342,409	659,838	766,948		1,774,414	
4	12165, 12175	Sch. 2A, Line 20	366	-	-	-	-	-	-	-	-	-	24,818	120,396	89,484		234,698	
5	12175	Sch. 2A, Line 21	367	-	-	-	-	-	-	-	-	-	24,818	120,396	46,027		191,241	
6	12165	Sch. 2A, Line 22	369	-	-	-	-	-	-	-	-	-	19,624	-	1,233,105		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	(Sum of Columns (a) thru (l))
8																		
9	Monthly Plant Additions Allocations: Line of Business																	
10	12170, 12175, 12190	(Line 2 divided by Line 25, Column (l)	364	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.33%	58.04%	25.63%			
11	12170, 12175, 12190	(Line 3 divided by Line 26, Column (l)	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%			
12	12165, 12175	(Line 4 divided by Line 27, Column (l)	366	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.57%	51.30%	38.13%			
13	12175	(Line 5 divided by Line 28, Column (l)	367	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.98%	62.96%	24.07%			
14	12165	(Line 6 divided by Line 29, Column (l)	369	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.57%	0.00%	98.43%			
15																		
16	Overheads Burdens Adjustment: Line of Business																	
17	12170, 12175, 12190	(Line 10 * Sch. 4 Line 1, Cols. ((f) - (c) - (g))	364	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (1,081)	$ (3,843)	$ (1,697)		$ (6,621)	
18	12170, 12175, 12190	(Line 11 * Sch. 4 Line 2, Cols. ((f) - (c) - (g))	365	-	-	-	-	-	-	-	-	449	29,874	57,565	66,899		154,787	
19	12165, 12175	(Line 12 * Sch. 4 Line 3, Cols. ((f) - (c) - (g))	366	-	-	-	-	-	-	-	-	-	1,878	9,116	6,776		17,770	
20	12175	(Line 13 * Sch. 4 Line 4, Cols. ((f) - (c) - (g))	367	-	-	-	-	-	-	-	-	-	(1,691)	(8,200)	(3,135)		(13,025)	
21	12165	(Line 14 * Sch. 4 Line 5, Cols. ((f) - (c) - (g))	369	-	-	-	-	-	-	-	-	-	12,934	-	810,898		823,832	
22	Total Overheads Burdens Adjustment	(Sum of Lines 17 thru 21)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 449	$ 41,915	$ 54,639	$ 879,741		$ 976,743	(Sum of Columns (a) thru (l)
23																		
24	Cumulative Before Adjustment Depreciable Additions: Line of Business																	
25	12170, 12175, 12190	(Prior Mo. Line 25 + Current Mo. Line 2)	364	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 39,452	$ 179,646	$ 241,563		$ 241,563	
26	12170, 12175, 12190	(Prior Mo. Line 26 + Current Mo. Line 3)	365	-	-	-	-	-	-	-	-	5,219	347,628	1,007,466	1,774,414		1,774,414	
27	12165, 12175	(Prior Mo. Line 27 + Current Mo. Line 4)	366	-	-	-	-	-	-	-	-	-	24,818	145,215	234,698		234,698	
28	12175	(Prior Mo. Line 28 + Current Mo. Line 5)	367	-	-	-	-	-	-	-	-	-	24,818	145,215	191,241		191,241	
29	12165	(Prior Mo. Line 29 + Current Mo. Line 6)	369	-	-	-	-	-	-	-	-	-	19,624	19,624	1,252,729		1,252,729	
30	Cumulative Before Adjustment Depreciable Additions	(Sum of Lines 25 thru 29)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,219	$ 456,341	$ 1,497,165	$ 3,694,645		$ 3,694,645	Column (l)
31																		
32	Cumulative After Adjustment Depreciable Additions: Line of Business																	
33	12170, 12175, 12190	(Prior Mo. Line 33 + Current Mo. Line 2 and 17)	364	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,371	$ 174,722	$ 234,942		$ 234,942	
34	12170, 12175, 12190	(Prior Mo. Line 34 + Current Mo. Line 3 and 18)	365	-	-	-	-	-	-	-	-	5,668	377,951	1,095,354	1,929,201		1,929,201	
35	12165, 12175	(Prior Mo. Line 35 + Current Mo. Line 4 and 19)	366	-	-	-	-	-	-	-	-	-	26,697	156,209	252,469		252,469	
36	12175	(Prior Mo. Line 36 + Current Mo. Line 5 and 20)	367	-	-	-	-	-	-	-	-	-	23,128	135,324	178,216		178,216	
37	12165	(Prior Mo. Line 37 + Current Mo. Line 6 and 21)	369	-	-	-	-	-	-	-	-	-	32,558	32,558	2,076,561		2,076,561	
38	Cumulative After Adjustment Depreciable Additions	(Sum of Lines 33 thru 37)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,668	$ 498,705	$ 1,594,168	$ 4,671,388		$ 4,671,388	Column (l)
39																		
40	Cost of Removal: Line of Business																	
41	12170, 12175, 12190	Sch. 2A, Line 43	364	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 889	$ 544	$ 6,464	$ 6,172	$ 5,184		$ 19,254	
42	12170, 12175, 12190	Sch. 2A, Line 44	365	-	-	-	-	-	-	-	1,096	4,566	19,233	19,628	13,156		57,678	
43	12165, 12175	Sch. 2A, Line 45	366	-	-	-	-	-	-	-	886	346	5,874	5,265	4,946		17,315	
44	12175	Sch. 2A, Line 46	367	-	-	-	-	-	-	-	886	346	5,874	5,265	4,946		17,315	
45	12165	Sch. 2A, Line 47	369	-	-	-	-	-	-	-	-	-	-	-	2		2	
46	Total Monthly Cost of Removal	(Sum of Lines 41 thru 45)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 5,801	$ 37,445	$ 36,330	$ 28,234		$ 111,565	(Sum of Columns (a) thru (l)
47																		
48	Cumulative Cost of Removal	(Prior Mo. Line 48 + Current Mo. Line 46)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 9,557	$ 47,002	$ 83,331	$ 111,565		$ 111,565	Column (l)
49																		
50	**Total Grid Modernization Plant Investment**	**(Line 38 + Line 48)**		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 3,756**	**$ 15,226**	**$ 545,706**	**$ 1,677,499**	**$ 4,782,953**		**$ 4,782,953**	**(Line 38 + Line 48)**
51																		
52	Depreciable Retirements																	
53	Plant Retirements: Line of Business																	
54	12170, 12175, 12190	Company Records	364											$ (143)	$ (3,290)		$ (3,433)	
55	12170, 12175, 12190	Company Records	365											(1,066)	(39,610)		(40,676)	
56	12165, 12175	Company Records	366														-	
57	12175	Company Records	367														-	
58	12165	Company Records	369														-	
59	Total Monthly Depreciable Retirements	(Sum of Lines 54 thru 58)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (1,209)	$ (42,900)		$ (44,110)	(Sum of Columns (a) thru (l)
60																		
61	Cumulative Plant Retirements: Line of Business																	
62	12170, 12175, 12190	(Prior Mo. Line 62 + Current Mo. Line 54)	364	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (143)	$ (3,433)		$ (3,433)	
63	12170, 12175, 12190	(Prior Mo. Line 63 + Current Mo. Line 55)	365	-	-	-	-	-	-	-	-	-	-	(1,066)	(40,676)		(40,676)	
64	12165, 12175	(Prior Mo. Line 64 + Current Mo. Line 56)	366	-	-	-	-	-	-	-	-	-	-	-	-		-	
65	12175	(Prior Mo. Line 65 + Current Mo. Line 57)	367	-	-	-	-	-	-	-	-	-	-	-	-		-	
66	12165	(Prior Mo. Line 66 + Current Mo. Line 58)	369	-	-	-	-	-	-	-	-	-	-	-	-		-	
67	Total Cumulative Plant Retirements	(Sum of Lines 62 thru 66)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (1,209)	$ (44,110)		$ (44,110)	Column (l)
68																		
69	Book Depreciation																	
70	Book Depreciation: Line of Business																	
71	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
72	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
73	12165, 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
74	12175	As Approved in DPU 17-05	367	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%	2.92%		2.92%	As Approved in DPU 17-05
75	12165	As Approved in DPU 17-05	369	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%	2.65%		2.65%	As Approved in DPU 17-05
76																		
77	Book Depreciation relating to Additions: Line of Business																	
78	12170, 12175, 12190	(Average of Current and Prior Mo. Line 33 * Line 71/12)	364	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 50	$ 325	$ 854		$ 8,137	Prior Year Line 78 + (Line 33 * Line 71)
79	12170, 12175, 12190	(Average of Current and Prior Mo. Line 34 * Line 72/12)	365	-	-	-	-	-	-	-	-	7	501	2,398	6,292		65,905	Prior Year Line 79 + (Line 34 * Line 72)
80	12165, 12175	(Average of Current and Prior Mo. Line 35 * Line 73/12)	366	-	-	-	-	-	-	-	-	-	24	185	546		5,898	Prior Year Line 80 + (Line 35 * Line 73)
81	12175	(Average of Current and Prior Mo. Line 36 * Line 74/12)	367	-	-	-	-	-	-	-	-	-	28	221	602		5,806	Prior Year Line 81 + (Line 36 * Line 74)
82	12165	(Average of Current and Prior Mo. Line 37 * Line 75/12)	369	-	-	-	-	-	-	-	-	-	36	108	2,437		57,466	Prior Year Line 82 + (Line 37 * Line 75)
83	Total Cumulative Book Depreciation Additions	(Sum of Lines 78 thru 82)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7	$ 638	$ 3,237	$ 10,731		$ 143,212	(Sum of Lines 78 thru 82)
84																		
85	Book Depreciation Relating to Retirements: Line of Business																	
86	12170, 12175, 12190	(Average of Current and Prior Mo. Line 62 * Line 71/12)	364	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (0)	$ (5)		$ (111)	Prior Year Line 86 + (Line 62 * Line 71)
87	12170, 12175, 12190	(Average of Current and Prior Mo. Line 63 * Line 72/12)	365	-	-	-	-	-	-	-	-	-	-	(1)	(55)		(1,312)	Prior Year Line 87 + (Line 63 * Line 72)
88	12165, 12175	(Average of Current and Prior Mo. Line 64 * Line 73/12)	366	-	-	-	-	-	-	-	-	-	-	-	-		-	Prior Year Line 88 + (Line 64 * Line 73)
89	12175	(Average of Current and Prior Mo. Line 65 * Line 74/12)	367	-	-	-	-	-	-	-	-	-	-	-	-		-	Prior Year Line 89 + (Line 65 * Line 74)
90	12165	(Average of Current and Prior Mo. Line 66 * Line 75/12)	369	-	-	-	-	-	-	-	-	-	-	-	-		-	Prior Year Line 90 + (Line 66 * Line 75)
91	Total Cumulative Book Depreciation Retirements	(Sum of Lines 86 thru 90)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (2)	$ (60)		$ (1,423)	(Sum of Lines 86 thru 90)
92																		
93	Cumulative Book Depreciation	Line 83 + Line 91		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7	$ 638	$ 3,235	$ 10,671		$ 141,789	Line 83 + Line 91
94																		
95	Deferred Tax Calculation																	
96	Federal Tax Depreciation	Sch. 3, Line 25		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 5,855	$ 43,661	$ 63,086	$ 170,386	$ 337,227	Sch. 3, Line 25
97	Cumulative Federal Tax Depreciation	(Prior Mo. Line 97 + Current Mo. Line 96)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 9,611	$ 53,271	$ 116,357	$ 286,743	$ 623,970	Prior Year Line 97 + Current Year Line 96
98																		
99	State Tax Depreciation	Sch. 3, Line 52		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 5,855	$ 43,661	$ 63,086	$ 170,386	$ 337,227	Sch. 3, Line 52
100	Cumulative State Tax Depreciation	(Prior Mo. Line 100 + Current Mo. Line 99)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 9,611	$ 53,271	$ 116,357	$ 286,743	$ 623,970	Prior Year Line 100 + Current Year Line 99
101																		
102	Federal Book/Tax Timing Difference	(Line 97 - Line 93)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 9,603	$ 52,633	$ 113,122	$ 276,072	$ 482,181	(Line 97 - Line 93)
103	Federal Tax Rate	Schedule 5, Footnote 1		21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	Schedule 5, Footnote 1
104	Deferred Federal Tax Reserve	(Line 102 * Line 103)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 789	$ 2,017	$ 11,053	$ 23,756	$ 57,975	$ 101,258	(Line 102 * Line 103)
105																		
106	State Book/Tax Timing Difference	(Line 100 - Line 93)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 9,603	$ 52,633	$ 113,122	$ 276,072	$ 482,181	(Line 100 - Line 93)
107	State Tax Rate	Schedule 5, Footnote 1		6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	6.32%	Schedule 5, Footnote 1
108	Deferred State Tax Reserve	(Line 106 * Line 107)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 237	$ 607	$ 3,326	$ 7,149	$ 17,448	$ 30,474	(Line 106 * Line 107)
109																		
110	Rate Base Calculation:																	
111	Total Cumulative Grid Modernization Plant Investment	Line 50		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 15,226	$ 545,706	$ 1,677,499	$ 4,782,953	$ 4,782,953	Line 50
112	Accumulated Reserve for Depreciation	Line 93 * -1		-	-	-	-	-	-	-	-	(7)	(638)	(3,235)	(10,671)		(141,789)	Line 93 * -1
113	Cumulative Net Plant	(Line 111 + Line 112)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 15,218	$ 545,068	$ 1,674,264	$ 4,772,282	$ 4,641,164	(Line 111 + Line 112)
114	Deferred Tax Reserve	(Line 104 + Line 108)		-	-	-	-	-	-	-	-	(1,026)	(2,624)	(14,379)	(30,905)	(75,423)	(131,732)	(Line 104 + Line 108)
115	Cumulative Month End/Year End Rate Base	(Line 113 + Line 114)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,730	$ 12,595	$ 530,689	$ 1,643,359	$ 4,696,859	$ 4,509,432	(Line 113 + Line 114)
116																		
117	Revenue Requirement Calculation:																	
118	Average Rate Base	Mo. 1 = Line 115 / 2, then (Prior Mo. & Cur Mo. Line 115 / 2)		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,365	$ 7,662	$ 271,642	$ 1,087,024	$ 3,170,109	$ 4,603,146	Prior Year & Current Year Line 115 / 2
119	Pre-Tax ROR	Sch. 5, Col (e) Line 5		9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%	9.34%		9.34%	Sch. 5, Col (e) Line 5
120	Number of Days in the Month			31	28	31	30	31	30	31	31	30	31	30	31			
121	Monthly Applicable Pre-Tax ROR	Line 119 * (Line 120 / 365)		0.79%	0.72%	0.79%	0.77%	0.79%	0.77%	0.79%	0.79%	0.77%	0.79%	0.77%	0.79%			
122	Return and Taxes	Line 118 * Line 121		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11	$ 59	$ 2,155	$ 8,345	$ 25,147	$ 35,716	$ 465,650	Prior Year Line 122 + (Line 118 * Line 119)
123	Monthly Book Depreciation	Line 93 - Prior Mo. Line 93		-	-	-	-	-	-	-	-	7	631	2,597	7,436	10,671	141,789	Line 93
124	Property Taxes	Sch. 6, Line 6		-	-	-	-	-	-	-	-	-	-	-	-	-	61,138	Sch. 6, Line 6
125	Monthly/Annual Revenue Requirement	Line 122 thru 124		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11	$ 66	$ 2,786	$ 10,942	$ 32,583	$ 46,388	$ 668,577	Line 122 thru 124

2018 Grid Modernization Investment
Recalculation of Vintage Investment for Non Grid Modernization-related Adjustments

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	Exh. ES-JGG-2, Line 4	364										$ 45,711	$ 150,639	$ 92,657
3	12170, 12175, 12190	Exh. ES-JGG-2, Line 8	365									5,219	348,668	670,284	797,688
4	12165, 12175	Exh. ES-JGG-2, Line 11	366										31,077	130,842	120,224
5	12175	Exh. ES-JGG-2, Line 13	367										31,077	130,842	76,766
6	12165	Exh. 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	Exh. ES-JGG-2, Line 26	364								$ 1,157	$ 664	$ 8,809	$ 8,151	$ 8,146
28	12170, 12175, 12190	Exh. ES-JGG-2, Line 30	365								1,364	4,686	21,578	21,606	16,118
29	12165, 12175	Exh. ES-JGG-2, Line 32	366								1,154	466	8,218	7,243	7,908
30	12175	Exh. ES-JGG-2, Line 34	367								1,154	466	8,218	7,243	7,908
31	12165	Exh. ES-JGG-2, Line 36	369								-	-	-	0	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

2019 Grid Modernization Cost Recovery
Calculation of Deferred Taxes for 2018 Grid Modernization Investment

Line #		Monthly Reference	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)	CY 12/31/19 (m)	Annual Reference (o)
1	**Federal Tax Depreciation**															
2																
3	Tax Depreciation															
4	Total Monthly Depreciable Plant Additions	Sch. 2, Line 7 + Line 22	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,668	$ 493,036	$ 1,095,463	$ 3,077,220	$ 4,671,388	(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%	3.750%	7.219%	Internal Revenue Code Section 168
6	Total Federal Tax Depreciation	Line 4 * Line 5	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 213	$ 18,489	$ 41,080	$ 115,396	$ 337,227	(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										53	53	53	53		
18	October											6,163	6,163	6,163		
19	November												20,540	20,540		
20	December													115,396		
21	Total Monthly Tax Depreciation	Line 9 through Line 20	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 53	$ 6,216	$ 26,756	$ 142,152		
22																
23	Deduction for Cost of Removal	Sch. 2, Line 46	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 5,801	$ 37,445	$ 36,330	$ 28,234		
24																
25	Total Federal Tax Depreciation and Cost of Removal	Sum of Lines 21 and 23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 5,855	$ 43,661	$ 63,086	$ 170,386	$ 337,227	Sum of Lines 6 and 23
26																
27	**State Tax Depreciation**															
28																
29	Tax Depreciation															
30	Total Monthly Depreciable Plant Additions	Line 4	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,668	$ 493,036	$ 1,095,463	$ 3,077,220	$ 4,671,388	(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%	3.750%	7.219%	Internal Revenue Code Section 168
32	Total State Tax Depreciation	Line 30 * Line 31	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 213	$ 18,489	$ 41,080	$ 115,396	$ 337,227	2019 = (Line 30 * Line 31); 2020 = (Line 30 * Line 31 * 6/12)
33																
34	Monthly Tax Depreciation															
35	January		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		
36	February			-	-	-	-	-	-	-	-	-	-	-		
37	March				-	-	-	-	-	-	-	-	-	-		
38	April					-	-	-	-	-	-	-	-	-		
39	May						-	-	-	-	-	-	-	-		
40	June							-	-	-	-	-	-	-		
41	July								-	-	-	-	-	-		
42	August									-	-	-	-	-		
43	September										53	53	53	53		
44	October											6,163	6,163	6,163		
45	November												20,540	20,540		
46	December													115,396		
47	Total Remaining Tax Depreciation	Line 35 through Line 46	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 53	$ 6,216	$ 26,756	$ 142,152		
48																
49	Deduction for Cost of Removal	Line 23	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 5,801	$ 37,445	$ 36,330	$ 28,234		
50																
51	Total State Tax Depreciation and Cost of Removal	Sum of Lines 47 and 49	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,756	$ 5,855	$ 43,661	$ 63,086	$ 170,386	$ 337,227	Sum of Lines 32 and 50

2019 Grid Modernization Cost Recovery
Calculation of Reallocation of Capitalized Overheads and Burdens for Rate Making Purposes
For the Year Ending December 31, 2018

Line	Line of Business	Plant Account	Actual 2018 Direct Capital Costs (a)	Percentage of Direct Costs (b)	Actual 2018 Overheads Capitalized (c)	Percentage of Total Overheads (d)	Actual 2018 Total Capital Costs (e) (a) + (c)	Normalized 2018 Overheads (f) (b) * (c) line 8	O&M Adjustment to Overheads (g)	Normalized 2018 Capital Costs (h) (a) + (f) + (g)
1	12170, 12175, 12190	364	$ 182,271	0%	$ 137,093	0%	$ 319,364	$ 130,472	$ -	$ 312,743
2	12170, 12175, 12190	365	1,188,105	1%	695,675	0%	1,883,780	850,462	-	2,038,567
3	12165, 12175	366	189,470	0%	117,855	0%	307,325	135,625	-	325,095
4	12175	367	146,082	0%	117,592	0%	263,674	104,568	-	250,650
5	12165	369	1,210,136	1%	42,401	0%	1,252,537	866,233	-	2,076,369
6	Subtotal: Grid Modernization Investment		$ 2,916,064	1%	$ 1,110,616	1%	$ 4,026,680	$ 2,087,360	-	5,003,424
7	All Other Non-Grid Modernization Capital		216,496,538	99%	155,948,073	99%	372,444,610	154,971,328	-	371,467,866
8	Total Capital Costs as Booked		$ 219,412,602	100%	$ 157,058,689	100%	$ 376,471,290	$ 157,058,689	$ -	$ 376,471,290

2019 Grid Modernization Cost Recovery
Calculation of Rate of Return and Capital Structure

Line #	Description	Capital Ratio (a)	Cost (b)	Weighted Cost (c)	Tax Gross-up Factor (1) (d)	Pre-Tax Rate of Return (2) (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%	0.05%
3	Equity	53.59%	10.00%	5.36%	72.68%	7.37%
4						
5	Total	100.00%		7.31%		9.34%

NOTE:

(1) Tax Gross-up Factor:

Federal Rate		21.00%
State Rate		8.00%
Effective State Rate = State Rate * (1 - Federal Rate)		6.32%
Effective State and Federal Tax Rate	T	27.32%
Net Income After Taxes on Income	1 - T	**72.68%**
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)

2019 Grid Modernization Cost Recovery
Calculation of Grid Modernization Property Tax

Line #	Description	Vintage Year	Reference	2018 (a)	2019 (b)
1	Plant in Service	2018	Schedule 2, Line 111	$ 4,782,953	$ 4,782,953
2	Accumulated Depreciation		Schedule 2, Line 112	(10,671)	(141,789)
3	Net Plant in Service		Line 1 + Line 2	$ 4,772,282	$ 4,641,164
4	Net Plant in Service subject to Property Tax Expense		Prior Year Line 3	$ -	$ 4,772,282
5	Property Tax Rate		**NOTE 1**	2.56%	2.56%
6	Vintage Year Property Tax Expense		Year 1 = 0; Year 2 = Line 4 * Line 5 * 50%; after Year 2 = Line 4 * Line 5	$ -	$ 61,138

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	2.56%

2019 Grid Modernization Cost Recovery
2018 Grid Modernization Incremental O&M Expense

Line #	Description	Reference	January	February	March	April	May	June	July	August	September	October	November	December	Total
			(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
1	Incremental Payroll-related Expense	Company Records	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,484	$ 23,380	$ 30,970	$ 41,874	$ 104,708
2															
3	Incremental External Contractor Expense	Sch. 7, Page 2, Line 11	$ -	$ -	$ -	$ -	$ -	$ 8,500	$ 1,438	$ -	$ 112,348	$ -	$ 273,204	$ 328,000	$ 723,490
4															
5	Total Incremental O&M Expense	Line 1 + Line 2	$ -	$ -	$ -	$ -	$ -	$ 8,500	$ 1,438	$ -	$ 120,833	$ 23,380	$ 304,174	$ 369,874	$ 828,199

2019 Grid Modernization Cost Recovery
2018 Grid Modernization Incremental External Contractor Expense

Line #	Vendor Name (1)	Payment Reference	Invoice Number	Line of Business	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	Alan Spaulding	911111663088	NU1796	12165	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 600	$ -	$ -	$ -	$ 600
2	Boathouse Group, Inc	911111519549	3501469	12165	-	-	-	-	-	8,500	-	-	-	-	-	-	8,500
3	Davey Tree Expert Company	911111664702	912880795	12185	-	-	-	-	-	-	-	-	30,297	-	-	-	30,297
4	Davey Tree Expert Company	911111664705	912990547	12185	-	-	-	-	-	-	-	-	74,766	-	-	-	74,766
5	Davey Tree Expert Company	911111786560	913110221	12185	-	-	-	-	-	-	-	-	-	-	273,204	-	273,204
6	Davey Tree Expert Company	911111786563	913185441	12185	-	-	-	-	-	-	-	-	-	-	-	328,000	328,000
7	Jeffrey Lin LLC	911111464409	2708	12165	-	-	-	-	-	-	1,438	-	-	-	-	-	1,438
8	Jeffrey Lin LLC	911111590501	2713	12165	-	-	-	-	-	-	-	-	4,168	-	-	-	4,168
9	Jeffrey Lin LLC	911111590505	2715	12165	-	-	-	-	-	-	-	-	1,093	-	-	-	1,093
10	The Hired Pens, Inc	911111592874	EES10	12165	-	-	-	-	-	-	-	-	1,425	-	-	-	1,425
11	Total External Contractor Expense				$ -	$ -	$ -	$ -	$ -	$ 8,500	$ 1,438	$ -	$ 112,348	$ -	$ 273,204	$ 328,000	$ 723,490

NOTE:
(1) Invoice copies are provided in sequential order in Exhibit ES-JGG-5.

2019 Grid Modernization Cost Recovery
Calculation of 2019 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	6,819,038,037	41.145%	$615,848	$0.00009
2	All	R-3/R-4	952,621,335	4.575%	$68,477	$0.00007
3	Greater Boston	G-1/T-1	497,906,356	3.446%	$51,579	$0.00010
4	Greater Boston	G-2/T-2	6,448,830,075	27.907%	$417,705	$0.00006
5	Greater Boston	G3/WR	3,065,221,570	7.998%	$119,712	$0.00004
6	Cambridge	G-0/G-1/G-6	228,359,725	0.829%	$12,408	$0.00005
7	Cambridge	G-2	539,162,728	1.329%	$19,892	$0.00004
8	Cambridge	G3/SB1	624,935,580	0.856%	$12,812	$0.00002
9	Cambridge	G-4	5,025,153	0.012%	$180	$0.00004
10	Cambridge	G-5	6,536,082	0.018%	$269	$0.00004
11	South	G-1/G-7	1,007,319,883	3.930%	$58,823	$0.00006
12	South	G-2	457,411,991	1.088%	$16,285	$0.00004
13	South	G-3	395,723,130	0.610%	$9,130	$0.00002
14	South	G-4	2,216,240	0.008%	$120	$0.00005
15	South	G-5	12,163,958	0.053%	$793	$0.00007
16	South	G-6	4,257,421	0.008%	$120	$0.00003
17	Western MA	23/24/G-0/T-0	573,433,235	2.626%	$39,305	$0.00007
18	Western MA	G-2/T-4	382,680,225	1.159%	$17,348	$0.00005
19	Western MA	T-2	695,358,835	1.495%	$22,377	$0.00003
20	Western MA	T-5	410,569,470	0.498%	$7,454	$0.00002
21	Eastern MA	S-1/S-2	82,692,360	0.315%	$4,715	$0.00006
22	Western MA	S-1/S-2	30,696,799	0.095%	$1,422	$0.00005
23		Total	23,242,160,187	100.000%	$1,496,776	$0.00006

2019 Grid Modernization Cost Recovery
2018 Calculation of Adjustment to Total Capitalized Overheads

	2018 Actual Amount (a)	Rate Year Recovery per D.P.U. 17-05 (b)	Adjustment to Capitalized Overheads (c)=(a)-(b)
Labor Overheads Charged to Expense			
Healthcare Expense	$24,035,127	$21,279,123	$2,756,004
Other Employee Benefits Expense	$13,364,472	$8,324,966	$5,039,506
Administrative & General Salaries Expense	$42,657,858	$43,001,019	($343,162)
Nonproductive Payroll Expense	$22,817,651	$21,580,553	$1,237,098
Payroll Tax Expense	$14,050,958	$10,445,264	$3,605,693
Miscellaneous Distribution Expenses	$7,685,484	$7,342,445	$343,038
Total Labor Overheads Charged to Expense	$124,611,549	$111,973,372	$12,638,178
Clearing Account Burdens			
Stores Handling and Lobby Stock Expense	$3,403,195	$2,715,729	$687,466
Vehicle Expense	$13,214,046	$13,988,748	($774,702)
Total Labor Overheads and Burdens Expense	$141,228,791	$128,677,849	$12,550,942

Notes:
Column (a) Per Company Books
Column (b) D.P.U. 17-05-F Compliance Filing dated June 8, 2018
Pension and PBOP costs are excluded from the overhead and burdens test baseline and actuals.

EVERSOURCE ENERGY

POSITION PROFILE **Effective Date: March 2018**

Title:	Financial Analyst	**Job Family:**	Finance
Job Profile Name:	Financial Analyst	**Job Profile #:**	10355
Job Code:		**Band:**	1B
Revision Date:	3-19-2018		

1. Role and Scope of Position:

The Financial Analyst provides financial support to the organization; coordinates and supports the Monthly Financial Reports; develops the departments' financial budgets and five-year financial forecasts; regulatory planning; project analysis; and, development of different reporting tools. The Financial Analyst provides financial and performance reporting for the Grid Modernization project. This includes monthly cost and production tracking against metrics determined by the MA DPU in their soon to be released order for the Grid Modernization docket.

2. Essential Functions:

- Coordinates, develops, supports and monitors the monthly cost and performance tracking of all metrics associate with the Grid Modernization program to ensure each component is properly reported and supported. Ensures compliance with all corporate critical path schedules.
- Reviews, validates and adopts financial model runs.
- Communicates results and related issues and their implication to management.
- Communicates results of an any issues with Grid Modernization cost and performance progress including recommendations for course correctio management.
- Coordinates and developments financial projections with input from affected groups and disciplines from across the company including financial forecasting, regulatory, corporate and field functional areas and accounting.
- Prepares financial projections for presentation to executive management.
- Ensures communication through reports to departmental management on a monthly basis for any specific operating and financial performance information such as budget versus actual and current versus prior year actual comparisons for making management decisions or evaluation of trends.
- Coordinates with all departmental areas on financial and business reporting requirements.
- Works effectively with all levels of management in order to provide financial analysis and problem-solving recommendations.
- Supports the development of rate case timelines and strategies as well as rate case proceedings, as it pertains to Grid Modernization investments.

3. Technical Knowledge/Skill/Education/Licenses/Certifications:

Technical Knowledge/Skills:

Knowledge:

- Knowledge and experience with capital and expense budgeting processes
- Knowledge and experience developing and implementing corporate strategies and initiatives
- Strong knowledge, experience and demonstrated ability in all areas of financial reporting, analyses and financial model management
- Understanding of financial statements and financial modeling

EVERSOURCE ENERGY

POSITION PROFILE **Effective Date: March 2018**

- Thorough understanding of the organization

Skills:

- Financial acumen including a basic understanding of financial concepts
- Financial modeling capabilities
- Strong detail orientation as well as the ability to be thorough and precise
- Ability to work effectively with various levels within the organization
- Ability to use and apply sound judgment
- Team membership
- Strong customer focus
- Functional understanding of computerized business systems
- Demonstrated skill with MS Office applications (specifically Word and Excel)
- Ability to multi-task and shift among multiple priorities simultaneously
- Spoken and written communications
- Initiative and personal ownership

Education/Experiences: A Bachelor's degree in Accounting, Finance or a closely-related discipline required. Active work towards or completion of a related advanced degree preferred. A minimum of 5 years related experience required.

Licenses & Certifications: Must hold a valid motor vehicle driver's license

4. Working Conditions:

5. Problem Solving & Complexity:

6. Physical Aspects:

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of the job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is *frequently* required to sit, stand, talk, and hear. The employee is *frequently* required to walk; use hands and fingers to operate, handle, or feel objects, tools, or controls; and reach with hands and arms.

The employee must *occasionally* lift and or move up to *15 pounds*. Specific vision abilities required by this job include close vision and ability to adjust focus.

The noise level in the work environment is usually *moderately quiet.*

Approved By:_____Date:_____

(Compensation)

EVERSOURCE ENERGY

POSITION PROFILE **Effective Date: 5-1-2018**

Title:	Analyst, Grid Modernization	**Job Family:**	Engineering
Job Profile Name:	Analyst	**Job Profile #:**	
Job Code:		**Band:**	
Revision Date:	05/24/2018		

1. Role and Scope of Position:

Individual will be responsible for tracking and reporting of multiple projects included in the Eversource MA grid modernization investment portfolio. The role will involve communications with numerous stakeholders involved in project design, planning, execution and executive oversight.

Individual will be self-driven and highly motivated, with the proven ability to track multiple projects simultaneously.

Individual will coordinate collection and management of data for all projects in the MA grid modernization portfolio related to project development and execution, including financial data; project milestone adherence; risk assessment and implementation; and performance metrics. Individual will develop monthly, quarterly and annual reports for internal management and support all regulatory reporting requirements.

Individual will work closely with employees and management from Engineering, Construction, Finance and Corporate Performance Management. The grid modernization portfolio of projects is complex, multi-disciplinary in nature, with multiple sensitive external stakeholders and elevated financial exposure profile that will require strong attention to detail and problem solving skills. Projects will be related to substation and distribution monitoring and control; distribution automation; distribution load flow analysis; distribution management systems; energy storage; and electric vehicle infrastructure.

2. Essential Functions:

- Strong knowledge of project management tracking and reporting.
- Strong problem solving skills and ability to analyze data and information and extract relevant factors.
- Demonstrated statistical analytical techniques.
- Experience extracting data from multiple databases including MS Access, and a variety of internal SQL and Oracle databases.
- Understanding of utility operations and business practices.
- Strong spoken and written communication skills.
- Demonstrated skill with MS Office Applications.
- Ability to multi-task and prioritize.
- Strong team membership skills.
- Ability to be flexible and adapt to new situations.
- Ability and willingness to work to meet deadlines.
- Strong customer service orientation.
- High degree of initiative, personal ownership and accountability.

3. Technical Knowledge/Skill/Education/Licenses/Certifications:

Technical Knowledge/Skill:

EVERSOURCE ENERGY

POSITION PROFILE **Effective Date: 5-1-2018**

- Strong statistical analytical techniques and ability to work with computer models.
- Familiarity with project management principles and practices.
- Proven teamwork, problem solving, interpersonal and motivational skills.
- Highly developed communication skills, (i.e. the ability to listen, write clearly, ability to discuss ideas and be persuasive).
- Ability to work effectively with colleagues internal and external to Eversource.
- Ability to grasp concepts, analyze project information, determine facts, be sensitive to underlying issues, and make well thought out recommendations and decisions.

Education:

- A Bachelor's degree in business, mathematics, statistics, computer science, economics, or a related discipline is required. The equivalent in combined education and related experience may also be considered.

Experience:

- A minimum of (0) zero to five (5) years related experience is required. Experience in the utility industry ideal but not required.

Working Conditions:

The physical demands described here are representative of those that must be met by and employee to successfully perform the essential functions of the job. Reasonable accommodations will be made to enable individuals with disabilities to perform the essential functions.

- Work is performed primarily in an office environment. Travel to office locations in eastern and western MA, and occasionally to CT and NH will be required.

3. Problem Solving & Complexity:

4. Physical Aspects:

Approved By:_____Date:_____

(Compensation)

EVERSOURCE ENERGY

POSITION PROFILE **Effective Date: 5-1-2018**

Title:	Program Manager, Grid Modernization	**Job Family:**	Engineering
Job Profile Name:	Program Manager	**Job Profile #:**	
Job Code:		**Band:**	
Revision Date:	05/24/2018		

1. Role and Scope of Position:

Individual will be responsible for delivery (scope, schedule and budget) of multiple simultaneous distribution and IT projects as part of the Eversource MA grid modernization investment portfolio. The role will involve coordinating with numerous internal stakeholders involved in project design, planning, execution and executive oversight. It will also involve communicating with external stakeholders and regulators.

Individual will be self-driven and highly motivated, with the proven ability to lead a team through development and execution of a complex program. Individual will collaborate with other managers and employees across the organization to ensure consistency and teamwork.

Individual is expected to perform as a professional project manager, with the expectation for timely identification of risk, issues and decisions to be made, and will have the ability to prioritize between competing project and stakeholders needs to achieve a measurable success. Individual will be accountable and have the responsibility to lead all phases of the program and drive to its completion effectively and within scope, schedule, and budget without undermining quality of work product and reliability expectations.

The individual will manage the program and other related initiatives under the direction of the Director, Grid Modernization and will lead teams in a matrix environment across the company. Individual will work closely with employees and management from Engineering, Operations, Finance, Communication, Community Relations, Regulatory, Legal, and Purchasing. The grid modernization portfolio of projects is complex, multi-disciplinary in nature, with multiple sensitive external stakeholders and elevated financial exposure profile that will require strong attention to details and problem solving skills. Projects will be related to substation and distribution monitoring and control; distribution automation; distribution load flow analysis; distribution management systems; energy storage; and electric vehicle infrastructure.

Individual is part of the management team and is expected to utilize proven leadership skills to manage team members' performance mainly in a matrix organization. Individual will develop and present written and oral reporting to executive management, local and state governmental agencies and outside organizations.

Primary duties will include overall responsibility for the management of projects within the MA Grid Modernization portfolio including achievement of all project milestones for engineering, construction and commissioning; development and monitoring of detailed budget, cash flow and schedule; development of regulatory reporting requirements and filings; coordination of regulatory approvals; managing the development and process for project selection; and insuring that all aspects of the projects are documented and completed in accordance with company policies and all regulations and laws.

Program manager will be supported by one or more financial and reporting analysts.

2. Essential Functions:

EVERSOURCE ENERGY

POSITION PROFILE **Effective Date: 5-1-2018**

- Lead project team to successful execution of the MA Grid Modernization Program.
- Continuously manage and analyze Program's progress against budget, schedule and scope and develop and implement strategies to maintain course including management of change control process.
- Prepare and deliver in writing and orally clear, concise and comprehensive reports on project status to management.
- Ensure the timely and accurate preparation of all project submittals to regulatory authorities.
- Initiate and tightly monitor project change request documentation for project changes.
- Integrate and manage a cross-functional project team responsible for all aspects of engineering and implementation of a diverse and complex portfolio of grid modernization projects.
- Provide guidance and support for analysts and individuals from supporting functions.

3. Technical Knowledge/Skill/Education/Licenses/Certifications:

Technical Knowledge/Skill:

- Thorough knowledge of Project Management principles and practices. Previous Project Management experience and/or Project Management certification is required.
- Understanding of electric distribution technology and operations, preferably with experience in managing projects in the electric distribution industry.
- Proven leadership, teambuilding, coaching, problem solving, interpersonal and motivational skills.
- Highly developed communication skills, (i.e. the ability to listen, write clearly and concisely, make presentations before senior management & external stakeholders, ability to discuss ideas and be persuasive, and able to work effectively with all levels within Eversource, government agencies and outside organizations).
- Ability to grasp concepts, analyze project information, determine facts, be sensitive to underlying issues, and make well thought out recommendations and decisions.

Education:

- Requires a Bachelor's degree in Engineering, Business, Management, or related discipline.
- Project management certification is preferred.

Experience:

- Minimum of eight (8) years related industry experience, with at least (2) years of experience managing teams and projects.
- Knowledge of or experience with electric distribution system preferred.

Working Conditions:

EVERSOURCE ENERGY

POSITION PROFILE **Effective Date: 5-1-2018**

The physical demands described here are representative of those that must be met by and employee to successfully perform the essential functions of the job. Reasonable accommodations will be made to enable individuals with disabilities to perform the essential functions.

- Work is performed primarily in an office environment. Travel to office locations in eastern and western MA, and occasionally to CT and NH will be required.

3. Problem Solving & Complexity:

4. Physical Aspects:

Approved By:_____Date:_____

(Compensation)

Eastern Massachusetts
Summary of Bill Impact Analysis
Proposed July 1, 2019

				Monthly		Month		Annual	
	Service Area	Rate	Season	kWh	kW	Total Change	% Change	Total Change	% Change
1	EMA	R-1		516		$ 0.05	0.0%	$ 0.60	0.0%
2	EMA	R-2		488		$ 0.03	0.0%	$ 0.36	0.0%
3	EMA	R-3		740		$ 0.05	0.0%	$ 0.60	0.0%
4	EMA	R-4		874		$ 0.04	0.0%	$ 0.48	0.0%
5	Boston	G-1ND	Winter	493		$ 0.04	0.0%	$ 0.48	0.0%
6	Boston	G-1ND	Summer	464		$ 0.04	0.0%	$ 0.48	0.0%
7	Boston	G-1DMD	Winter	300	3	$ 0.03	0.0%	$ 0.36	0.0%
8	Boston	G-1DMD	Winter	1,250	5	$ 0.12	0.0%	$ 1.44	0.0%
9	Boston	G-1DMD	Winter	2,000	5	$ 0.20	0.0%	$ 2.40	0.0%
10	Boston	G-1DMD	Summer	300	3	$ 0.03	0.0%	$ 0.36	0.0%
11	Boston	G-1DMD	Summer	1,250	5	$ 0.12	0.0%	$ 1.44	0.0%
12	Boston	G-1DMD	Summer	2,000	5	$ 0.20	0.0%	$ 2.40	0.0%
13	Boston	G-2	Winter	3,400	17	$ 0.20	0.0%	$ 2.40	0.0%
14	Boston	G-2	Winter	7,200	24	$ 0.43	0.0%	$ 5.16	0.0%
15	Boston	G-2	Winter	13,950	31	$ 0.83	0.0%	$ 9.96	0.0%
16	Boston	G-2	Summer	3,600	18	$ 0.22	0.0%	$ 2.64	0.0%
17	Boston	G-2	Summer	7,800	26	$ 0.47	0.0%	$ 5.64	0.0%
18	Boston	G-2	Summer	14,850	33	$ 0.89	0.0%	$ 10.68	0.0%
19	Boston (NEMA)	G-3	Winter	150,500	430	$ 6.02	0.0%	$ 72.24	0.0%
20	Boston (NEMA)	G-3	Winter	360,000	800	$ 14.40	0.0%	$ 172.80	0.0%
21	Boston (NEMA)	G-3	Winter	802,450	1,459	$ 32.10	0.0%	$ 385.20	0.0%
22	Boston (NEMA)	G-3	Summer	177,100	506	$ 7.09	0.0%	$ 85.08	0.0%
23	Boston (NEMA)	G-3	Summer	477,000	1,060	$ 19.08	0.0%	$ 228.96	0.0%
24	Boston (NEMA)	G-3	Summer	1,155,550	2,101	$ 46.22	0.0%	$ 554.64	0.0%
25	Boston (SEMA)	G-3	Winter	150,500	430	$ 6.02	0.0%	$ 72.24	0.0%
26	Boston (SEMA)	G-3	Winter	360,000	800	$ 14.40	0.0%	$ 172.80	0.0%
27	Boston (SEMA)	G-3	Winter	802,450	1,459	$ 32.10	0.0%	$ 385.20	0.0%
28	Boston (SEMA)	G-3	Summer	177,100	506	$ 7.09	0.0%	$ 85.08	0.0%
29	Boston (SEMA)	G-3	Summer	477,000	1,060	$ 19.08	0.0%	$ 228.96	0.0%
30	Boston (SEMA)	G-3	Summer	1,155,550	2,101	$ 46.22	0.0%	$ 554.64	0.0%
31	Boston	T-1	Winter	509		$ 0.05	0.0%	$ 0.60	0.0%
32	Boston	T-1	Summer	287		$ 0.03	0.0%	$ 0.36	0.0%
33	Boston (NEMA)	T-2	Winter	70,350	201	$ 4.22	0.0%	$ 50.64	0.0%
34	Boston (NEMA)	T-2	Winter	126,450	281	$ 7.59	0.0%	$ 91.08	0.0%
35	Boston (NEMA)	T-2	Winter	164,450	299	$ 9.87	0.0%	$ 118.44	0.0%
36	Boston (NEMA)	T-2	Summer	86,100	246	$ 5.16	0.0%	$ 61.92	0.0%
37	Boston (NEMA)	T-2	Summer	143,550	319	$ 8.61	0.0%	$ 103.32	0.0%
38	Boston (NEMA)	T-2	Summer	193,600	352	$ 11.62	0.0%	$ 139.44	0.0%
39	Boston (SEMA)	T-2	Winter	70,350	201	$ 4.22	0.0%	$ 50.64	0.0%
40	Boston (SEMA)	T-2	Winter	126,450	281	$ 7.59	0.0%	$ 91.08	0.0%
41	Boston (SEMA)	T-2	Winter	164,450	299	$ 9.87	0.0%	$ 118.44	0.0%
42	Boston (SEMA)	T-2	Summer	86,100	246	$ 5.16	0.0%	$ 61.92	0.0%
43	Boston (SEMA)	T-2	Summer	143,550	319	$ 8.61	0.0%	$ 103.32	0.0%
44	Boston (SEMA)	T-2	Summer	193,600	352	$ 11.62	0.0%	$ 139.44	0.0%
45	Cambridge	G-0		593		$ 0.03	0.0%	$ 0.36	0.0%

Eastern Massachusetts
Summary of Bill Impact Analysis
Proposed July 1, 2019

	Service Area	Rate	Season	Monthly kWh	Monthly kW	Month Total Change	Month % Change	Annual Total Change	Annual % Change
46	Cambridge	G-1		4,750	19	$ 0.24	0.0%	$ 2.88	0.0%
47	Cambridge	G-1		9,100	26	$ 0.45	0.0%	$ 5.40	0.0%
48	Cambridge	G-1		16,000	32	$ 0.80	0.0%	$ 9.60	0.0%
49	Cambridge	G-2		79,450	227	$ 3.18	0.0%	$ 38.16	0.0%
50	Cambridge	G-2		140,400	312	$ 5.61	0.0%	$ 67.32	0.0%
51	Cambridge	G-2		155,650	283	$ 6.23	0.0%	$ 74.76	0.0%
52	Cambridge	G-3		320,800	802	$ 6.42	0.0%	$ 77.04	0.0%
53	Cambridge	G-3		585,000	1,170	$ 11.70	0.0%	$ 140.40	0.0%
54	Cambridge	G-3		715,200	1,192	$ 14.30	0.0%	$ 171.60	0.0%
55	Cambridge	G-4		14,400	36	$ 0.57	0.0%	$ 6.84	0.0%
56	Cambridge	G-4		19,000	38	$ 0.76	0.0%	$ 9.12	0.0%
57	Cambridge	G-4		21,000	35	$ 0.84	0.0%	$ 10.08	0.0%
58	Cambridge	G-5		4,756		$ 0.19	0.0%	$ 2.28	0.0%
59	Cambridge	G-6		593		$ 0.03	0.0%	$ 0.36	0.0%
60	South	G-1		400	2	$ 0.03	0.0%	$ 0.36	0.0%
61	South	G-1		5,700	19	$ 0.34	0.0%	$ 4.08	0.0%
62	South	G-1		10,800	27	$ 0.65	0.0%	$ 7.80	0.0%
63	South	G-1S		450	9	$ 0.02	0.0%	$ 0.24	0.0%
64	South	G-1S		1,200	8	$ 0.07	0.0%	$ 0.84	0.0%
65	South	G-1S		2,700	9	$ 0.16	0.0%	$ 1.92	0.0%
66	South	G-2		61,500	205	$ 2.46	0.0%	$ 29.52	0.0%
67	South	G-2		85,600	214	$ 3.43	0.0%	$ 41.16	0.0%
68	South	G-2		126,500	253	$ 5.06	0.0%	$ 60.72	0.0%
69	South	G-3		373,100	1,066	$ 7.46	0.0%	$ 89.52	0.0%
70	South	G-3		354,600	788	$ 7.09	0.0%	$ 85.08	0.0%
71	South	G-3		614,900	1,118	$ 12.30	0.0%	$ 147.60	0.0%
72	South	G-4		7,800	52	$ 0.39	0.0%	$ 4.68	0.0%
73	South	G-4		6,750	27	$ 0.34	0.0%	$ 4.08	0.0%
74	South	G-4		9,450	27	$ 0.47	0.0%	$ 5.64	0.0%
75	South	G-5		1,472		$ 0.11	0.0%	$ 1.32	0.0%
76	South	G-6		60,748		$ 1.82	0.0%	$ 21.84	0.0%
77	South	G-7		7,000	20	$ 0.42	0.0%	$ 5.04	0.0%
78	South	G-7		15,500	31	$ 0.93	0.0%	$ 11.16	0.0%
79	South	G-7		11,700	18	$ 0.70	0.0%	$ 8.40	0.0%
80	South	G-7S		450	9	$ 0.03	0.0%	$ 0.36	0.0%
81	South	G-7S		1,500	10	$ 0.09	0.0%	$ 1.08	0.0%
82	South	G-7S		3,900	13	$ 0.23	0.0%	$ 2.76	0.0%

Western Massachusetts
Summary of Bill Impact Analysis
Proposed July 1, 2019

			Monthly		Month		Annual	
	Service A	Rate	kWh	kW	Total Change	% Change	Total Change	% Change
1	WMA	R-1	516		$ 0.04	0.0%	$ 0.48	0.0%
2	WMA	R-2	488		$ 0.03	0.0%	$ 0.36	0.0%
3	WMA	R-3	740		$ 0.05	0.0%	$ 0.60	0.0%
4	WMA	R-4	874		$ 0.04	0.0%	$ 0.48	0.0%
5	WMA	23	644		$ 0.05	0.0%	$ 0.54	0.0%
6	WMA	24	1,300	13	$ 0.09	0.0%	$ 1.09	0.0%
7	WMA	24	4,200	21	$ 0.29	0.0%	$ 3.53	0.0%
8	WMA	24	7,200	24	$ 0.50	0.0%	$ 6.05	0.0%
9	WMA	G-0	900	6	$ 0.06	0.0%	$ 0.76	0.0%
10	WMA	G-0	3,300	11	$ 0.23	0.0%	$ 2.77	0.0%
11	WMA	G-0	7,650	17	$ 0.54	0.0%	$ 6.43	0.0%
12	WMA	T-0	150	1	$ 0.01	0.0%	$ 0.13	0.0%
13	WMA	T-0	1,200	4	$ 0.08	0.0%	$ 1.01	0.0%
14	WMA	T-0	4,500	10	$ 0.32	0.0%	$ 3.78	0.0%
15	WMA	G-2	23,750	95	$ 1.19	0.0%	$ 14.25	0.0%
16	WMA	G-2	42,000	84	$ 2.10	0.0%	$ 25.20	0.0%
17	WMA	G-2	42,300	94	$ 2.11	0.0%	$ 25.38	0.0%
18	WMA	T-4	17,500	70	$ 0.88	0.0%	$ 10.50	0.0%
19	WMA	T-4	37,100	106	$ 1.86	0.0%	$ 22.26	0.0%
20	WMA	T-4	53,550	119	$ 2.68	0.0%	$ 32.13	0.0%
21	WMA	T-2	143,500	410	$ 4.31	0.0%	$ 51.66	0.0%
22	WMA	T-2	256,950	571	$ 7.71	0.0%	$ 92.50	0.0%
23	WMA	T-2	319,000	580	$ 9.57	0.0%	$ 114.84	0.0%
24	WMA	T-5	1,394,050	3,983	$ 27.88	0.0%	$ 334.57	0.0%
25	WMA	T-5	3,084,750	6,855	$ 61.70	0.0%	$ 740.34	0.0%
26	WMA	T-5	2,485,450	4,519	$ 49.71	0.0%	$ 596.51	0.0%

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Rate R-1 Residential

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$17.74	$13.59	$31.33	$17.74	$13.59	$31.33	$0.00	0.0%
		200	$28.47	$27.18	$55.65	$28.49	$27.18	$55.67	$0.02	0.0%
		300	$39.21	$40.76	$79.97	$39.23	$40.76	$79.99	$0.02	0.0%
		400	$49.94	$54.35	$104.29	$49.98	$54.35	$104.33	$0.04	0.0%
		500	$60.68	$67.94	$128.62	$60.72	$67.94	$128.66	$0.04	0.0%
		600	$71.41	$81.53	$152.94	$71.46	$81.53	$152.99	$0.05	0.0%
		700	$82.15	$95.12	$177.27	$82.21	$95.12	$177.33	$0.06	0.0%
		800	$92.88	$108.70	$201.58	$92.95	$108.70	$201.65	$0.07	0.0%
		900	$103.62	$122.29	$225.91	$103.70	$122.29	$225.99	$0.08	0.0%
		1,000	$114.35	$135.88	$250.23	$114.44	$135.88	$250.32	$0.09	0.0%
		1,250	$141.19	$169.85	$311.04	$141.30	$169.85	$311.15	$0.11	0.0%
		1,500	$168.03	$203.82	$371.85	$168.16	$203.82	$371.98	$0.13	0.0%
		2,000	$221.70	$271.76	$493.46	$221.88	$271.76	$493.64	$0.18	0.0%
	Avg	516	$62.39	$70.11	$132.50	$62.44	$70.11	$132.55	$0.05	0.0%

		Current Rates	Proposed Rates	Change
	Customer Charge	$7.00	$7.00	$ -
	Distribution Energy	$0.04563	$0.04563	$ -
	Revenue Decoupling	($0.00057)	($0.00057)	$ -
	Solar Massachusetts Renewable Target	$0.00088	$0.00088	$ -
	Residential Assistance Adjustment Factor	$0.00482	$0.00482	$ -
	Pension Adjustment Factor	$0.00093	$0.00093	$ -
	Net Metering Recovery Surcharge	$0.00629	$0.00629	$ -
	Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
	AG Consulting Expense	$0.00001	$0.00001	$ -
	Storm Cost Recovery Adjustment Factor	$0.00365	$0.00365	$ -
	Storm Reserve Adjustment	$0.00000	$0.00000	$ -
	Basic Service Cost True Up Factor	($0.00024)	($0.00024)	$ -
	Solar Program Cost Adjustment Factor	$0.00004	$0.00004	$ -
	Solar Expansion Cost Recovery Factor	$0.00075	$0.00075	$ -
	Vegetation Management	$0.00167	$0.00167	$ -
	Tax Act Credit Factor	($0.00133)	($0.00133)	$ -
	Grid Modernization	$0.00000	$0.00009	$0.00009
	Transition	($0.00052)	($0.00052)	$ -
	Transmission Energy	$0.02585	$0.02585	$ -
	Energy Efficiency Reconciliation Factor	$0.01475	$0.01475	$ -
	System Benefits Charge	$0.00250	$0.00250	$ -
	Renewable Energy Charge	$0.00050	$0.00050	$ -
	Basic Service Charge	$0.13588	$0.13588	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Rate R-2 Residential Assistance

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$10.48	$8.70	$19.18	$10.48	$8.70	$19.18	$0.00	0.0%
		200	$16.48	$17.39	$33.87	$16.49	$17.39	$33.88	$0.01	0.0%
		300	$22.48	$26.09	$48.57	$22.49	$26.09	$48.58	$0.01	0.0%
		400	$28.47	$34.79	$63.26	$28.50	$34.79	$63.29	$0.03	0.0%
		500	$34.47	$43.48	$77.95	$34.50	$43.48	$77.98	$0.03	0.0%
		600	$40.47	$52.18	$92.65	$40.51	$52.18	$92.69	$0.04	0.0%
		700	$46.47	$60.87	$107.34	$46.51	$60.87	$107.38	$0.04	0.0%
		800	$52.47	$69.57	$122.04	$52.52	$69.57	$122.09	$0.05	0.0%
		900	$58.47	$78.27	$136.74	$58.52	$78.27	$136.79	$0.05	0.0%
		1,000	$64.47	$86.96	$151.43	$64.52	$86.96	$151.48	$0.05	0.0%
		1,250	$79.46	$108.70	$188.16	$79.54	$108.70	$188.24	$0.08	0.0%
		1,500	$94.46	$130.44	$224.90	$94.55	$130.44	$224.99	$0.09	0.0%
		2,000	$124.45	$173.93	$298.38	$124.57	$173.93	$298.50	$0.12	0.0%
	Avg	488	$33.75	$42.44	$76.19	$33.78	$42.44	$76.22	$0.03	0.0%

		Current Rates	Proposed Rates	Change
	Customer Charge	$7.00	$7.00	$ -
	Distribution Energy	$0.04563	$0.04563	$ -
	Revenue Decoupling	($0.00057)	($0.00057)	$ -
	Solar Massachusetts Renewable Target	$0.00088	$0.00088	$ -
	Residential Assistance Adjustment Factor	$0.00482	$0.00482	$ -
	Pension Adjustment Factor	$0.00093	$0.00093	$ -
	Net Metering Recovery Surcharge	$0.00629	$0.00629	$ -
	Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
	AG Consulting Expense	$0.00001	$0.00001	$ -
	Storm Cost Recovery Adjustment Factor	$0.00365	$0.00365	$ -
	Storm Reserve Adjustment	$0.00000	$0.00000	$ -
	Basic Service Cost True Up Factor	($0.00024)	($0.00024)	$ -
	Solar Program Cost Adjustment Factor	$0.00004	$0.00004	$ -
	Solar Expansion Cost Recovery Factor	$0.00075	$0.00075	$ -
	Vegetation Management	$0.00167	$0.00167	$ -
	Tax Act Credit Factor	($0.00133)	($0.00133)	$ -
	Grid Modernization	$0.00000	$0.00009	$0.00009
	Transition	($0.00052)	($0.00052)	$ -
	Transmission Energy	$0.02585	$0.02585	$ -
	Energy Efficiency Reconciliation Factor	$0.00113	$0.00113	$ -
	System Benefits Charge	$0.00250	$0.00250	$ -
	Renewable Energy Charge	$0.00050	$0.00050	$ -
	Basic Service Charge	$0.13588	$0.13588	$ -
	Low Income Discount	36%	36%	0%

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Rate R-3 Residential Space Heating

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$16.81	$13.59	$30.40	$16.82	$13.59	$30.41	$0.01	0.0%
		200	$26.63	$27.18	$53.81	$26.64	$27.18	$53.82	$0.01	0.0%
		300	$36.44	$40.76	$77.20	$36.46	$40.76	$77.22	$0.02	0.0%
		400	$46.25	$54.35	$100.60	$46.28	$54.35	$100.63	$0.03	0.0%
		500	$56.07	$67.94	$124.01	$56.10	$67.94	$124.04	$0.03	0.0%
		600	$65.88	$81.53	$147.41	$65.92	$81.53	$147.45	$0.04	0.0%
		700	$75.69	$95.12	$170.81	$75.74	$95.12	$170.86	$0.05	0.0%
		800	$85.50	$108.70	$194.20	$85.56	$108.70	$194.26	$0.06	0.0%
		900	$95.32	$122.29	$217.61	$95.38	$122.29	$217.67	$0.06	0.0%
		1,000	$105.13	$135.88	$241.01	$105.20	$135.88	$241.08	$0.07	0.0%
		1,250	$129.66	$169.85	$299.51	$129.75	$169.85	$299.60	$0.09	0.0%
		1,500	$154.20	$203.82	$358.02	$154.30	$203.82	$358.12	$0.10	0.0%
		2,000	$203.26	$271.76	$475.02	$203.40	$271.76	$475.16	$0.14	0.0%
	Avg	740	$79.62	$100.55	$180.17	$79.67	$100.55	$180.22	$0.05	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$7.00	$7.00	$ -
Distribution Energy	$0.03994	$0.03994	$ -
Revenue Decoupling	($0.00046)	($0.00046)	$ -
Solar Massachusetts Renewable Target	$0.00071	$0.00071	$ -
Residential Assistance Adjustment Factor	$0.00392	$0.00392	$ -
Pension Adjustment Factor	$0.00092	$0.00092	$ -
Net Metering Recovery Surcharge	$0.00511	$0.00511	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00296	$0.00296	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00019)	($0.00019)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00061	$0.00061	$ -
Vegetation Management	$0.00164	$0.00164	$ -
Tax Act Credit Factor	($0.00108)	($0.00108)	$ -
Grid Modernization	$0.00000	$0.00007	$0.00007
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02504	$0.02504	$ -
Energy Efficiency Reconciliation Factor	$0.01475	$0.01475	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13588	$0.13588	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Rate R-4 Residential Assistance Space Heating

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$9.89	$8.70	$18.59	$9.89	$8.70	$18.59	$0.00	0.0%
		200	$15.30	$17.39	$32.69	$15.31	$17.39	$32.70	$0.01	0.0%
		300	$20.71	$26.09	$46.80	$20.72	$26.09	$46.81	$0.01	0.0%
		400	$26.11	$34.79	$60.90	$26.13	$34.79	$60.92	$0.02	0.0%
		500	$31.52	$43.48	$75.00	$31.55	$43.48	$75.03	$0.03	0.0%
		600	$36.93	$52.18	$89.11	$36.96	$52.18	$89.14	$0.03	0.0%
		700	$42.34	$60.87	$103.21	$42.37	$60.87	$103.24	$0.03	0.0%
		800	$47.75	$69.57	$117.32	$47.78	$69.57	$117.35	$0.03	0.0%
		900	$53.16	$78.27	$131.43	$53.20	$78.27	$131.47	$0.04	0.0%
		1,000	$58.57	$86.96	$145.53	$58.61	$86.96	$145.57	$0.04	0.0%
		1,250	$72.09	$108.70	$180.79	$72.14	$108.70	$180.84	$0.05	0.0%
		1,500	$85.61	$130.44	$216.05	$85.68	$130.44	$216.12	$0.07	0.0%
		2,000	$112.65	$173.93	$286.58	$112.74	$173.93	$286.67	$0.09	0.0%
	Avg	874	$51.75	$76.01	$127.76	$51.79	$76.01	$127.80	$0.04	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$7.00	$7.00	$ -
Distribution Energy	$0.03994	$0.03994	$ -
Revenue Decoupling	($0.00046)	($0.00046)	$ -
Solar Massachusetts Renewable Target	$0.00071	$0.00071	$ -
Residential Assistance Adjustment Factor	$0.00392	$0.00392	$ -
Pension Adjustment Factor	$0.00092	$0.00092	$ -
Net Metering Recovery Surcharge	$0.00511	$0.00511	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00296	$0.00296	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00019)	($0.00019)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00061	$0.00061	$ -
Vegetation Management	$0.00164	$0.00164	$ -
Tax Act Credit Factor	($0.00108)	($0.00108)	$ -
Grid Modernization	$0.00000	$0.00007	$0.00007
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02504	$0.02504	$ -
Energy Efficiency Reconciliation Factor	$0.00113	$0.00113	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13588	$0.13588	$ -
Low Income Discount	36%	36%	0%

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Rate R-1 Residential

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$17.66	$11.68	$29.34	$17.67	$11.68	$29.35	$0.01	0.0%
		200	$28.33	$23.36	$51.69	$28.35	$23.36	$51.71	$0.02	0.0%
		300	$38.99	$35.03	$74.02	$39.02	$35.03	$74.05	$0.03	0.0%
		400	$49.66	$46.71	$96.37	$49.69	$46.71	$96.40	$0.03	0.0%
		500	$60.32	$58.39	$118.71	$60.37	$58.39	$118.76	$0.05	0.0%
		600	$70.98	$70.07	$141.05	$71.04	$70.07	$141.11	$0.06	0.0%
		700	$81.65	$81.75	$163.40	$81.71	$81.75	$163.46	$0.06	0.0%
		800	$92.31	$93.42	$185.73	$92.38	$93.42	$185.80	$0.07	0.0%
		900	$102.98	$105.10	$208.08	$103.06	$105.10	$208.16	$0.08	0.0%
		1,000	$113.64	$116.78	$230.42	$113.73	$116.78	$230.51	$0.09	0.0%
		1,250	$140.30	$145.98	$286.28	$140.41	$145.98	$286.39	$0.11	0.0%
		1,500	$166.96	$175.17	$342.13	$167.10	$175.17	$342.27	$0.14	0.0%
		2,000	$220.28	$233.56	$453.84	$220.46	$233.56	$454.02	$0.18	0.0%
	Avg	516	$62.03	$60.26	$122.29	$62.07	$60.26	$122.33	$0.04	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$7.00	$7.00	$ -
Distribution Energy	$0.04563	$0.04563	$ -
Revenue Decoupling	($0.00057)	($0.00057)	$ -
Solar Massachusetts Renewable Target	$0.00088	$0.00088	$ -
Residential Assistance Adjustment Factor	$0.00482	$0.00482	$ -
Pension Adjustment Factor	$0.00093	$0.00093	$ -
Net Metering Recovery Surcharge	$0.00629	$0.00629	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00367	$0.00367	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00024)	($0.00024)	$ -
Solar Program Cost Adjustment Factor	$0.00004	$0.00004	$ -
Solar Expansion Cost Recovery Factor	$0.00075	$0.00075	$ -
Vegetation Management	$0.00167	$0.00167	$ -
Tax Act Credit Factor	($0.00133)	($0.00133)	$ -
Grid Modernization	$0.00000	$0.00009	$0.00009
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02585	$0.02585	$ -
Energy Efficiency Reconciliation Factor	$0.01402	$0.01402	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11678	$0.11678	$ -

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Rate R-2 Residential Assistance

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$10.45	$7.47	$17.92	$10.46	$7.47	$17.93	$0.01	0.1%
		200	$16.42	$14.95	$31.37	$16.43	$14.95	$31.38	$0.01	0.0%
		300	$22.39	$22.42	$44.81	$22.41	$22.42	$44.83	$0.02	0.0%
		400	$28.36	$29.90	$58.26	$28.38	$29.90	$58.28	$0.02	0.0%
		500	$34.33	$37.37	$71.70	$34.36	$37.37	$71.73	$0.03	0.0%
		600	$40.30	$44.84	$85.14	$40.33	$44.84	$85.17	$0.03	0.0%
		700	$46.26	$52.32	$98.58	$46.31	$52.32	$98.63	$0.05	0.1%
		800	$52.23	$59.79	$112.02	$52.28	$59.79	$112.07	$0.05	0.0%
		900	$58.20	$67.27	$125.47	$58.26	$67.27	$125.53	$0.06	0.0%
		1,000	$64.17	$74.74	$138.91	$64.23	$74.74	$138.97	$0.06	0.0%
		1,250	$79.10	$93.42	$172.52	$79.17	$93.42	$172.59	$0.07	0.0%
		1,500	$94.02	$112.11	$206.13	$94.11	$112.11	$206.22	$0.09	0.0%
		2,000	$123.87	$149.48	$273.35	$123.98	$149.48	$273.46	$0.11	0.0%
	Avg	488	$33.61	$36.47	$70.08	$33.64	$36.47	$70.11	$0.03	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$7.00	$7.00	$ -
Distribution Energy	$0.04563	$0.04563	$ -
Revenue Decoupling	($0.00057)	($0.00057)	$ -
Solar Massachusetts Renewable Target	$0.00088	$0.00088	$ -
Residential Assistance Adjustment Factor	$0.00482	$0.00482	$ -
Pension Adjustment Factor	$0.00093	$0.00093	$ -
Net Metering Recovery Surcharge	$0.00629	$0.00629	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00367	$0.00367	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00024)	($0.00024)	$ -
Solar Program Cost Adjustment Factor	$0.00004	$0.00004	$ -
Solar Expansion Cost Recovery Factor	$0.00075	$0.00075	$ -
Vegetation Management	$0.00167	$0.00167	$ -
Tax Act Credit Factor	($0.00133)	($0.00133)	$ -
Grid Modernization	$0.00000	$0.00009	$0.00009
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02585	$0.02585	$ -
Energy Efficiency Reconciliation Factor	$0.00065	$0.00065	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11678	$0.11678	$ -
Low Income Discount	36%	36%	0%

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Rate R-3 Residential Space Heating

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$16.74	$11.68	$28.42	$16.75	$11.68	$28.43	$0.01	0.0%
		200	$26.48	$23.36	$49.84	$26.49	$23.36	$49.85	$0.01	0.0%
		300	$36.22	$35.03	$71.25	$36.24	$35.03	$71.27	$0.02	0.0%
		400	$45.96	$46.71	$92.67	$45.99	$46.71	$92.70	$0.03	0.0%
		500	$55.70	$58.39	$114.09	$55.74	$58.39	$114.13	$0.04	0.0%
		600	$65.44	$70.07	$135.51	$65.48	$70.07	$135.55	$0.04	0.0%
		700	$75.18	$81.75	$156.93	$75.23	$81.75	$156.98	$0.05	0.0%
		800	$84.92	$93.42	$178.34	$84.98	$93.42	$178.40	$0.06	0.0%
		900	$94.66	$105.10	$199.76	$94.72	$105.10	$199.82	$0.06	0.0%
		1,000	$104.40	$116.78	$221.18	$104.47	$116.78	$221.25	$0.07	0.0%
		1,250	$128.75	$145.98	$274.73	$128.84	$145.98	$274.82	$0.09	0.0%
		1,500	$153.10	$175.17	$328.27	$153.21	$175.17	$328.38	$0.11	0.0%
		2,000	$201.80	$233.56	$435.36	$201.94	$233.56	$435.50	$0.14	0.0%
	Avg	740	$79.08	$86.42	$165.50	$79.13	$86.42	$165.55	$0.05	0.0%

		Current Rates	Proposed Rates	Change
	Customer Charge	$7.00	$7.00	$ -
	Distribution Energy	$0.03994	$0.03994	$ -
	Revenue Decoupling	($0.00046)	($0.00046)	$ -
	Solar Massachusetts Renewable Target	$0.00071	$0.00071	$ -
	Residential Assistance Adjustment Factor	$0.00392	$0.00392	$ -
	Pension Adjustment Factor	$0.00092	$0.00092	$ -
	Net Metering Recovery Surcharge	$0.00511	$0.00511	$ -
	Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
	AG Consulting Expense	$0.00001	$0.00001	$ -
	Storm Cost Recovery Adjustment Factor	$0.00296	$0.00296	$ -
	Storm Reserve Adjustment	$0.00000	$0.00000	$ -
	Basic Service Cost True Up Factor	($0.00019)	($0.00019)	$ -
	Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
	Solar Expansion Cost Recovery Factor	$0.00061	$0.00061	$ -
	Vegetation Management	$0.00164	$0.00164	$ -
	Tax Act Credit Factor	($0.00108)	($0.00108)	$ -
	Grid Modernization	$0.00000	$0.00007	$0.00007
	Transition	($0.00052)	($0.00052)	$ -
	Transmission Energy	$0.02504	$0.02504	$ -
	Energy Efficiency Reconciliation Factor	$0.01402	$0.01402	$ -
	System Benefits Charge	$0.00250	$0.00250	$ -
	Renewable Energy Charge	$0.00050	$0.00050	$ -
	Basic Service Charge	$0.11678	$0.11678	$ -

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Rate R-4 Residential Assistance Space Heating

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$9.86	$7.47	$17.33	$9.86	$7.47	$17.33	$0.00	0.0%
		200	$15.24	$14.95	$30.19	$15.24	$14.95	$30.19	$0.00	0.0%
		300	$20.61	$22.42	$43.03	$20.63	$22.42	$43.05	$0.02	0.0%
		400	$25.99	$29.90	$55.89	$26.01	$29.90	$55.91	$0.02	0.0%
		500	$31.37	$37.37	$68.74	$31.39	$37.37	$68.76	$0.02	0.0%
		600	$36.75	$44.84	$81.59	$36.77	$44.84	$81.61	$0.02	0.0%
		700	$42.13	$52.32	$94.45	$42.16	$52.32	$94.48	$0.03	0.0%
		800	$47.50	$59.79	$107.29	$47.54	$59.79	$107.33	$0.04	0.0%
		900	$52.88	$67.27	$120.15	$52.92	$67.27	$120.19	$0.04	0.0%
		1,000	$58.26	$74.74	$133.00	$58.30	$74.74	$133.04	$0.04	0.0%
		1,250	$71.70	$93.42	$165.12	$71.76	$93.42	$165.18	$0.06	0.0%
		1,500	$85.15	$112.11	$197.26	$85.22	$112.11	$197.33	$0.07	0.0%
		2,000	$112.04	$149.48	$261.52	$112.13	$149.48	$261.61	$0.09	0.0%
	Avg	874	$51.48	$65.32	$116.80	$51.52	$65.32	$116.84	$0.04	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$7.00	$7.00	$ -
Distribution Energy	$0.03994	$0.03994	$ -
Revenue Decoupling	($0.00046)	($0.00046)	$ -
Solar Massachusetts Renewable Target	$0.00071	$0.00071	$ -
Residential Assistance Adjustment Factor	$0.00392	$0.00392	$ -
Pension Adjustment Factor	$0.00092	$0.00092	$ -
Net Metering Recovery Surcharge	$0.00511	$0.00511	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00296	$0.00296	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00019)	($0.00019)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00061	$0.00061	$ -
Vegetation Management	$0.00164	$0.00164	$ -
Tax Act Credit Factor	($0.00108)	($0.00108)	$ -
Grid Modernization	$0.00000	$0.00007	$0.00007
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02504	$0.02504	$ -
Energy Efficiency Reconciliation Factor	$0.00065	$0.00065	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11678	$0.11678	$ -
Low Income Discount	36%	36%	0%

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		20	$10.00	$2.64	$12.64	$10.00	$2.64	$12.64	$0.00	0.0%
		50	$13.00	$6.59	$19.59	$13.00	$6.59	$19.59	$0.00	0.0%
		90	$17.00	$11.87	$28.87	$17.00	$11.87	$28.87	$0.00	0.0%
		150	$22.99	$19.78	$42.77	$23.01	$19.78	$42.79	$0.02	0.0%
		230	$30.99	$30.33	$61.32	$31.01	$30.33	$61.34	$0.02	0.0%
		350	$42.98	$46.15	$89.13	$43.02	$46.15	$89.17	$0.04	0.0%
		500	$57.98	$65.93	$123.91	$58.03	$65.93	$123.96	$0.05	0.0%
		750	$82.96	$98.89	$181.85	$83.04	$98.89	$181.93	$0.08	0.0%
		1,300	$137.94	$171.41	$309.35	$138.07	$171.41	$309.48	$0.13	0.0%
		2,000	$207.90	$263.70	$471.60	$208.10	$263.70	$471.80	$0.20	0.0%
	Avg	493	$57.28	$65.00	$122.28	$57.32	$65.00	$122.32	$0.04	0.0%

		Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		20	$10.55	$2.64	$13.19	$10.55	$2.64	$13.19	$0.00	0.0%
		50	$14.38	$6.59	$20.97	$14.39	$6.59	$20.98	$0.01	0.0%
		90	$19.49	$11.87	$31.36	$19.49	$11.87	$31.36	$0.00	0.0%
		150	$27.14	$19.78	$46.92	$27.16	$19.78	$46.94	$0.02	0.0%
		230	$37.35	$30.33	$67.68	$37.38	$30.33	$67.71	$0.03	0.0%
		350	$52.67	$46.15	$98.82	$52.70	$46.15	$98.85	$0.03	0.0%
		500	$71.81	$65.93	$137.74	$71.86	$65.93	$137.79	$0.05	0.0%
		750	$103.72	$98.89	$202.61	$103.79	$98.89	$202.68	$0.07	0.0%
		1,300	$173.91	$171.41	$345.32	$174.04	$171.41	$345.45	$0.13	0.0%
		2,000	$263.24	$263.70	$526.94	$263.44	$263.70	$527.14	$0.20	0.0%
	Avg	464	$67.22	$61.18	$128.40	$67.26	$61.18	$128.44	$0.04	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$8.00	$8.00	$ -
Distribution Energy - Winter	$0.04531	$0.04531	$ -
Distribution Energy - Summer	$0.07298	$0.07298	$ -
Revenue Decoupling	($0.00066)	($0.00066)	$ -
Solar Massachusetts Renewable Target	$0.00101	$0.00101	$ -
Residential Assistance Adjustment Factor	$0.00556	$0.00556	$ -
Pension Adjustment Factor	$0.00097	$0.00097	$ -
Net Metering Recovery Surcharge	$0.00725	$0.00725	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00421	$0.00421	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00028)	($0.00028)	$ -
Solar Program Cost Adjustment Factor	$0.00005	$0.00005	$ -
Solar Expansion Cost Recovery Factor	$0.00087	$0.00087	$ -
Vegetation Management	$0.00173	$0.00173	$ -
Tax Act Credit Factor	($0.00154)	($0.00154)	$ -
Grid Modernization	$0.00000	$0.00010	$0.00010
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02278	$0.02278	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 100

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	1	100	$20.13	$13.19	$33.32	$20.14	$13.19	$33.33	$0.01	0.0%
	2	200	$29.25	$26.37	$55.62	$29.27	$26.37	$55.64	$0.02	0.0%
	3	300	$38.37	$39.56	$77.93	$38.40	$39.56	$77.96	$0.03	0.0%
	4	400	$47.49	$52.74	$100.23	$47.53	$52.74	$100.27	$0.04	0.0%
	5	500	$56.62	$65.93	$122.55	$56.67	$65.93	$122.60	$0.05	0.0%
	6	600	$65.75	$79.11	$144.86	$65.81	$79.11	$144.92	$0.06	0.0%
	7	700	$74.87	$92.30	$167.17	$74.94	$92.30	$167.24	$0.07	0.0%
	8	800	$83.99	$105.48	$189.47	$84.07	$105.48	$189.55	$0.08	0.0%
	10	1,000	$102.24	$131.85	$234.09	$102.34	$131.85	$234.19	$0.10	0.0%
	12	1,200	$152.95	$158.22	$311.17	$153.07	$158.22	$311.29	$0.12	0.0%
Avg	3	300	$38.37	$39.56	$77.93	$38.40	$39.56	$77.96	$0.03	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	1	100	$22.70	$13.19	$35.89	$22.71	$13.19	$35.90	$0.01	0.0%
	2	200	$34.39	$26.37	$60.76	$34.41	$26.37	$60.78	$0.02	0.0%
	3	300	$46.09	$39.56	$85.65	$46.12	$39.56	$85.68	$0.03	0.0%
	4	400	$57.78	$52.74	$110.52	$57.82	$52.74	$110.56	$0.04	0.0%
	5	500	$69.49	$65.93	$135.42	$69.54	$65.93	$135.47	$0.05	0.0%
	6	600	$81.19	$79.11	$160.30	$81.25	$79.11	$160.36	$0.06	0.0%
	7	700	$92.88	$92.30	$185.18	$92.95	$92.30	$185.25	$0.07	0.0%
	8	800	$104.58	$105.48	$210.06	$104.66	$105.48	$210.14	$0.08	0.0%
	10	1,000	$127.97	$131.85	$259.82	$128.07	$131.85	$259.92	$0.10	0.0%
	12	1,200	$246.60	$158.22	$404.82	$246.72	$158.22	$404.94	$0.12	0.0%
Avg	3	300	$46.09	$39.56	$85.65	$46.12	$39.56	$85.68	$0.03	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$11.00	$11.00	$ -
Distribution Demand <=10 kW - Winter	$0.00	$0.00	$ -
Distribution Demand >10 kW - Winter	$0.28	$0.28	$ -
Transmission Demand >10 kW - Winter	$15.95	$15.95	$ -
Distribution Demand <=10 kW - Summer	$0.00	$0.00	$ -
Distribution Demand >10 kW - Summer	$0.86	$0.86	$ -
Transmission Demand >10 kW - Summer	$46.76	$46.76	$ -
Distribution Energy - 1st 2000 kWh - Winter	$0.04238	$0.04238	$ -
Distribution Energy - next 150 hrs*kW - Winter	$0.03685	$0.03685	$ -
Distribution Energy - remainder kWh - Winter	$0.02446	$0.02446	$ -
Distribution Energy - 1st 2000 kWh - Summer	$0.06811	$0.06811	$ -
Distribution Energy - next 150 hrs*kW - Summer	$0.04134	$0.04134	$ -
Distribution Energy - remainder kWh - Summer	$0.02571	$0.02571	$ -
Revenue Decoupling	($0.00066)	($0.00066)	$ -
Solar Massachusetts Renewable Target	$0.00101	$0.00101	$ -
Residential Assistance Adjustment Factor	$0.00556	$0.00556	$ -
Pension Adjustment Factor	$0.00097	$0.00097	$ -
Net Metering Recovery Surcharge	$0.00725	$0.00725	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00421	$0.00421	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00028)	($0.00028)	$ -
Solar Program Cost Adjustment Factor	$0.00005	$0.00005	$ -
Solar Expansion Cost Recovery Factor	$0.00087	$0.00087	$ -
Vegetation Management	$0.00173	$0.00173	$ -
Tax Act Credit Factor	($0.00154)	($0.00154)	$ -
Grid Modernization	$0.00000	$0.00010	$0.00010
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy - 1st 2000 kWh	$0.01700	$0.01700	$ -
Transmission Energy - next 150 hrs*kW	$0.01700	$0.01700	$ -
Transmission Energy - remainder kWh	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 250

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	1	250	$33.82	$32.96	$66.78	$33.84	$32.96	$66.80	$0.02	0.0%
	2	500	$56.62	$65.93	$122.55	$56.67	$65.93	$122.60	$0.05	0.0%
	3	750	$79.44	$98.89	$178.33	$79.51	$98.89	$178.40	$0.07	0.0%
	4	1,000	$102.24	$131.85	$234.09	$102.34	$131.85	$234.19	$0.10	0.0%
	5	1,250	$125.06	$164.81	$289.87	$125.18	$164.81	$289.99	$0.12	0.0%
	6	1,500	$147.86	$197.78	$345.64	$148.01	$197.78	$345.79	$0.15	0.0%
	7	1,750	$170.68	$230.74	$401.42	$170.85	$230.74	$401.59	$0.17	0.0%
	8	2,000	$193.48	$263.70	$457.18	$193.68	$263.70	$457.38	$0.20	0.0%
	10	2,500	$236.34	$329.63	$565.97	$236.59	$329.63	$566.22	$0.25	0.0%
	12	3,000	$311.65	$395.55	$707.20	$311.95	$395.55	$707.50	$0.30	0.0%
Avg	5	1,250	$125.06	$164.81	$289.87	$125.18	$164.81	$289.99	$0.12	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	1	250	$40.25	$32.96	$73.21	$40.27	$32.96	$73.23	$0.02	0.0%
	2	500	$69.49	$65.93	$135.42	$69.54	$65.93	$135.47	$0.05	0.0%
	3	750	$98.73	$98.89	$197.62	$98.80	$98.89	$197.69	$0.07	0.0%
	4	1,000	$127.97	$131.85	$259.82	$128.07	$131.85	$259.92	$0.10	0.0%
	5	1,250	$157.22	$164.81	$322.03	$157.34	$164.81	$322.15	$0.12	0.0%
	6	1,500	$186.46	$197.78	$384.24	$186.61	$197.78	$384.39	$0.15	0.0%
	7	1,750	$215.70	$230.74	$446.44	$215.87	$230.74	$446.61	$0.17	0.0%
	8	2,000	$244.94	$263.70	$508.64	$245.14	$263.70	$508.84	$0.20	0.0%
	10	2,500	$290.04	$329.63	$619.67	$290.29	$329.63	$619.92	$0.25	0.0%
	12	3,000	$430.38	$395.55	$825.93	$430.68	$395.55	$826.23	$0.30	0.0%
Avg	5	1,250	$157.22	$164.81	$322.03	$157.34	$164.81	$322.15	$0.12	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$11.00	$11.00	$ -
Distribution Demand <=10 kW - Winter	$0.00	$0.00	$ -
Distribution Demand >10 kW - Winter	$0.28	$0.28	$ -
Transmission Demand >10 kW - Winter	$15.95	$15.95	$ -
Distribution Demand <=10 kW - Summer	$0.00	$0.00	$ -
Distribution Demand >10 kW - Summer	$0.86	$0.86	$ -
Transmission Demand >10 kW - Summer	$46.76	$46.76	$ -
Distribution Energy - 1st 2000 kWh - Winter	$0.04238	$0.04238	$ -
Distribution Energy - next 150 hrs*kW - Winter	$0.03685	$0.03685	$ -
Distribution Energy - remainder kWh - Winter	$0.02446	$0.02446	$ -
Distribution Energy - 1st 2000 kWh - Summer	$0.06811	$0.06811	$ -
Distribution Energy - next 150 hrs*kW - Summer	$0.04134	$0.04134	$ -
Distribution Energy - remainder kWh - Summer	$0.02571	$0.02571	$ -
Revenue Decoupling	($0.00066)	($0.00066)	$ -
Solar Massachusetts Renewable Target	$0.00101	$0.00101	$ -
Residential Assistance Adjustment Factor	$0.00556	$0.00556	$ -
Pension Adjustment Factor	$0.00097	$0.00097	$ -
Net Metering Recovery Surcharge	$0.00725	$0.00725	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00421	$0.00421	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00028)	($0.00028)	$ -
Solar Program Cost Adjustment Factor	$0.00005	$0.00005	$ -
Solar Expansion Cost Recovery Factor	$0.00087	$0.00087	$ -
Vegetation Management	$0.00173	$0.00173	$ -
Tax Act Credit Factor	($0.00154)	($0.00154)	$ -
Grid Modernization	$0.00000	$0.00010	$0.00010
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy - 1st 2000 kWh	$0.01700	$0.01700	$ -
Transmission Energy - next 150 hrs*kW	$0.01700	$0.01700	$ -
Transmission Energy - remainder kWh	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 400

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	1	400	$47.49	$52.74	$100.23	$47.53	$52.74	$100.27	$0.04	0.0%
	2	800	$83.99	$105.48	$189.47	$84.07	$105.48	$189.55	$0.08	0.0%
	3	1,200	$120.49	$158.22	$278.71	$120.61	$158.22	$278.83	$0.12	0.0%
	4	1,600	$156.99	$210.96	$367.95	$157.15	$210.96	$368.11	$0.16	0.0%
	5	2,000	$193.48	$263.70	$457.18	$193.68	$263.70	$457.38	$0.20	0.0%
	6	2,400	$227.76	$316.44	$544.20	$228.00	$316.44	$544.44	$0.24	0.0%
	7	2,800	$262.05	$369.18	$631.23	$262.33	$369.18	$631.51	$0.28	0.0%
	8	3,200	$296.33	$421.92	$718.25	$296.65	$421.92	$718.57	$0.32	0.0%
	10	4,000	$350.21	$527.40	$877.61	$350.61	$527.40	$878.01	$0.40	0.0%
	12	4,800	$436.54	$632.88	$1,069.42	$437.02	$632.88	$1,069.90	$0.48	0.0%
Avg	5	2,000	$193.48	$263.70	$457.18	$193.68	$263.70	$457.38	$0.20	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	1	400	$57.78	$52.74	$110.52	$57.82	$52.74	$110.56	$0.04	0.0%
	2	800	$104.58	$105.48	$210.06	$104.66	$105.48	$210.14	$0.08	0.0%
	3	1,200	$151.36	$158.22	$309.58	$151.48	$158.22	$309.70	$0.12	0.0%
	4	1,600	$198.16	$210.96	$409.12	$198.32	$210.96	$409.28	$0.16	0.0%
	5	2,000	$244.94	$263.70	$508.64	$245.14	$263.70	$508.84	$0.20	0.0%
	6	2,400	$281.02	$316.44	$597.46	$281.26	$316.44	$597.70	$0.24	0.0%
	7	2,800	$317.10	$369.18	$686.28	$317.38	$369.18	$686.56	$0.28	0.0%
	8	3,200	$353.18	$421.92	$775.10	$353.50	$421.92	$775.42	$0.32	0.0%
	10	4,000	$409.03	$527.40	$936.43	$409.43	$527.40	$936.83	$0.40	0.0%
	12	4,800	$560.11	$632.88	$1,192.99	$560.59	$632.88	$1,193.47	$0.48	0.0%
Avg	5	2,000	$244.94	$263.70	$508.64	$245.14	$263.70	$508.84	$0.20	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$11.00	$11.00	$ -
Distribution Demand <=10 kW - Winter	$0.00	$0.00	$ -
Distribution Demand >10 kW - Winter	$0.28	$0.28	$ -
Transmission Demand >10 kW - Winter	$15.95	$15.95	$ -
Distribution Demand <=10 kW - Summer	$0.00	$0.00	$ -
Distribution Demand >10 kW - Summer	$0.86	$0.86	$ -
Transmission Demand >10 kW - Summer	$46.76	$46.76	$ -
Distribution Energy - 1st 2000 kWh - Winter	$0.04238	$0.04238	$ -
Distribution Energy - next 150 hrs*kW - Winter	$0.03685	$0.03685	$ -
Distribution Energy - remainder kWh - Winter	$0.02446	$0.02446	$ -
Distribution Energy - 1st 2000 kWh - Summer	$0.06811	$0.06811	$ -
Distribution Energy - next 150 hrs*kW - Summer	$0.04134	$0.04134	$ -
Distribution Energy - remainder kWh - Summer	$0.02571	$0.02571	$ -
Revenue Decoupling	($0.00066)	($0.00066)	$ -
Solar Massachusetts Renewable Target	$0.00101	$0.00101	$ -
Residential Assistance Adjustment Factor	$0.00556	$0.00556	$ -
Pension Adjustment Factor	$0.00097	$0.00097	$ -
Net Metering Recovery Surcharge	$0.00725	$0.00725	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00421	$0.00421	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00028)	($0.00028)	$ -
Solar Program Cost Adjustment Factor	$0.00005	$0.00005	$ -
Solar Expansion Cost Recovery Factor	$0.00087	$0.00087	$ -
Vegetation Management	$0.00173	$0.00173	$ -
Tax Act Credit Factor	($0.00154)	($0.00154)	$ -
Grid Modernization	$0.00000	$0.00010	$0.00010
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy - 1st 2000 kWh	$0.01700	$0.01700	$ -
Transmission Energy - next 150 hrs*kW	$0.01700	$0.01700	$ -
Transmission Energy - remainder kWh	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Greater Boston Service Area
Rate G-2 Medium General Service

Hours Use: 200

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	8	1,600	$86.03	$210.96	$296.99	$86.13	$210.96	$297.09	$0.10	0.0%
	10	2,000	$103.04	$263.70	$366.74	$103.16	$263.70	$366.86	$0.12	0.0%
	12	2,400	$152.36	$316.44	$468.80	$152.50	$316.44	$468.94	$0.14	0.0%
	14	2,800	$201.68	$369.18	$570.86	$201.85	$369.18	$571.03	$0.17	0.0%
	16	3,200	$251.00	$421.92	$672.92	$251.19	$421.92	$673.11	$0.19	0.0%
	20	4,000	$349.64	$527.40	$877.04	$349.88	$527.40	$877.28	$0.24	0.0%
	24	4,800	$448.28	$632.88	$1,081.16	$448.57	$632.88	$1,081.45	$0.29	0.0%
	30	6,000	$596.24	$791.10	$1,387.34	$596.60	$791.10	$1,387.70	$0.36	0.0%
	40	8,000	$842.84	$1,054.80	$1,897.64	$843.32	$1,054.80	$1,898.12	$0.48	0.0%
	70	14,000	$1,579.78	$1,845.90	$3,425.68	$1,580.62	$1,845.90	$3,426.52	$0.84	0.0%
Avg	17	3,400	$275.66	$448.29	$723.95	$275.86	$448.29	$724.15	$0.20	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	8	1,600	$102.26	$210.96	$313.22	$102.36	$210.96	$313.32	$0.10	0.0%
	10	2,000	$123.32	$263.70	$387.02	$123.44	$263.70	$387.14	$0.12	0.0%
	12	2,400	$220.31	$316.44	$536.75	$220.45	$316.44	$536.89	$0.14	0.0%
	14	2,800	$317.30	$369.18	$686.48	$317.47	$369.18	$686.65	$0.17	0.0%
	16	3,200	$414.28	$421.92	$836.20	$414.47	$421.92	$836.39	$0.19	0.0%
	20	4,000	$608.26	$527.40	$1,135.66	$608.50	$527.40	$1,135.90	$0.24	0.0%
	24	4,800	$802.24	$632.88	$1,435.12	$802.53	$632.88	$1,435.41	$0.29	0.0%
	30	6,000	$1,093.20	$791.10	$1,884.30	$1,093.56	$791.10	$1,884.66	$0.36	0.0%
	40	8,000	$1,578.14	$1,054.80	$2,632.94	$1,578.62	$1,054.80	$2,633.42	$0.48	0.0%
	70	14,000	$3,028.19	$1,845.90	$4,874.09	$3,029.03	$1,845.90	$4,874.93	$0.84	0.0%
Avg	18	3,600	$511.27	$474.66	$985.93	$511.49	$474.66	$986.15	$0.22	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$18.00	$18.00	$ -
Distribution Demand <=10 kW - Winter	$0.00	$0.00	$ -
Distribution Demand >10 kW - Winter	$9.65	$9.65	$ -
Transmission Demand >10 kW - Winter	$7.54	$7.54	$ -
Distribution Demand <=10 kW - Summer	$0.00	$0.00	$ -
Distribution Demand >10 kW - Summer	$20.68	$20.68	$ -
Transmission Demand >10 kW - Summer	$19.99	$19.99	$ -
Distribution Energy - 1st 2000 kWh - Winter	$0.01827	$0.01827	$ -
Distribution Energy - next 150 hrs*kW - Winter	$0.01310	$0.01310	$ -
Distribution Energy - remainder kWh - Winter	$0.01119	$0.01119	$ -
Distribution Energy - 1st 2000 kWh - Summer	$0.02841	$0.02841	$ -
Distribution Energy - next 150 hrs*kW - Summer	$0.01487	$0.01487	$ -
Distribution Energy - remainder kWh - Summer	$0.01169	$0.01169	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Greater Boston Service Area
Rate G-2 Medium General Service

Hours Use: 300

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	8	2,400	$117.98	$316.44	$434.42	$118.12	$316.44	$434.56	$0.14	0.0%
	10	3,000	$140.39	$395.55	$535.94	$140.57	$395.55	$536.12	$0.18	0.0%
	12	3,600	$197.18	$474.66	$671.84	$197.40	$474.66	$672.06	$0.22	0.0%
	14	4,200	$253.78	$553.77	$807.55	$254.03	$553.77	$807.80	$0.25	0.0%
	16	4,800	$310.00	$632.88	$942.88	$310.29	$632.88	$943.17	$0.29	0.0%
	20	6,000	$422.43	$791.10	$1,213.53	$422.79	$791.10	$1,213.89	$0.36	0.0%
	24	7,200	$534.86	$949.32	$1,484.18	$535.29	$949.32	$1,484.61	$0.43	0.0%
	30	9,000	$703.52	$1,186.65	$1,890.17	$704.06	$1,186.65	$1,890.71	$0.54	0.0%
	40	12,000	$984.60	$1,582.20	$2,566.80	$985.32	$1,582.20	$2,567.52	$0.72	0.0%
	70	21,000	$1,827.86	$2,768.85	$4,596.71	$1,829.12	$2,768.85	$4,597.97	$1.26	0.0%
Avg	24	7,200	$534.86	$949.32	$1,484.18	$535.29	$949.32	$1,484.61	$0.43	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	8	2,400	$138.97	$316.44	$455.41	$139.11	$316.44	$455.55	$0.14	0.0%
	10	3,000	$162.44	$395.55	$557.99	$162.62	$395.55	$558.17	$0.18	0.0%
	12	3,600	$267.25	$474.66	$741.91	$267.47	$474.66	$742.13	$0.22	0.0%
	14	4,200	$371.75	$553.77	$925.52	$372.00	$553.77	$925.77	$0.25	0.0%
	16	4,800	$475.60	$632.88	$1,108.48	$475.89	$632.88	$1,108.77	$0.29	0.0%
	20	6,000	$683.32	$791.10	$1,474.42	$683.68	$791.10	$1,474.78	$0.36	0.0%
	24	7,200	$891.04	$949.32	$1,840.36	$891.47	$949.32	$1,840.79	$0.43	0.0%
	30	9,000	$1,202.61	$1,186.65	$2,389.26	$1,203.15	$1,186.65	$2,389.80	$0.54	0.0%
	40	12,000	$1,721.90	$1,582.20	$3,304.10	$1,722.62	$1,582.20	$3,304.82	$0.72	0.0%
	70	21,000	$3,279.77	$2,768.85	$6,048.62	$3,281.03	$2,768.85	$6,049.88	$1.26	0.0%
Avg	26	7,800	$994.89	$1,028.43	$2,023.32	$995.36	$1,028.43	$2,023.79	$0.47	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$18.00	$18.00	$ -
Distribution Demand <=10 kW - Winter	$0.00	$0.00	$ -
Distribution Demand >10 kW - Winter	$9.65	$9.65	$ -
Transmission Demand >10 kW - Winter	$7.54	$7.54	$ -
Distribution Demand <=10 kW - Summer	$0.00	$0.00	$ -
Distribution Demand >10 kW - Summer	$20.68	$20.68	$ -
Transmission Demand >10 kW - Summer	$19.99	$19.99	$ -
Distribution Energy - 1st 2000 kWh - Winter	$0.01827	$0.01827	$ -
Distribution Energy - next 150 hrs*kW - Winter	$0.01310	$0.01310	$ -
Distribution Energy - remainder kWh - Winter	$0.01119	$0.01119	$ -
Distribution Energy - 1st 2000 kWh - Summer	$0.02841	$0.02841	$ -
Distribution Energy - next 150 hrs*kW - Summer	$0.01487	$0.01487	$ -
Distribution Energy - remainder kWh - Summer	$0.01169	$0.01169	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Greater Boston Service Area
Rate G-2 Medium General Service

Hours Use: 450

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	8	3,600	$162.04	$474.66	$636.70	$162.26	$474.66	$636.92	$0.22	0.0%
	10	4,500	$194.51	$593.33	$787.84	$194.78	$593.33	$788.11	$0.27	0.0%
	12	5,400	$261.35	$711.99	$973.34	$261.67	$711.99	$973.66	$0.32	0.0%
	14	6,300	$328.21	$830.66	$1,158.87	$328.58	$830.66	$1,159.24	$0.37	0.0%
	16	7,200	$395.05	$949.32	$1,344.37	$395.48	$949.32	$1,344.80	$0.43	0.0%
	20	9,000	$528.75	$1,186.65	$1,715.40	$529.29	$1,186.65	$1,715.94	$0.54	0.0%
	24	10,800	$662.45	$1,423.98	$2,086.43	$663.10	$1,423.98	$2,087.08	$0.65	0.0%
	30	13,500	$863.00	$1,779.98	$2,642.98	$863.81	$1,779.98	$2,643.79	$0.81	0.0%
	40	18,000	$1,197.24	$2,373.30	$3,570.54	$1,198.32	$2,373.30	$3,571.62	$1.08	0.0%
	70	31,500	$2,199.98	$4,153.28	$6,353.26	$2,201.87	$4,153.28	$6,355.15	$1.89	0.0%
Avg	31	13,950	$896.42	$1,839.31	$2,735.73	$897.25	$1,839.31	$2,736.56	$0.83	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	8	3,600	$184.64	$474.66	$659.30	$184.86	$474.66	$659.52	$0.22	0.0%
	10	4,500	$217.95	$593.33	$811.28	$218.22	$593.33	$811.55	$0.27	0.0%
	12	5,400	$332.58	$711.99	$1,044.57	$332.90	$711.99	$1,044.89	$0.32	0.0%
	14	6,300	$447.23	$830.66	$1,277.89	$447.60	$830.66	$1,278.26	$0.37	0.0%
	16	7,200	$561.86	$949.32	$1,511.18	$562.29	$949.32	$1,511.61	$0.43	0.0%
	20	9,000	$791.14	$1,186.65	$1,977.79	$791.68	$1,186.65	$1,978.33	$0.54	0.0%
	24	10,800	$1,020.42	$1,423.98	$2,444.40	$1,021.07	$1,423.98	$2,445.05	$0.65	0.0%
	30	13,500	$1,364.35	$1,779.98	$3,144.33	$1,365.16	$1,779.98	$3,145.14	$0.81	0.0%
	40	18,000	$1,937.54	$2,373.30	$4,310.84	$1,938.62	$2,373.30	$4,311.92	$1.08	0.0%
	70	31,500	$3,657.15	$4,153.28	$7,810.43	$3,659.04	$4,153.28	$7,812.32	$1.89	0.0%
Avg	33	14,850	$1,536.30	$1,957.97	$3,494.27	$1,537.19	$1,957.97	$3,495.16	$0.89	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$18.00	$18.00	$ -
Distribution Demand <=10 kW - Winter	$0.00	$0.00	$ -
Distribution Demand >10 kW - Winter	$9.65	$9.65	$ -
Transmission Demand >10 kW - Winter	$7.54	$7.54	$ -
Distribution Demand <=10 kW - Summer	$0.00	$0.00	$ -
Distribution Demand >10 kW - Summer	$20.68	$20.68	$ -
Transmission Demand >10 kW - Summer	$19.99	$19.99	$ -
Distribution Energy - 1st 2000 kWh - Winter	$0.01827	$0.01827	$ -
Distribution Energy - next 150 hrs*kW - Winter	$0.01310	$0.01310	$ -
Distribution Energy - remainder kWh - Winter	$0.01119	$0.01119	$ -
Distribution Energy - 1st 2000 kWh - Summer	$0.02841	$0.02841	$ -
Distribution Energy - next 150 hrs*kW - Summer	$0.01487	$0.01487	$ -
Distribution Energy - remainder kWh - Summer	$0.01169	$0.01169	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 350

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	35,000	$2,725.55	$3,961.30	$6,686.85	$2,726.95	$3,961.30	$6,688.25	$1.40	0.0%
	250	87,500	$6,438.88	$9,903.25	$16,342.13	$6,442.38	$9,903.25	$16,345.63	$3.50	0.0%
	400	140,000	$10,152.20	$15,845.20	$25,997.40	$10,157.80	$15,845.20	$26,003.00	$5.60	0.0%
	550	192,500	$13,865.53	$21,787.15	$35,652.68	$13,873.23	$21,787.15	$35,660.38	$7.70	0.0%
	700	245,000	$17,578.85	$27,729.10	$45,307.95	$17,588.65	$27,729.10	$45,317.75	$9.80	0.0%
	1,000	350,000	$25,005.50	$39,613.00	$64,618.50	$25,019.50	$39,613.00	$64,632.50	$14.00	0.0%
	1,500	525,000	$37,383.25	$59,419.50	$96,802.75	$37,404.25	$59,419.50	$96,823.75	$21.00	0.0%
	2,500	875,000	$62,138.75	$99,032.50	$161,171.25	$62,173.75	$99,032.50	$161,206.25	$35.00	0.0%
	5,000	1,750,000	$124,027.50	$198,065.00	$322,092.50	$124,097.50	$198,065.00	$322,162.50	$70.00	0.0%
Avg	430	150,500	$10,894.87	$17,033.59	$27,928.46	$10,900.89	$17,033.59	$27,934.48	$6.02	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	35,000	$3,342.55	$3,961.30	$7,303.85	$3,343.95	$3,961.30	$7,305.25	$1.40	0.0%
	250	87,500	$7,981.38	$9,903.25	$17,884.63	$7,984.88	$9,903.25	$17,888.13	$3.50	0.0%
	400	140,000	$12,620.20	$15,845.20	$28,465.40	$12,625.80	$15,845.20	$28,471.00	$5.60	0.0%
	550	192,500	$17,259.03	$21,787.15	$39,046.18	$17,266.73	$21,787.15	$39,053.88	$7.70	0.0%
	700	245,000	$21,897.85	$27,729.10	$49,626.95	$21,907.65	$27,729.10	$49,636.75	$9.80	0.0%
	1,000	350,000	$31,175.50	$39,613.00	$70,788.50	$31,189.50	$39,613.00	$70,802.50	$14.00	0.0%
	1,500	525,000	$46,638.25	$59,419.50	$106,057.75	$46,659.25	$59,419.50	$106,078.75	$21.00	0.0%
	2,500	875,000	$77,563.75	$99,032.50	$176,596.25	$77,598.75	$99,032.50	$176,631.25	$35.00	0.0%
	5,000	1,750,000	$154,877.50	$198,065.00	$352,942.50	$154,947.50	$198,065.00	$353,012.50	$70.00	0.0%
Avg	506	177,100	$15,898.30	$20,044.18	$35,942.48	$15,905.39	$20,044.18	$35,949.57	$7.09	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$250.00	$250.00	$ -
Distribution Demand - Winter	$8.87	$8.87	$ -
Distribution Demand - Summer	$15.04	$15.04	$ -
Transmission Demand	$9.05	$9.05	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00024)	($0.00024)	$ -
Solar Massachusetts Renewable Target	$0.00037	$0.00037	$ -
Residential Assistance Adjustment Factor	$0.00203	$0.00203	$ -
Pension Adjustment Factor	$0.00030	$0.00030	$ -
Net Metering Recovery Surcharge	$0.00264	$0.00264	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00154	$0.00154	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00010)	($0.00010)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00032	$0.00032	$ -
Vegetation Management	$0.00053	$0.00053	$ -
Tax Act Credit Factor	($0.00056)	($0.00056)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11318	$0.11318	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 450

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	45,000	$2,920.85	$5,093.10	$8,013.95	$2,922.65	$5,093.10	$8,015.75	$1.80	0.0%
	250	112,500	$6,927.13	$12,732.75	$19,659.88	$6,931.63	$12,732.75	$19,664.38	$4.50	0.0%
	400	180,000	$10,933.40	$20,372.40	$31,305.80	$10,940.60	$20,372.40	$31,313.00	$7.20	0.0%
	550	247,500	$14,939.68	$28,012.05	$42,951.73	$14,949.58	$28,012.05	$42,961.63	$9.90	0.0%
	700	315,000	$18,945.95	$35,651.70	$54,597.65	$18,958.55	$35,651.70	$54,610.25	$12.60	0.0%
	1,000	450,000	$26,958.50	$50,931.00	$77,889.50	$26,976.50	$50,931.00	$77,907.50	$18.00	0.0%
	1,500	675,000	$40,312.75	$76,396.50	$116,709.25	$40,339.75	$76,396.50	$116,736.25	$27.00	0.0%
	2,500	1,125,000	$67,021.25	$127,327.50	$194,348.75	$67,066.25	$127,327.50	$194,393.75	$45.00	0.0%
	5,000	2,250,000	$133,792.50	$254,655.00	$388,447.50	$133,882.50	$254,655.00	$388,537.50	$90.00	0.0%
Avg	800	360,000	$21,616.80	$40,744.80	$62,361.60	$21,631.20	$40,744.80	$62,376.00	$14.40	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	45,000	$3,537.85	$5,093.10	$8,630.95	$3,539.65	$5,093.10	$8,632.75	$1.80	0.0%
	250	112,500	$8,469.63	$12,732.75	$21,202.38	$8,474.13	$12,732.75	$21,206.88	$4.50	0.0%
	400	180,000	$13,401.40	$20,372.40	$33,773.80	$13,408.60	$20,372.40	$33,781.00	$7.20	0.0%
	550	247,500	$18,333.18	$28,012.05	$46,345.23	$18,343.08	$28,012.05	$46,355.13	$9.90	0.0%
	700	315,000	$23,264.95	$35,651.70	$58,916.65	$23,277.55	$35,651.70	$58,929.25	$12.60	0.0%
	1,000	450,000	$33,128.50	$50,931.00	$84,059.50	$33,146.50	$50,931.00	$84,077.50	$18.00	0.0%
	1,500	675,000	$49,567.75	$76,396.50	$125,964.25	$49,594.75	$76,396.50	$125,991.25	$27.00	0.0%
	2,500	1,125,000	$82,446.25	$127,327.50	$209,773.75	$82,491.25	$127,327.50	$209,818.75	$45.00	0.0%
	5,000	2,250,000	$164,642.50	$254,655.00	$419,297.50	$164,732.50	$254,655.00	$419,387.50	$90.00	0.0%
Avg	1,060	477,000	$35,101.21	$53,986.86	$89,088.07	$35,120.29	$53,986.86	$89,107.15	$19.08	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$250.00	$250.00	$ -
Distribution Demand - Winter	$8.87	$8.87	$ -
Distribution Demand - Summer	$15.04	$15.04	$ -
Transmission Demand	$9.05	$9.05	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00024)	($0.00024)	$ -
Solar Massachusetts Renewable Target	$0.00037	$0.00037	$ -
Residential Assistance Adjustment Factor	$0.00203	$0.00203	$ -
Pension Adjustment Factor	$0.00030	$0.00030	$ -
Net Metering Recovery Surcharge	$0.00264	$0.00264	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00154	$0.00154	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00010)	($0.00010)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00032	$0.00032	$ -
Vegetation Management	$0.00053	$0.00053	$ -
Tax Act Credit Factor	($0.00056)	($0.00056)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11318	$0.11318	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 550

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	55,000	$3,116.15	$6,224.90	$9,341.05	$3,118.35	$6,224.90	$9,343.25	$2.20	0.0%
	250	137,500	$7,415.38	$15,562.25	$22,977.63	$7,420.88	$15,562.25	$22,983.13	$5.50	0.0%
	400	220,000	$11,714.60	$24,899.60	$36,614.20	$11,723.40	$24,899.60	$36,623.00	$8.80	0.0%
	550	302,500	$16,013.83	$34,236.95	$50,250.78	$16,025.93	$34,236.95	$50,262.88	$12.10	0.0%
	700	385,000	$20,313.05	$43,574.30	$63,887.35	$20,328.45	$43,574.30	$63,902.75	$15.40	0.0%
	1,000	550,000	$28,911.50	$62,249.00	$91,160.50	$28,933.50	$62,249.00	$91,182.50	$22.00	0.0%
	1,500	825,000	$43,242.25	$93,373.50	$136,615.75	$43,275.25	$93,373.50	$136,648.75	$33.00	0.0%
	2,500	1,375,000	$71,903.75	$155,622.50	$227,526.25	$71,958.75	$155,622.50	$227,581.25	$55.00	0.0%
	5,000	2,750,000	$143,557.50	$311,245.00	$454,802.50	$143,667.50	$311,245.00	$454,912.50	$110.00	0.0%
Avg	1,459	802,450	$42,067.13	$90,821.29	$132,888.42	$42,099.23	$90,821.29	$132,920.52	$32.10	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	55,000	$3,733.15	$6,224.90	$9,958.05	$3,735.35	$6,224.90	$9,960.25	$2.20	0.0%
	250	137,500	$8,957.88	$15,562.25	$24,520.13	$8,963.38	$15,562.25	$24,525.63	$5.50	0.0%
	400	220,000	$14,182.60	$24,899.60	$39,082.20	$14,191.40	$24,899.60	$39,091.00	$8.80	0.0%
	550	302,500	$19,407.33	$34,236.95	$53,644.28	$19,419.43	$34,236.95	$53,656.38	$12.10	0.0%
	700	385,000	$24,632.05	$43,574.30	$68,206.35	$24,647.45	$43,574.30	$68,221.75	$15.40	0.0%
	1,000	550,000	$35,081.50	$62,249.00	$97,330.50	$35,103.50	$62,249.00	$97,352.50	$22.00	0.0%
	1,500	825,000	$52,497.25	$93,373.50	$145,870.75	$52,530.25	$93,373.50	$145,903.75	$33.00	0.0%
	2,500	1,375,000	$87,328.75	$155,622.50	$242,951.25	$87,383.75	$155,622.50	$243,006.25	$55.00	0.0%
	5,000	2,750,000	$174,407.50	$311,245.00	$485,652.50	$174,517.50	$311,245.00	$485,762.50	$110.00	0.0%
Avg	2,101	1,155,550	$73,430.98	$130,785.15	$204,216.13	$73,477.20	$130,785.15	$204,262.35	$46.22	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$250.00	$250.00	$ -
Distribution Demand - Winter	$8.87	$8.87	$ -
Distribution Demand - Summer	$15.04	$15.04	$ -
Transmission Demand	$9.05	$9.05	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00024)	($0.00024)	$ -
Solar Massachusetts Renewable Target	$0.00037	$0.00037	$ -
Residential Assistance Adjustment Factor	$0.00203	$0.00203	$ -
Pension Adjustment Factor	$0.00030	$0.00030	$ -
Net Metering Recovery Surcharge	$0.00264	$0.00264	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00154	$0.00154	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00010)	($0.00010)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00032	$0.00032	$ -
Vegetation Management	$0.00053	$0.00053	$ -
Tax Act Credit Factor	($0.00056)	($0.00056)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11318	$0.11318	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 350

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	35,000	$2,725.55	$3,708.25	$6,433.80	$2,726.95	$3,708.25	$6,435.20	$1.40	0.0%
	250	87,500	$6,438.88	$9,270.63	$15,709.51	$6,442.38	$9,270.63	$15,713.01	$3.50	0.0%
	400	140,000	$10,152.20	$14,833.00	$24,985.20	$10,157.80	$14,833.00	$24,990.80	$5.60	0.0%
	550	192,500	$13,865.53	$20,395.38	$34,260.91	$13,873.23	$20,395.38	$34,268.61	$7.70	0.0%
	700	245,000	$17,578.85	$25,957.75	$43,536.60	$17,588.65	$25,957.75	$43,546.40	$9.80	0.0%
	1,000	350,000	$25,005.50	$37,082.50	$62,088.00	$25,019.50	$37,082.50	$62,102.00	$14.00	0.0%
	1,500	525,000	$37,383.25	$55,623.75	$93,007.00	$37,404.25	$55,623.75	$93,028.00	$21.00	0.0%
	2,500	875,000	$62,138.75	$92,706.25	$154,845.00	$62,173.75	$92,706.25	$154,880.00	$35.00	0.0%
	5,000	1,750,000	$124,027.50	$185,412.50	$309,440.00	$124,097.50	$185,412.50	$309,510.00	$70.00	0.0%
Avg	430	150,500	$10,894.87	$15,945.48	$26,840.35	$10,900.89	$15,945.48	$26,846.37	$6.02	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	35,000	$3,342.55	$3,708.25	$7,050.80	$3,343.95	$3,708.25	$7,052.20	$1.40	0.0%
	250	87,500	$7,981.38	$9,270.63	$17,252.01	$7,984.88	$9,270.63	$17,255.51	$3.50	0.0%
	400	140,000	$12,620.20	$14,833.00	$27,453.20	$12,625.80	$14,833.00	$27,458.80	$5.60	0.0%
	550	192,500	$17,259.03	$20,395.38	$37,654.41	$17,266.73	$20,395.38	$37,662.11	$7.70	0.0%
	700	245,000	$21,897.85	$25,957.75	$47,855.60	$21,907.65	$25,957.75	$47,865.40	$9.80	0.0%
	1,000	350,000	$31,175.50	$37,082.50	$68,258.00	$31,189.50	$37,082.50	$68,272.00	$14.00	0.0%
	1,500	525,000	$46,638.25	$55,623.75	$102,262.00	$46,659.25	$55,623.75	$102,283.00	$21.00	0.0%
	2,500	875,000	$77,563.75	$92,706.25	$170,270.00	$77,598.75	$92,706.25	$170,305.00	$35.00	0.0%
	5,000	1,750,000	$154,877.50	$185,412.50	$340,290.00	$154,947.50	$185,412.50	$340,360.00	$70.00	0.0%
Avg	506	177,100	$15,898.30	$18,763.75	$34,662.05	$15,905.39	$18,763.75	$34,669.14	$7.09	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$250.00	$250.00	$ -
Distribution Demand - Winter	$8.87	$8.87	$ -
Distribution Demand - Summer	$15.04	$15.04	$ -
Transmission Demand	$9.05	$9.05	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00024)	($0.00024)	$ -
Solar Massachusetts Renewable Target	$0.00037	$0.00037	$ -
Residential Assistance Adjustment Factor	$0.00203	$0.00203	$ -
Pension Adjustment Factor	$0.00030	$0.00030	$ -
Net Metering Recovery Surcharge	$0.00264	$0.00264	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00154	$0.00154	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00010)	($0.00010)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00032	$0.00032	$ -
Vegetation Management	$0.00053	$0.00053	$ -
Tax Act Credit Factor	($0.00056)	($0.00056)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.10595	$0.10595	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 450

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	45,000	$2,920.85	$4,767.75	$7,688.60	$2,922.65	$4,767.75	$7,690.40	$1.80	0.0%
	250	112,500	$6,927.13	$11,919.38	$18,846.51	$6,931.63	$11,919.38	$18,851.01	$4.50	0.0%
	400	180,000	$10,933.40	$19,071.00	$30,004.40	$10,940.60	$19,071.00	$30,011.60	$7.20	0.0%
	550	247,500	$14,939.68	$26,222.63	$41,162.31	$14,949.58	$26,222.63	$41,172.21	$9.90	0.0%
	700	315,000	$18,945.95	$33,374.25	$52,320.20	$18,958.55	$33,374.25	$52,332.80	$12.60	0.0%
	1,000	450,000	$26,958.50	$47,677.50	$74,636.00	$26,976.50	$47,677.50	$74,654.00	$18.00	0.0%
	1,500	675,000	$40,312.75	$71,516.25	$111,829.00	$40,339.75	$71,516.25	$111,856.00	$27.00	0.0%
	2,500	1,125,000	$67,021.25	$119,193.75	$186,215.00	$67,066.25	$119,193.75	$186,260.00	$45.00	0.0%
	5,000	2,250,000	$133,792.50	$238,387.50	$372,180.00	$133,882.50	$238,387.50	$372,270.00	$90.00	0.0%
Avg	800	360,000	$21,616.80	$38,142.00	$59,758.80	$21,631.20	$38,142.00	$59,773.20	$14.40	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	45,000	$3,537.85	$4,767.75	$8,305.60	$3,539.65	$4,767.75	$8,307.40	$1.80	0.0%
	250	112,500	$8,469.63	$11,919.38	$20,389.01	$8,474.13	$11,919.38	$20,393.51	$4.50	0.0%
	400	180,000	$13,401.40	$19,071.00	$32,472.40	$13,408.60	$19,071.00	$32,479.60	$7.20	0.0%
	550	247,500	$18,333.18	$26,222.63	$44,555.81	$18,343.08	$26,222.63	$44,565.71	$9.90	0.0%
	700	315,000	$23,264.95	$33,374.25	$56,639.20	$23,277.55	$33,374.25	$56,651.80	$12.60	0.0%
	1,000	450,000	$33,128.50	$47,677.50	$80,806.00	$33,146.50	$47,677.50	$80,824.00	$18.00	0.0%
	1,500	675,000	$49,567.75	$71,516.25	$121,084.00	$49,594.75	$71,516.25	$121,111.00	$27.00	0.0%
	2,500	1,125,000	$82,446.25	$119,193.75	$201,640.00	$82,491.25	$119,193.75	$201,685.00	$45.00	0.0%
	5,000	2,250,000	$164,642.50	$238,387.50	$403,030.00	$164,732.50	$238,387.50	$403,120.00	$90.00	0.0%
Avg	1,060	477,000	$35,101.21	$50,538.15	$85,639.36	$35,120.29	$50,538.15	$85,658.44	$19.08	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$250.00	$250.00	$ -
Distribution Demand - Winter	$8.87	$8.87	$ -
Distribution Demand - Summer	$15.04	$15.04	$ -
Transmission Demand	$9.05	$9.05	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00024)	($0.00024)	$ -
Solar Massachusetts Renewable Target	$0.00037	$0.00037	$ -
Residential Assistance Adjustment Factor	$0.00203	$0.00203	$ -
Pension Adjustment Factor	$0.00030	$0.00030	$ -
Net Metering Recovery Surcharge	$0.00264	$0.00264	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00154	$0.00154	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00010)	($0.00010)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00032	$0.00032	$ -
Vegetation Management	$0.00053	$0.00053	$ -
Tax Act Credit Factor	($0.00056)	($0.00056)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.10595	$0.10595	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 550

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	55,000	$3,116.15	$5,827.25	$8,943.40	$3,118.35	$5,827.25	$8,945.60	$2.20	0.0%
	250	137,500	$7,415.38	$14,568.13	$21,983.51	$7,420.88	$14,568.13	$21,989.01	$5.50	0.0%
	400	220,000	$11,714.60	$23,309.00	$35,023.60	$11,723.40	$23,309.00	$35,032.40	$8.80	0.0%
	550	302,500	$16,013.83	$32,049.88	$48,063.71	$16,025.93	$32,049.88	$48,075.81	$12.10	0.0%
	700	385,000	$20,313.05	$40,790.75	$61,103.80	$20,328.45	$40,790.75	$61,119.20	$15.40	0.0%
	1,000	550,000	$28,911.50	$58,272.50	$87,184.00	$28,933.50	$58,272.50	$87,206.00	$22.00	0.0%
	1,500	825,000	$43,242.25	$87,408.75	$130,651.00	$43,275.25	$87,408.75	$130,684.00	$33.00	0.0%
	2,500	1,375,000	$71,903.75	$145,681.25	$217,585.00	$71,958.75	$145,681.25	$217,640.00	$55.00	0.0%
	5,000	2,750,000	$143,557.50	$291,362.50	$434,920.00	$143,667.50	$291,362.50	$435,030.00	$110.00	0.0%
Avg	1,459	802,450	$42,067.13	$85,019.58	$127,086.71	$42,099.23	$85,019.58	$127,118.81	$32.10	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	100	55,000	$3,733.15	$5,827.25	$9,560.40	$3,735.35	$5,827.25	$9,562.60	$2.20	0.0%
	250	137,500	$8,957.88	$14,568.13	$23,526.01	$8,963.38	$14,568.13	$23,531.51	$5.50	0.0%
	400	220,000	$14,182.60	$23,309.00	$37,491.60	$14,191.40	$23,309.00	$37,500.40	$8.80	0.0%
	550	302,500	$19,407.33	$32,049.88	$51,457.21	$19,419.43	$32,049.88	$51,469.31	$12.10	0.0%
	700	385,000	$24,632.05	$40,790.75	$65,422.80	$24,647.45	$40,790.75	$65,438.20	$15.40	0.0%
	1,000	550,000	$35,081.50	$58,272.50	$93,354.00	$35,103.50	$58,272.50	$93,376.00	$22.00	0.0%
	1,500	825,000	$52,497.25	$87,408.75	$139,906.00	$52,530.25	$87,408.75	$139,939.00	$33.00	0.0%
	2,500	1,375,000	$87,328.75	$145,681.25	$233,010.00	$87,383.75	$145,681.25	$233,065.00	$55.00	0.0%
	5,000	2,750,000	$174,407.50	$291,362.50	$465,770.00	$174,517.50	$291,362.50	$465,880.00	$110.00	0.0%
Avg	2,101	1,155,550	$73,430.98	$122,430.52	$195,861.50	$73,477.20	$122,430.52	$195,907.72	$46.22	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$250.00	$250.00	$ -
Distribution Demand - Winter	$8.87	$8.87	$ -
Distribution Demand - Summer	$15.04	$15.04	$ -
Transmission Demand	$9.05	$9.05	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00024)	($0.00024)	$ -
Solar Massachusetts Renewable Target	$0.00037	$0.00037	$ -
Residential Assistance Adjustment Factor	$0.00203	$0.00203	$ -
Pension Adjustment Factor	$0.00030	$0.00030	$ -
Net Metering Recovery Surcharge	$0.00264	$0.00264	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00154	$0.00154	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00010)	($0.00010)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00032	$0.00032	$ -
Vegetation Management	$0.00053	$0.00053	$ -
Tax Act Credit Factor	($0.00056)	($0.00056)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.10595	$0.10595	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Current Monthly Bill (Winter)			Proposed Monthly Bill (Winter)			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		1	$10.10	$0.13	$10.23	$10.10	$0.13	$10.23	$0.00	0.0%
		75	$17.16	$9.89	$27.05	$17.17	$9.89	$27.06	$0.01	0.0%
		100	$19.55	$13.19	$32.74	$19.56	$13.19	$32.75	$0.01	0.0%
		200	$29.09	$26.37	$55.46	$29.11	$26.37	$55.48	$0.02	0.0%
		500	$57.73	$65.93	$123.66	$57.78	$65.93	$123.71	$0.05	0.0%
		1,000	$105.46	$131.85	$237.31	$105.56	$131.85	$237.41	$0.10	0.0%
	Avg	509	$58.59	$67.11	$125.70	$58.64	$67.11	$125.75	$0.05	0.0%

		Monthly	Current Monthly Bill (Summer)			Proposed Monthly Bill (Summer)			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		1	$10.11	$0.13	$10.24	$10.11	$0.13	$10.24	$0.00	0.0%
		75	$18.56	$9.89	$28.45	$18.57	$9.89	$28.46	$0.01	0.0%
		100	$21.41	$13.19	$34.60	$21.42	$13.19	$34.61	$0.01	0.0%
		200	$32.83	$26.37	$59.20	$32.85	$26.37	$59.22	$0.02	0.0%
		500	$67.07	$65.93	$133.00	$67.12	$65.93	$133.05	$0.05	0.0%
		1,000	$124.14	$131.85	$255.99	$124.24	$131.85	$256.09	$0.10	0.0%
	Avg	287	$42.76	$37.84	$80.60	$42.79	$37.84	$80.63	$0.03	0.0%

		Current Rates	Proposed Rates	Change
	Customer Charge	$10.00	$10.00	$ -
	Distribution Energy Peak - Winter	$0.07269	$0.07269	$ -
	Distribution Energy Off Peak - Winter	$0.01853	$0.01853	$ -
	Distribution Energy Peak - Summer	$0.15506	$0.15506	$ -
	Distribution Energy Off Peak - Summer	$0.02044	$0.02044	$ -
	Revenue Decoupling	($0.00066)	($0.00066)	$ -
	Solar Massachusetts Renewable Target	$0.00101	$0.00101	$ -
	Residential Assistance Adjustment Factor	$0.00556	$0.00556	$ -
	Pension Adjustment Factor	$0.00097	$0.00097	$ -
	Net Metering Recovery Surcharge	$0.00725	$0.00725	$ -
	Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
	AG Consulting Expense	$0.00001	$0.00001	$ -
	Storm Cost Recovery Adjustment Factor	$0.00421	$0.00421	$ -
	Storm Reserve Adjustment	$0.00000	$0.00000	$ -
	Basic Service Cost True Up Factor	($0.00028)	($0.00028)	$ -
	Solar Program Cost Adjustment Factor	$0.00005	$0.00005	$ -
	Solar Expansion Cost Recovery Factor	$0.00087	$0.00087	$ -
	Vegetation Management	$0.00173	$0.00173	$ -
	Tax Act Credit Factor	($0.00154)	($0.00154)	$ -
	Grid Modernization	$0.00000	$0.00010	$0.00010
	Transition	($0.00052)	($0.00052)	$ -
	Transmission Energy Peak - Winter	$0.07461	$0.07461	$ -
	Transmission Energy Off Peak - Winter	$0.00000	$0.00000	$ -
	Transmission Energy Peak - Summer	$0.07863	$0.07863	$ -
	Transmission Energy Off Peak - Summer	$0.00000	$0.00000	$ -
	Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
	System Benefits Charge	$0.00250	$0.00250	$ -
	Renewable Energy Charge	$0.00050	$0.00050	$ -
	Basic Service Charge	$0.13185	$0.13185	$ -

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

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 350

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	17,500	$1,410.88	$1,980.65	$3,391.53	$1,411.93	$1,980.65	$3,392.58	$1.05	0.0%
	100	35,000	$2,794.75	$3,961.30	$6,756.05	$2,796.85	$3,961.30	$6,758.15	$2.10	0.0%
	150	52,500	$4,178.63	$5,941.95	$10,120.58	$4,181.78	$5,941.95	$10,123.73	$3.15	0.0%
	200	70,000	$5,645.50	$7,922.60	$13,568.10	$5,649.70	$7,922.60	$13,572.30	$4.20	0.0%
	250	87,500	$7,029.38	$9,903.25	$16,932.63	$7,034.63	$9,903.25	$16,937.88	$5.25	0.0%
	300	105,000	$8,413.25	$11,883.90	$20,297.15	$8,419.55	$11,883.90	$20,303.45	$6.30	0.0%
	500	175,000	$13,998.75	$19,806.50	$33,805.25	$14,009.25	$19,806.50	$33,815.75	$10.50	0.0%
	1,000	350,000	$27,837.50	$39,613.00	$67,450.50	$27,858.50	$39,613.00	$67,471.50	$21.00	0.0%
Avg	201	70,350	$5,673.18	$7,962.21	$13,635.39	$5,677.40	$7,962.21	$13,639.61	$4.22	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	17,500	$1,843.38	$1,980.65	$3,824.03	$1,844.43	$1,980.65	$3,825.08	$1.05	0.0%
	100	35,000	$3,659.75	$3,961.30	$7,621.05	$3,661.85	$3,961.30	$7,623.15	$2.10	0.0%
	150	52,500	$5,476.13	$5,941.95	$11,418.08	$5,479.28	$5,941.95	$11,421.23	$3.15	0.0%
	200	70,000	$7,375.50	$7,922.60	$15,298.10	$7,379.70	$7,922.60	$15,302.30	$4.20	0.0%
	250	87,500	$9,191.88	$9,903.25	$19,095.13	$9,197.13	$9,903.25	$19,100.38	$5.25	0.0%
	300	105,000	$11,008.25	$11,883.90	$22,892.15	$11,014.55	$11,883.90	$22,898.45	$6.30	0.0%
	500	175,000	$18,323.75	$19,806.50	$38,130.25	$18,334.25	$19,806.50	$38,140.75	$10.50	0.0%
	1,000	350,000	$36,487.50	$39,613.00	$76,100.50	$36,508.50	$39,613.00	$76,121.50	$21.00	0.0%
Avg	246	86,100	$9,046.57	$9,744.80	$18,791.37	$9,051.73	$9,744.80	$18,796.53	$5.16	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge kW <=150	$27.00	$27.00	$ -
Customer Charge 150 < kW <= 300	$110.00	$110.00	$ -
Customer Charge 300 < kW <= 1000	$160.00	$160.00	$ -
Customer Charge kW > 1000	$360.00	$360.00	$ -
Distribution Demand - Winter	$11.46	$11.46	$ -
Distribution Demand - Summer	$20.11	$20.11	$ -
Transmission Demand	$7.73	$7.73	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11318	$0.11318	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 450

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	22,500	$1,532.13	$2,546.55	$4,078.68	$1,533.48	$2,546.55	$4,080.03	$1.35	0.0%
	100	45,000	$3,037.25	$5,093.10	$8,130.35	$3,039.95	$5,093.10	$8,133.05	$2.70	0.0%
	150	67,500	$4,542.38	$7,639.65	$12,182.03	$4,546.43	$7,639.65	$12,186.08	$4.05	0.0%
	200	90,000	$6,130.50	$10,186.20	$16,316.70	$6,135.90	$10,186.20	$16,322.10	$5.40	0.0%
	250	112,500	$7,635.63	$12,732.75	$20,368.38	$7,642.38	$12,732.75	$20,375.13	$6.75	0.0%
	300	135,000	$9,140.75	$15,279.30	$24,420.05	$9,148.85	$15,279.30	$24,428.15	$8.10	0.0%
	500	225,000	$15,211.25	$25,465.50	$40,676.75	$15,224.75	$25,465.50	$40,690.25	$13.50	0.0%
	1,000	450,000	$30,262.50	$50,931.00	$81,193.50	$30,289.50	$50,931.00	$81,220.50	$27.00	0.0%
Avg	281	126,450	$8,568.80	$14,311.61	$22,880.41	$8,576.39	$14,311.61	$22,888.00	$7.59	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	22,500	$1,964.63	$2,546.55	$4,511.18	$1,965.98	$2,546.55	$4,512.53	$1.35	0.0%
	100	45,000	$3,902.25	$5,093.10	$8,995.35	$3,904.95	$5,093.10	$8,998.05	$2.70	0.0%
	150	67,500	$5,839.88	$7,639.65	$13,479.53	$5,843.93	$7,639.65	$13,483.58	$4.05	0.0%
	200	90,000	$7,860.50	$10,186.20	$18,046.70	$7,865.90	$10,186.20	$18,052.10	$5.40	0.0%
	250	112,500	$9,798.13	$12,732.75	$22,530.88	$9,804.88	$12,732.75	$22,537.63	$6.75	0.0%
	300	135,000	$11,735.75	$15,279.30	$27,015.05	$11,743.85	$15,279.30	$27,023.15	$8.10	0.0%
	500	225,000	$19,536.25	$25,465.50	$45,001.75	$19,549.75	$25,465.50	$45,015.25	$13.50	0.0%
	1,000	450,000	$38,912.50	$50,931.00	$89,843.50	$38,939.50	$50,931.00	$89,870.50	$27.00	0.0%
Avg	319	143,550	$12,522.05	$16,246.99	$28,769.04	$12,530.66	$16,246.99	$28,777.65	$8.61	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge kW <=150	$27.00	$27.00	$ -
Customer Charge 150 < kW <= 300	$110.00	$110.00	$ -
Customer Charge 300 < kW <= 1000	$160.00	$160.00	$ -
Customer Charge kW > 1000	$360.00	$360.00	$ -
Distribution Demand - Winter	$11.46	$11.46	$ -
Distribution Demand - Summer	$20.11	$20.11	$ -
Transmission Demand	$7.73	$7.73	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11318	$0.11318	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 550

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	27,500	$1,653.38	$3,112.45	$4,765.83	$1,655.03	$3,112.45	$4,767.48	$1.65	0.0%
	100	55,000	$3,279.75	$6,224.90	$9,504.65	$3,283.05	$6,224.90	$9,507.95	$3.30	0.0%
	150	82,500	$4,906.13	$9,337.35	$14,243.48	$4,911.08	$9,337.35	$14,248.43	$4.95	0.0%
	200	110,000	$6,615.50	$12,449.80	$19,065.30	$6,622.10	$12,449.80	$19,071.90	$6.60	0.0%
	250	137,500	$8,241.88	$15,562.25	$23,804.13	$8,250.13	$15,562.25	$23,812.38	$8.25	0.0%
	300	165,000	$9,868.25	$18,674.70	$28,542.95	$9,878.15	$18,674.70	$28,552.85	$9.90	0.0%
	500	275,000	$16,423.75	$31,124.50	$47,548.25	$16,440.25	$31,124.50	$47,564.75	$16.50	0.0%
	1,000	550,000	$32,687.50	$62,249.00	$94,936.50	$32,720.50	$62,249.00	$94,969.50	$33.00	0.0%
Avg	299	164,450	$9,835.72	$18,612.45	$28,448.17	$9,845.59	$18,612.45	$28,458.04	$9.87	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	27,500	$2,085.88	$3,112.45	$5,198.33	$2,087.53	$3,112.45	$5,199.98	$1.65	0.0%
	100	55,000	$4,144.75	$6,224.90	$10,369.65	$4,148.05	$6,224.90	$10,372.95	$3.30	0.0%
	150	82,500	$6,203.63	$9,337.35	$15,540.98	$6,208.58	$9,337.35	$15,545.93	$4.95	0.0%
	200	110,000	$8,345.50	$12,449.80	$20,795.30	$8,352.10	$12,449.80	$20,801.90	$6.60	0.0%
	250	137,500	$10,404.38	$15,562.25	$25,966.63	$10,412.63	$15,562.25	$25,974.88	$8.25	0.0%
	300	165,000	$12,463.25	$18,674.70	$31,137.95	$12,473.15	$18,674.70	$31,147.85	$9.90	0.0%
	500	275,000	$20,748.75	$31,124.50	$51,873.25	$20,765.25	$31,124.50	$51,889.75	$16.50	0.0%
	1,000	550,000	$41,337.50	$62,249.00	$103,586.50	$41,370.50	$62,249.00	$103,619.50	$33.00	0.0%
Avg	352	193,600	$14,654.48	$21,911.65	$36,566.13	$14,666.10	$21,911.65	$36,577.75	$11.62	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge kW <=150	$27.00	$27.00	$ -
Customer Charge 150 < kW <= 300	$110.00	$110.00	$ -
Customer Charge 300 < kW <= 1000	$160.00	$160.00	$ -
Customer Charge kW > 1000	$360.00	$360.00	$ -
Distribution Demand - Winter	$11.46	$11.46	$ -
Distribution Demand - Summer	$20.11	$20.11	$ -
Transmission Demand	$7.73	$7.73	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11318	$0.11318	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 350

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	17,500	$1,410.88	$1,854.13	$3,265.01	$1,411.93	$1,854.13	$3,266.06	$1.05	0.0%
	100	35,000	$2,794.75	$3,708.25	$6,503.00	$2,796.85	$3,708.25	$6,505.10	$2.10	0.0%
	150	52,500	$4,178.63	$5,562.38	$9,741.01	$4,181.78	$5,562.38	$9,744.16	$3.15	0.0%
	200	70,000	$5,645.50	$7,416.50	$13,062.00	$5,649.70	$7,416.50	$13,066.20	$4.20	0.0%
	250	87,500	$7,029.38	$9,270.63	$16,300.01	$7,034.63	$9,270.63	$16,305.26	$5.25	0.0%
	300	105,000	$8,413.25	$11,124.75	$19,538.00	$8,419.55	$11,124.75	$19,544.30	$6.30	0.0%
	500	175,000	$13,998.75	$18,541.25	$32,540.00	$14,009.25	$18,541.25	$32,550.50	$10.50	0.0%
	1,000	350,000	$27,837.50	$37,082.50	$64,920.00	$27,858.50	$37,082.50	$64,941.00	$21.00	0.0%
Avg	201	70,350	$5,673.18	$7,453.58	$13,126.76	$5,677.40	$7,453.58	$13,130.98	$4.22	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	17,500	$1,843.38	$1,854.13	$3,697.51	$1,844.43	$1,854.13	$3,698.56	$1.05	0.0%
	100	35,000	$3,659.75	$3,708.25	$7,368.00	$3,661.85	$3,708.25	$7,370.10	$2.10	0.0%
	150	52,500	$5,476.13	$5,562.38	$11,038.51	$5,479.28	$5,562.38	$11,041.66	$3.15	0.0%
	200	70,000	$7,375.50	$7,416.50	$14,792.00	$7,379.70	$7,416.50	$14,796.20	$4.20	0.0%
	250	87,500	$9,191.88	$9,270.63	$18,462.51	$9,197.13	$9,270.63	$18,467.76	$5.25	0.0%
	300	105,000	$11,008.25	$11,124.75	$22,133.00	$11,014.55	$11,124.75	$22,139.30	$6.30	0.0%
	500	175,000	$18,323.75	$18,541.25	$36,865.00	$18,334.25	$18,541.25	$36,875.50	$10.50	0.0%
	1,000	350,000	$36,487.50	$37,082.50	$73,570.00	$36,508.50	$37,082.50	$73,591.00	$21.00	0.0%
Avg	246	86,100	$9,046.57	$9,122.30	$18,168.87	$9,051.73	$9,122.30	$18,174.03	$5.16	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge kW <=150	$27.00	$27.00	$ -
Customer Charge 150 < kW <= 300	$110.00	$110.00	$ -
Customer Charge 300 < kW <= 1000	$160.00	$160.00	$ -
Customer Charge kW > 1000	$360.00	$360.00	$ -
Distribution Demand - Winter	$11.46	$11.46	$ -
Distribution Demand - Summer	$20.11	$20.11	$ -
Transmission Demand	$7.73	$7.73	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.10595	$0.10595	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 450

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	22,500	$1,532.13	$2,383.88	$3,916.01	$1,533.48	$2,383.88	$3,917.36	$1.35	0.0%
	100	45,000	$3,037.25	$4,767.75	$7,805.00	$3,039.95	$4,767.75	$7,807.70	$2.70	0.0%
	150	67,500	$4,542.38	$7,151.63	$11,694.01	$4,546.43	$7,151.63	$11,698.06	$4.05	0.0%
	200	90,000	$6,130.50	$9,535.50	$15,666.00	$6,135.90	$9,535.50	$15,671.40	$5.40	0.0%
	250	112,500	$7,635.63	$11,919.38	$19,555.01	$7,642.38	$11,919.38	$19,561.76	$6.75	0.0%
	300	135,000	$9,140.75	$14,303.25	$23,444.00	$9,148.85	$14,303.25	$23,452.10	$8.10	0.0%
	500	225,000	$15,211.25	$23,838.75	$39,050.00	$15,224.75	$23,838.75	$39,063.50	$13.50	0.0%
	1,000	450,000	$30,262.50	$47,677.50	$77,940.00	$30,289.50	$47,677.50	$77,967.00	$27.00	0.0%
Avg	281	126,450	$8,568.80	$13,397.38	$21,966.18	$8,576.39	$13,397.38	$21,973.77	$7.59	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	22,500	$1,964.63	$2,383.88	$4,348.51	$1,965.98	$2,383.88	$4,349.86	$1.35	0.0%
	100	45,000	$3,902.25	$4,767.75	$8,670.00	$3,904.95	$4,767.75	$8,672.70	$2.70	0.0%
	150	67,500	$5,839.88	$7,151.63	$12,991.51	$5,843.93	$7,151.63	$12,995.56	$4.05	0.0%
	200	90,000	$7,860.50	$9,535.50	$17,396.00	$7,865.90	$9,535.50	$17,401.40	$5.40	0.0%
	250	112,500	$9,798.13	$11,919.38	$21,717.51	$9,804.88	$11,919.38	$21,724.26	$6.75	0.0%
	300	135,000	$11,735.75	$14,303.25	$26,039.00	$11,743.85	$14,303.25	$26,047.10	$8.10	0.0%
	500	225,000	$19,536.25	$23,838.75	$43,375.00	$19,549.75	$23,838.75	$43,388.50	$13.50	0.0%
	1,000	450,000	$38,912.50	$47,677.50	$86,590.00	$38,939.50	$47,677.50	$86,617.00	$27.00	0.0%
Avg	319	143,550	$12,522.05	$15,209.12	$27,731.17	$12,530.66	$15,209.12	$27,739.78	$8.61	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge kW <=150	$27.00	$27.00	$ -
Customer Charge 150 < kW <= 300	$110.00	$110.00	$ -
Customer Charge 300 < kW <= 1000	$160.00	$160.00	$ -
Customer Charge kW > 1000	$360.00	$360.00	$ -
Distribution Demand - Winter	$11.46	$11.46	$ -
Distribution Demand - Summer	$20.11	$20.11	$ -
Transmission Demand	$7.73	$7.73	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.10595	$0.10595	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

Hours Use: 550

	Monthly kW	Monthly kWh	Current Monthly Bill (Winter) Delivery	Supplier	Total	Proposed Monthly Bill (Winter) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	27,500	$1,653.38	$2,913.63	$4,567.01	$1,655.03	$2,913.63	$4,568.66	$1.65	0.0%
	100	55,000	$3,279.75	$5,827.25	$9,107.00	$3,283.05	$5,827.25	$9,110.30	$3.30	0.0%
	150	82,500	$4,906.13	$8,740.88	$13,647.01	$4,911.08	$8,740.88	$13,651.96	$4.95	0.0%
	200	110,000	$6,615.50	$11,654.50	$18,270.00	$6,622.10	$11,654.50	$18,276.60	$6.60	0.0%
	250	137,500	$8,241.88	$14,568.13	$22,810.01	$8,250.13	$14,568.13	$22,818.26	$8.25	0.0%
	300	165,000	$9,868.25	$17,481.75	$27,350.00	$9,878.15	$17,481.75	$27,359.90	$9.90	0.0%
	500	275,000	$16,423.75	$29,136.25	$45,560.00	$16,440.25	$29,136.25	$45,576.50	$16.50	0.0%
	1,000	550,000	$32,687.50	$58,272.50	$90,960.00	$32,720.50	$58,272.50	$90,993.00	$33.00	0.0%
Avg	299	164,450	$9,835.72	$17,423.48	$27,259.20	$9,845.59	$17,423.48	$27,269.07	$9.87	0.0%

	Monthly kW	Monthly kWh	Current Monthly Bill (Summer) Delivery	Supplier	Total	Proposed Monthly Bill (Summer) Delivery	Supplier	Total	Total Bill Impact Change	% Change
	50	27,500	$2,085.88	$2,913.63	$4,999.51	$2,087.53	$2,913.63	$5,001.16	$1.65	0.0%
	100	55,000	$4,144.75	$5,827.25	$9,972.00	$4,148.05	$5,827.25	$9,975.30	$3.30	0.0%
	150	82,500	$6,203.63	$8,740.88	$14,944.51	$6,208.58	$8,740.88	$14,949.46	$4.95	0.0%
	200	110,000	$8,345.50	$11,654.50	$20,000.00	$8,352.10	$11,654.50	$20,006.60	$6.60	0.0%
	250	137,500	$10,404.38	$14,568.13	$24,972.51	$10,412.63	$14,568.13	$24,980.76	$8.25	0.0%
	300	165,000	$12,463.25	$17,481.75	$29,945.00	$12,473.15	$17,481.75	$29,954.90	$9.90	0.0%
	500	275,000	$20,748.75	$29,136.25	$49,885.00	$20,765.25	$29,136.25	$49,901.50	$16.50	0.0%
	1,000	550,000	$41,337.50	$58,272.50	$99,610.00	$41,370.50	$58,272.50	$99,643.00	$33.00	0.0%
Avg	352	193,600	$14,654.48	$20,511.92	$35,166.40	$14,666.10	$20,511.92	$35,178.02	$11.62	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge kW <=150	$27.00	$27.00	$ -
Customer Charge 150 < kW <= 300	$110.00	$110.00	$ -
Customer Charge 300 < kW <= 1000	$160.00	$160.00	$ -
Customer Charge kW > 1000	$360.00	$360.00	$ -
Distribution Demand - Winter	$11.46	$11.46	$ -
Distribution Demand - Summer	$20.11	$20.11	$ -
Transmission Demand	$7.73	$7.73	$ -
Distribution Energy	$0.00000	$0.00000	$ -
Revenue Decoupling	($0.00041)	($0.00041)	$ -
Solar Massachusetts Renewable Target	$0.00063	$0.00063	$ -
Residential Assistance Adjustment Factor	$0.00346	$0.00346	$ -
Pension Adjustment Factor	$0.00047	$0.00047	$ -
Net Metering Recovery Surcharge	$0.00451	$0.00451	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00262	$0.00262	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00054	$0.00054	$ -
Vegetation Management	$0.00083	$0.00083	$ -
Tax Act Credit Factor	($0.00095)	($0.00095)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.10595	$0.10595	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		25	$7.00	$3.30	$10.30	$7.00	$3.30	$10.30	$0.00	0.0%
		50	$9.00	$6.59	$15.59	$9.00	$6.59	$15.59	$0.00	0.0%
		100	$13.00	$13.19	$26.19	$13.00	$13.19	$26.19	$0.00	0.0%
		150	$16.99	$19.78	$36.77	$17.00	$19.78	$36.78	$0.01	0.0%
		250	$24.99	$32.96	$57.95	$25.00	$32.96	$57.96	$0.01	0.0%
		400	$36.98	$52.74	$89.72	$37.00	$52.74	$89.74	$0.02	0.0%
		600	$52.98	$79.11	$132.09	$53.01	$79.11	$132.12	$0.03	0.0%
		900	$76.96	$118.67	$195.63	$77.01	$118.67	$195.68	$0.05	0.0%
		1,500	$124.94	$197.78	$322.72	$125.02	$197.78	$322.80	$0.08	0.0%
		2,500	$204.90	$329.63	$534.53	$205.03	$329.63	$534.66	$0.13	0.0%
	Avg	593	$52.42	$78.19	$130.61	$52.45	$78.19	$130.64	$0.03	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$5.00	$5.00	$ -
Distribution Energy	$0.03438	$0.03438	$ -
Revenue Decoupling	($0.00032)	($0.00032)	$ -
Solar Massachusetts Renewable Target	$0.00050	$0.00050	$ -
Residential Assistance Adjustment Factor	$0.00273	$0.00273	$ -
Pension Adjustment Factor	$0.00054	$0.00054	$ -
Net Metering Recovery Surcharge	$0.00356	$0.00356	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00207	$0.00207	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00014)	($0.00014)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00043	$0.00043	$ -
Vegetation Management	$0.00097	$0.00097	$ -
Tax Act Credit Factor	($0.00075)	($0.00075)	$ -
Grid Modernization	$0.00000	$0.00005	$0.00005
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02328	$0.02328	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 250										
		5	1,250	$105.65	$164.81	$270.46	$105.71	$164.81	$270.52	$0.06	0.0%
		10	2,500	$203.30	$329.63	$532.93	$203.43	$329.63	$533.06	$0.13	0.0%
		15	3,750	$317.75	$494.44	$812.19	$317.94	$494.44	$812.38	$0.19	0.0%
		20	5,000	$432.20	$659.25	$1,091.45	$432.45	$659.25	$1,091.70	$0.25	0.0%
		30	7,500	$661.10	$988.88	$1,649.98	$661.48	$988.88	$1,650.36	$0.38	0.0%
		50	12,500	$1,118.90	$1,648.13	$2,767.03	$1,119.53	$1,648.13	$2,767.66	$0.63	0.0%
		75	18,750	$1,691.15	$2,472.19	$4,163.34	$1,692.09	$2,472.19	$4,164.28	$0.94	0.0%
		100	25,000	$2,263.40	$3,296.25	$5,559.65	$2,264.65	$3,296.25	$5,560.90	$1.25	0.0%
Avg		19	4,750	$409.31	$626.29	$1,035.60	$409.55	$626.29	$1,035.84	$0.24	0.0%
	Hours Use: 350										
		5	1,750	$122.63	$230.74	$353.37	$122.72	$230.74	$353.46	$0.09	0.0%
		10	3,500	$237.26	$461.48	$698.74	$237.44	$461.48	$698.92	$0.18	0.0%
		15	5,250	$368.69	$692.21	$1,060.90	$368.95	$692.21	$1,061.16	$0.26	0.0%
		20	7,000	$500.12	$922.95	$1,423.07	$500.47	$922.95	$1,423.42	$0.35	0.0%
		30	10,500	$762.98	$1,384.43	$2,147.41	$763.51	$1,384.43	$2,147.94	$0.53	0.0%
		50	17,500	$1,288.70	$2,307.38	$3,596.08	$1,289.58	$2,307.38	$3,596.96	$0.88	0.0%
		75	26,250	$1,945.85	$3,461.06	$5,406.91	$1,947.16	$3,461.06	$5,408.22	$1.31	0.0%
		100	35,000	$2,603.00	$4,614.75	$7,217.75	$2,604.75	$4,614.75	$7,219.50	$1.75	0.0%
Avg		26	9,100	$657.84	$1,199.84	$1,857.68	$658.29	$1,199.84	$1,858.13	$0.45	0.0%
	Hours Use: 500										
		5	2,500	$148.10	$329.63	$477.73	$148.23	$329.63	$477.86	$0.13	0.0%
		10	5,000	$288.20	$659.25	$947.45	$288.45	$659.25	$947.70	$0.25	0.0%
		15	7,500	$445.10	$988.88	$1,433.98	$445.48	$988.88	$1,434.36	$0.38	0.0%
		20	10,000	$602.00	$1,318.50	$1,920.50	$602.50	$1,318.50	$1,921.00	$0.50	0.0%
		30	15,000	$915.80	$1,977.75	$2,893.55	$916.55	$1,977.75	$2,894.30	$0.75	0.0%
		50	25,000	$1,543.40	$3,296.25	$4,839.65	$1,544.65	$3,296.25	$4,840.90	$1.25	0.0%
		75	37,500	$2,327.90	$4,944.38	$7,272.28	$2,329.78	$4,944.38	$7,274.16	$1.88	0.0%
		100	50,000	$3,112.40	$6,592.50	$9,704.90	$3,114.90	$6,592.50	$9,707.40	$2.50	0.0%
Avg		32	16,000	$978.56	$2,109.60	$3,088.16	$979.36	$2,109.60	$3,088.96	$0.80	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$8.00	$8.00	$ -
Distribution Demand <=10 kW	$3.87	$3.87	$ -
Distribution Demand >10 kW	$7.23	$7.23	$ -
Transmission Demand	$7.17	$7.17	$ -
Distribution Energy	$0.01166	$0.01166	$ -
Revenue Decoupling	($0.00032)	($0.00032)	$ -
Solar Massachusetts Renewable Target	$0.00050	$0.00050	$ -
Residential Assistance Adjustment Factor	$0.00273	$0.00273	$ -
Pension Adjustment Factor	$0.00054	$0.00054	$ -
Net Metering Recovery Surcharge	$0.00356	$0.00356	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00207	$0.00207	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00014)	($0.00014)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00043	$0.00043	$ -
Vegetation Management	$0.00097	$0.00097	$ -
Tax Act Credit Factor	($0.00075)	($0.00075)	$ -
Grid Modernization	$0.00000	$0.00005	$0.00005
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kVA	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 350										
		100	35,000	$1,995.70	$3,961.30	$5,957.00	$1,997.10	$3,961.30	$5,958.40	$1.40	0.0%
		150	52,500	$3,234.55	$5,941.95	$9,176.50	$3,236.65	$5,941.95	$9,178.60	$2.10	0.0%
		200	70,000	$4,473.40	$7,922.60	$12,396.00	$4,476.20	$7,922.60	$12,398.80	$2.80	0.0%
		300	105,000	$6,951.10	$11,883.90	$18,835.00	$6,955.30	$11,883.90	$18,839.20	$4.20	0.0%
		500	175,000	$11,906.50	$19,806.50	$31,713.00	$11,913.50	$19,806.50	$31,720.00	$7.00	0.0%
		750	262,500	$18,100.75	$29,709.75	$47,810.50	$18,111.25	$29,709.75	$47,821.00	$10.50	0.0%
		1,000	350,000	$24,295.00	$39,613.00	$63,908.00	$24,309.00	$39,613.00	$63,922.00	$14.00	0.0%
	Avg	227	79,450	$5,142.38	$8,992.15	$14,134.53	$5,145.56	$8,992.15	$14,137.71	$3.18	0.0%
	Hours Use: 450										
		100	45,000	$2,287.90	$5,093.10	$7,381.00	$2,289.70	$5,093.10	$7,382.80	$1.80	0.0%
		150	67,500	$3,672.85	$7,639.65	$11,312.50	$3,675.55	$7,639.65	$11,315.20	$2.70	0.0%
		200	90,000	$5,057.80	$10,186.20	$15,244.00	$5,061.40	$10,186.20	$15,247.60	$3.60	0.0%
		300	135,000	$7,827.70	$15,279.30	$23,107.00	$7,833.10	$15,279.30	$23,112.40	$5.40	0.0%
		500	225,000	$13,367.50	$25,465.50	$38,833.00	$13,376.50	$25,465.50	$38,842.00	$9.00	0.0%
		750	337,500	$20,292.25	$38,198.25	$58,490.50	$20,305.75	$38,198.25	$58,504.00	$13.50	0.0%
		1,000	450,000	$27,217.00	$50,931.00	$78,148.00	$27,235.00	$50,931.00	$78,166.00	$18.00	0.0%
	Avg	312	140,400	$8,160.09	$15,890.47	$24,050.56	$8,165.70	$15,890.47	$24,056.17	$5.61	0.0%
	Hours Use: 550										
		100	55,000	$2,580.10	$6,224.90	$8,805.00	$2,582.30	$6,224.90	$8,807.20	$2.20	0.0%
		150	82,500	$4,111.15	$9,337.35	$13,448.50	$4,114.45	$9,337.35	$13,451.80	$3.30	0.0%
		200	110,000	$5,642.20	$12,449.80	$18,092.00	$5,646.60	$12,449.80	$18,096.40	$4.40	0.0%
		300	165,000	$8,704.30	$18,674.70	$27,379.00	$8,710.90	$18,674.70	$27,385.60	$6.60	0.0%
		500	275,000	$14,828.50	$31,124.50	$45,953.00	$14,839.50	$31,124.50	$45,964.00	$11.00	0.0%
		750	412,500	$22,483.75	$46,686.75	$69,170.50	$22,500.25	$46,686.75	$69,187.00	$16.50	0.0%
		1,000	550,000	$30,139.00	$62,249.00	$92,388.00	$30,161.00	$62,249.00	$92,410.00	$22.00	0.0%
	Avg	283	155,650	$8,183.74	$17,616.47	$25,800.21	$8,189.97	$17,616.47	$25,806.44	$6.23	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$97.00	$97.00	$ -
Distribution Demand <=100 kVA	$4.18	$4.18	$ -
Distribution Demand >100 kVA	$5.18	$5.18	$ -
Transmission Demand <=100 kVA	$4.58	$4.58	$ -
Transmission Demand >100 kVA	$9.37	$9.37	$ -
Distribution Energy	$0.00982	$0.00982	$ -
Revenue Decoupling	($0.00022)	($0.00022)	$ -
Solar Massachusetts Renewable Target	$0.00034	$0.00034	$ -
Residential Assistance Adjustment Factor	$0.00188	$0.00188	$ -
Pension Adjustment Factor	$0.00041	$0.00041	$ -
Net Metering Recovery Surcharge	$0.00245	$0.00245	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00142	$0.00142	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00009)	($0.00009)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00029	$0.00029	$ -
Vegetation Management	$0.00074	$0.00074	$ -
Tax Act Credit Factor	($0.00052)	($0.00052)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11318	$0.11318	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly kVA	Monthly kWh	Current Monthly Bill Delivery	Current Monthly Bill Supplier	Current Monthly Bill Total	Proposed Monthly Bill Delivery	Proposed Monthly Bill Supplier	Proposed Monthly Bill Total	Total Bill Impact Change	Total Bill Impact % Change
Hours Use: 400											
		300	120,000	$5,497.53	$13,581.60	$19,079.13	$5,499.93	$13,581.60	$19,081.53	$2.40	0.0%
		500	200,000	$9,627.53	$22,636.00	$32,263.53	$9,631.53	$22,636.00	$32,267.53	$4.00	0.0%
		1,000	400,000	$19,952.53	$45,272.00	$65,224.53	$19,960.53	$45,272.00	$65,232.53	$8.00	0.0%
		2,000	800,000	$40,602.53	$90,544.00	$131,146.53	$40,618.53	$90,544.00	$131,162.53	$16.00	0.0%
		3,000	1,200,000	$61,252.53	$135,816.00	$197,068.53	$61,276.53	$135,816.00	$197,092.53	$24.00	0.0%
		5,000	2,000,000	$102,552.53	$226,360.00	$328,912.53	$102,592.53	$226,360.00	$328,952.53	$40.00	0.0%
Avg		802	320,800	$15,863.83	$36,308.14	$52,171.97	$15,870.25	$36,308.14	$52,178.39	$6.42	0.0%
Hours Use: 500											
		300	150,000	$6,097.53	$16,977.00	$23,074.53	$6,100.53	$16,977.00	$23,077.53	$3.00	0.0%
		500	250,000	$10,627.53	$28,295.00	$38,922.53	$10,632.53	$28,295.00	$38,927.53	$5.00	0.0%
		1,000	500,000	$21,952.53	$56,590.00	$78,542.53	$21,962.53	$56,590.00	$78,552.53	$10.00	0.0%
		2,000	1,000,000	$44,602.53	$113,180.00	$157,782.53	$44,622.53	$113,180.00	$157,802.53	$20.00	0.0%
		3,000	1,500,000	$67,252.53	$169,770.00	$237,022.53	$67,282.53	$169,770.00	$237,052.53	$30.00	0.0%
		5,000	2,500,000	$112,552.53	$282,950.00	$395,502.53	$112,602.53	$282,950.00	$395,552.53	$50.00	0.0%
Avg		1,170	585,000	$25,803.03	$66,210.30	$92,013.33	$25,814.73	$66,210.30	$92,025.03	$11.70	0.0%
Hours Use: 600											
		300	180,000	$6,697.53	$20,372.40	$27,069.93	$6,701.13	$20,372.40	$27,073.53	$3.60	0.0%
		500	300,000	$11,627.53	$33,954.00	$45,581.53	$11,633.53	$33,954.00	$45,587.53	$6.00	0.0%
		1,000	600,000	$23,952.53	$67,908.00	$91,860.53	$23,964.53	$67,908.00	$91,872.53	$12.00	0.0%
		2,000	1,200,000	$48,602.53	$135,816.00	$184,418.53	$48,626.53	$135,816.00	$184,442.53	$24.00	0.0%
		3,000	1,800,000	$73,252.53	$203,724.00	$276,976.53	$73,288.53	$203,724.00	$277,012.53	$36.00	0.0%
		5,000	3,000,000	$122,552.53	$339,540.00	$462,092.53	$122,612.53	$339,540.00	$462,152.53	$60.00	0.0%
Avg		1,192	715,200	$28,685.33	$80,946.34	$109,631.67	$28,699.63	$80,946.34	$109,645.97	$14.30	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$97.00	$97.00	$ -
Distribution Demand <=100 kVA	$0.00	$0.00	$ -
Distribution Demand >100 kVA	$4.30	$4.30	$ -
Transmission Demand <=100 kVA	$470.53	$470.53	$ -
Transmission Demand >100 kVA	$8.35	$8.35	$ -
Distribution Energy	$0.00343	$0.00343	$ -
Revenue Decoupling	($0.00012)	($0.00012)	$ -
Solar Massachusetts Renewable Target	$0.00019	$0.00019	$ -
Residential Assistance Adjustment Factor	$0.00102	$0.00102	$ -
Pension Adjustment Factor	$0.00031	$0.00031	$ -
Net Metering Recovery Surcharge	$0.00133	$0.00133	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00077	$0.00077	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00005)	($0.00005)	$ -
Solar Program Cost Adjustment Factor	$0.00001	$0.00001	$ -
Solar Expansion Cost Recovery Factor	$0.00016	$0.00016	$ -
Vegetation Management	$0.00055	$0.00055	$ -
Tax Act Credit Factor	($0.00028)	($0.00028)	$ -
Grid Modernization	$0.00000	$0.00002	$0.00002
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.11318	$0.11318	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 400										
		5	2,000	$132.73	$263.70	$396.43	$132.81	$263.70	$396.51	$0.08	0.0%
		15	6,000	$374.19	$791.10	$1,165.29	$374.43	$791.10	$1,165.53	$0.24	0.0%
		25	10,000	$615.65	$1,318.50	$1,934.15	$616.05	$1,318.50	$1,934.55	$0.40	0.0%
		50	20,000	$1,219.30	$2,637.00	$3,856.30	$1,220.10	$2,637.00	$3,857.10	$0.80	0.0%
		75	30,000	$1,822.95	$3,955.50	$5,778.45	$1,824.15	$3,955.50	$5,779.65	$1.20	0.0%
Avg		36	14,400	$881.26	$1,898.64	$2,779.90	$881.83	$1,898.64	$2,780.47	$0.57	0.0%
	Hours Use: 500										
		5	2,500	$148.05	$329.63	$477.68	$148.15	$329.63	$477.78	$0.10	0.0%
		15	7,500	$420.15	$988.88	$1,409.03	$420.45	$988.88	$1,409.33	$0.30	0.0%
		25	12,500	$692.25	$1,648.13	$2,340.38	$692.75	$1,648.13	$2,340.88	$0.50	0.0%
		50	25,000	$1,372.50	$3,296.25	$4,668.75	$1,373.50	$3,296.25	$4,669.75	$1.00	0.0%
		75	37,500	$2,052.75	$4,944.38	$6,997.13	$2,054.25	$4,944.38	$6,998.63	$1.50	0.0%
Avg		38	19,000	$1,045.98	$2,505.15	$3,551.13	$1,046.74	$2,505.15	$3,551.89	$0.76	0.0%
	Hours Use: 600										
		5	3,000	$163.37	$395.55	$558.92	$163.49	$395.55	$559.04	$0.12	0.0%
		15	9,000	$466.11	$1,186.65	$1,652.76	$466.47	$1,186.65	$1,653.12	$0.36	0.0%
		25	15,000	$768.85	$1,977.75	$2,746.60	$769.45	$1,977.75	$2,747.20	$0.60	0.0%
		50	30,000	$1,525.70	$3,955.50	$5,481.20	$1,526.90	$3,955.50	$5,482.40	$1.20	0.0%
		75	45,000	$2,282.55	$5,933.25	$8,215.80	$2,284.35	$5,933.25	$8,217.60	$1.80	0.0%
Avg		35	21,000	$1,071.59	$2,768.85	$3,840.44	$1,072.43	$2,768.85	$3,841.28	$0.84	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$12.00	$12.00	$ -
Distribution Demand	$4.28	$4.28	$ -
Transmission Demand	$7.61	$7.61	$ -
Distribution Energy	$0.01075	$0.01075	$ -
Revenue Decoupling	($0.00021)	($0.00021)	$ -
Solar Massachusetts Renewable Target	$0.00032	$0.00032	$ -
Residential Assistance Adjustment Factor	$0.00174	$0.00174	$ -
Pension Adjustment Factor	$0.00073	$0.00073	$ -
Net Metering Recovery Surcharge	$0.00227	$0.00227	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00133	$0.00133	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00009)	($0.00009)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00027	$0.00027	$ -
Vegetation Management	$0.00131	$0.00131	$ -
Tax Act Credit Factor	($0.00048)	($0.00048)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

Cambridge Service Area
Rate G-5 Commercial Space Heating

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		500	$38.07	$65.93	$104.00	$38.09	$65.93	$104.02	$0.02	0.0%
		750	$53.10	$98.89	$151.99	$53.13	$98.89	$152.02	$0.03	0.0%
		1,000	$68.13	$131.85	$199.98	$68.17	$131.85	$200.02	$0.04	0.0%
		1,500	$98.20	$197.78	$295.98	$98.26	$197.78	$296.04	$0.06	0.0%
		2,000	$128.26	$263.70	$391.96	$128.34	$263.70	$392.04	$0.08	0.0%
		2,500	$158.33	$329.63	$487.96	$158.43	$329.63	$488.06	$0.10	0.0%
		3,000	$188.39	$395.55	$583.94	$188.51	$395.55	$584.06	$0.12	0.0%
		5,000	$308.65	$659.25	$967.90	$308.85	$659.25	$968.10	$0.20	0.0%
		10,000	$676.65	$1,318.50	$1,995.15	$677.05	$1,318.50	$1,995.55	$0.40	0.0%
		35,000	$2,516.65	$4,614.75	$7,131.40	$2,518.05	$4,614.75	$7,132.80	$1.40	0.0%
	Avg	4,756	$293.98	$627.08	$921.06	$294.17	$627.08	$921.25	$0.19	0.0%

		Current Rates	Proposed Rates	Change
	Customer Charge	$8.00	$8.00	$ -
	Distribution Energy <=5,000 kWh	$0.01831	$0.01831	$ -
	Distribution Energy >5,000 kWh	$0.02407	$0.02407	$ -
	Revenue Decoupling	($0.00024)	($0.00024)	$ -
	Solar Massachusetts Renewable Target	$0.00037	$0.00037	$ -
	Residential Assistance Adjustment Factor	$0.00201	$0.00201	$ -
	Pension Adjustment Factor	$0.00088	$0.00088	$ -
	Net Metering Recovery Surcharge	$0.00262	$0.00262	$ -
	Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
	AG Consulting Expense	$0.00000	$0.00000	$ -
	Storm Cost Recovery Adjustment Factor	$0.00149	$0.00149	$ -
	Storm Reserve Adjustment	$0.00000	$0.00000	$ -
	Basic Service Cost True Up Factor	($0.00010)	($0.00010)	$ -
	Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
	Solar Expansion Cost Recovery Factor	$0.00031	$0.00031	$ -
	Vegetation Management	$0.00158	$0.00158	$ -
	Tax Act Credit Factor	($0.00056)	($0.00056)	$ -
	Grid Modernization	$0.00000	$0.00004	$0.00004
	Transition	($0.00052)	($0.00052)	$ -
	Transmission Energy <=5,000 kWh	$0.02076	$0.02076	$ -
	Transmission Energy >5,000 kWh	$0.02847	$0.02847	$ -
	Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
	System Benefits Charge	$0.00250	$0.00250	$ -
	Renewable Energy Charge	$0.00050	$0.00050	$ -
	Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		25	$10.02	$3.30	$13.32	$10.02	$3.30	$13.32	$0.00	0.0%
		50	$11.54	$6.59	$18.13	$11.55	$6.59	$18.14	$0.01	0.1%
		100	$14.59	$13.19	$27.78	$14.59	$13.19	$27.78	$0.00	0.0%
		150	$17.63	$19.78	$37.41	$17.64	$19.78	$37.42	$0.01	0.0%
		250	$23.72	$32.96	$56.68	$23.73	$32.96	$56.69	$0.01	0.0%
		400	$32.85	$52.74	$85.59	$32.87	$52.74	$85.61	$0.02	0.0%
		600	$45.03	$79.11	$124.14	$45.06	$79.11	$124.17	$0.03	0.0%
		900	$63.30	$118.67	$181.97	$63.34	$118.67	$182.01	$0.04	0.0%
		1,500	$99.83	$197.78	$297.61	$99.90	$197.78	$297.68	$0.07	0.0%
		2,500	$160.72	$329.63	$490.35	$160.84	$329.63	$490.47	$0.12	0.0%
	Avg	593	$44.61	$78.19	$122.80	$44.64	$78.19	$122.83	$0.03	0.0%

		Current Rates	Proposed Rates	Change
	Customer Charge	$8.50	$8.50	$ -
	Distribution Energy - Peak	$0.06346	$0.06346	$ -
	Distribution Energy - Low Load	$0.02338	$0.02338	$ -
	Revenue Decoupling	($0.00032)	($0.00032)	$ -
	Solar Massachusetts Renewable Target	$0.00050	$0.00050	$ -
	Residential Assistance Adjustment Factor	$0.00273	$0.00273	$ -
	Pension Adjustment Factor	$0.00054	$0.00054	$ -
	Net Metering Recovery Surcharge	$0.00356	$0.00356	$ -
	Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
	AG Consulting Expense	$0.00001	$0.00001	$ -
	Storm Cost Recovery Adjustment Factor	$0.00207	$0.00207	$ -
	Storm Reserve Adjustment	$0.00000	$0.00000	$ -
	Basic Service Cost True Up Factor	($0.00014)	($0.00014)	$ -
	Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
	Solar Expansion Cost Recovery Factor	$0.00043	$0.00043	$ -
	Vegetation Management	$0.00097	$0.00097	$ -
	Tax Act Credit Factor	($0.00075)	($0.00075)	$ -
	Grid Modernization	$0.00000	$0.00005	$0.00005
	Transition	($0.00052)	($0.00052)	$ -
	Transmission Energy - Peak	$0.02328	$0.02328	$ -
	Transmission Energy - Low Load	$0.00000	$0.00000	$ -
	Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
	System Benefits Charge	$0.00250	$0.00250	$ -
	Renewable Energy Charge	$0.00050	$0.00050	$ -
	Basic Service Charge	$0.13185	$0.13185	$ -

	On-Peak Use:	24%
	Off-Peak Use:	76%

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 200										
		5	1,000	$94.58	$131.85	$226.43	$94.64	$131.85	$226.49	$0.06	0.0%
		10	2,000	$183.16	$263.70	$446.86	$183.28	$263.70	$446.98	$0.12	0.0%
		15	3,000	$275.37	$395.55	$670.92	$275.55	$395.55	$671.10	$0.18	0.0%
		25	5,000	$441.35	$659.25	$1,100.60	$441.65	$659.25	$1,100.90	$0.30	0.0%
		50	10,000	$856.30	$1,318.50	$2,174.80	$856.90	$1,318.50	$2,175.40	$0.60	0.0%
		100	20,000	$1,686.20	$2,637.00	$4,323.20	$1,687.40	$2,637.00	$4,324.40	$1.20	0.0%
Avg		2	400	$41.43	$52.74	$94.17	$41.46	$52.74	$94.20	$0.03	0.0%
	Hours Use: 300										
		5	1,500	$138.87	$197.78	$336.65	$138.96	$197.78	$336.74	$0.09	0.0%
		10	3,000	$250.22	$395.55	$645.77	$250.40	$395.55	$645.95	$0.18	0.0%
		15	4,500	$362.13	$593.33	$955.46	$362.40	$593.33	$955.73	$0.27	0.0%
		25	7,500	$585.95	$988.88	$1,574.83	$586.40	$988.88	$1,575.28	$0.45	0.0%
		50	15,000	$1,145.50	$1,977.75	$3,123.25	$1,146.40	$1,977.75	$3,124.15	$0.90	0.0%
		100	30,000	$2,264.60	$3,955.50	$6,220.10	$2,266.40	$3,955.50	$6,221.90	$1.80	0.0%
Avg		19	5,700	$451.66	$751.55	$1,203.21	$452.00	$751.55	$1,203.55	$0.34	0.0%
	Hours Use: 400										
		5	2,000	$183.16	$263.70	$446.86	$183.28	$263.70	$446.98	$0.12	0.0%
		10	4,000	$308.06	$527.40	$835.46	$308.30	$527.40	$835.70	$0.24	0.0%
		15	6,000	$448.89	$791.10	$1,239.99	$449.25	$791.10	$1,240.35	$0.36	0.0%
		25	10,000	$730.55	$1,318.50	$2,049.05	$731.15	$1,318.50	$2,049.65	$0.60	0.0%
		50	20,000	$1,434.70	$2,637.00	$4,071.70	$1,435.90	$2,637.00	$4,072.90	$1.20	0.0%
		100	40,000	$2,843.00	$5,274.00	$8,117.00	$2,845.40	$5,274.00	$8,119.40	$2.40	0.0%
Avg		27	10,800	$786.88	$1,423.98	$2,210.86	$787.53	$1,423.98	$2,211.51	$0.65	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$6.00	$6.00	$ -
Distribution Demand <=10 kW	$0.00	$0.00	$ -
Distribution Demand >10 kW	$5.03	$5.03	$ -
Distribution Energy <=2,300 kWh	$0.04216	$0.04216	$ -
Distribution Energy >2,300 kWh	$0.01142	$0.01142	$ -
Revenue Decoupling	($0.00036)	($0.00036)	$ -
Solar Massachusetts Renewable Target	$0.00055	$0.00055	$ -
Residential Assistance Adjustment Factor	$0.00301	$0.00301	$ -
Pension Adjustment Factor	$0.00070	$0.00070	$ -
Net Metering Recovery Surcharge	$0.00393	$0.00393	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00228	$0.00228	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00015)	($0.00015)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00047	$0.00047	$ -
Vegetation Management	$0.00125	$0.00125	$ -
Tax Act Credit Factor	($0.00083)	($0.00083)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02285	$0.02285	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly kW	Monthly kWh	Current Monthly Bill Delivery	Current Monthly Bill Supplier	Current Monthly Bill Total	Proposed Monthly Bill Delivery	Proposed Monthly Bill Supplier	Proposed Monthly Bill Total	Total Bill Impact Change	Total Bill Impact % Change
Hours Use: 50											
		5	250	$37.09	$32.96	$70.05	$37.10	$32.96	$70.06	$0.01	0.0%
		10	500	$68.18	$65.93	$134.11	$68.21	$65.93	$134.14	$0.03	0.0%
		20	1,000	$174.45	$131.85	$306.30	$174.51	$131.85	$306.36	$0.06	0.0%
		50	2,500	$456.06	$329.63	$785.69	$456.21	$329.63	$785.84	$0.15	0.0%
Avg		9	450	$61.96	$59.33	$121.29	$61.98	$59.33	$121.31	$0.02	0.0%
Hours Use: 150											
		5	750	$99.26	$98.89	$198.15	$99.31	$98.89	$198.20	$0.05	0.0%
		10	1,500	$192.53	$197.78	$390.31	$192.62	$197.78	$390.40	$0.09	0.0%
		20	3,000	$359.35	$395.55	$754.90	$359.53	$395.55	$755.08	$0.18	0.0%
		50	7,500	$811.96	$988.88	$1,800.84	$812.41	$988.88	$1,801.29	$0.45	0.0%
Avg		8	1,200	$155.22	$158.22	$313.44	$155.29	$158.22	$313.51	$0.07	0.0%
Hours Use: 300											
		5	1,500	$192.53	$197.78	$390.31	$192.62	$197.78	$390.40	$0.09	0.0%
		10	3,000	$315.25	$395.55	$710.80	$315.43	$395.55	$710.98	$0.18	0.0%
		20	6,000	$572.89	$791.10	$1,363.99	$573.25	$791.10	$1,364.35	$0.36	0.0%
		50	15,000	$1,345.81	$1,977.75	$3,323.56	$1,346.71	$1,977.75	$3,324.46	$0.90	0.0%
Avg		9	2,700	$293.89	$356.00	$649.89	$294.05	$356.00	$650.05	$0.16	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$6.00	$6.00	$ -
Distribution Demand <=10 kW	$0.00	$0.00	$ -
Distribution Demand >10 kW	$4.41	$4.41	$ -
Distribution Energy <=1,800 kWh	$0.07793	$0.07793	$ -
Distribution Energy >1,800 kWh	$0.02476	$0.02476	$ -
Revenue Decoupling	($0.00036)	($0.00036)	$ -
Solar Massachusetts Renewable Target	$0.00055	$0.00055	$ -
Residential Assistance Adjustment Factor	$0.00301	$0.00301	$ -
Pension Adjustment Factor	$0.00070	$0.00070	$ -
Net Metering Recovery Surcharge	$0.00393	$0.00393	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00228	$0.00228	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00015)	($0.00015)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00047	$0.00047	$ -
Vegetation Management	$0.00125	$0.00125	$ -
Tax Act Credit Factor	($0.00083)	($0.00083)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02285	$0.02285	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

South Shore, Cape Cod, and Martha's Vineyard Service Area
Rate G-2 Medium General Time-of-Use

		Monthly kVA	Monthly kWh	Current Monthly Bill Delivery	Current Monthly Bill Supplier	Current Monthly Bill Total	Proposed Monthly Bill Delivery	Proposed Monthly Bill Supplier	Proposed Monthly Bill Total	Total Bill Impact Change	Total Bill Impact % Change
Hours Use: 300											
		100	30,000	$2,256.68	$3,178.50	$5,435.18	$2,257.88	$3,178.50	$5,436.38	$1.20	0.0%
		150	45,000	$3,200.02	$4,767.75	$7,967.77	$3,201.82	$4,767.75	$7,969.57	$1.80	0.0%
		200	60,000	$4,143.37	$6,357.00	$10,500.37	$4,145.77	$6,357.00	$10,502.77	$2.40	0.0%
		300	90,000	$6,030.05	$9,535.50	$15,565.55	$6,033.65	$9,535.50	$15,569.15	$3.60	0.0%
		500	150,000	$9,803.42	$15,892.50	$25,695.92	$9,809.42	$15,892.50	$25,701.92	$6.00	0.0%
Avg		205	61,500	$4,237.70	$6,515.93	$10,753.63	$4,240.16	$6,515.93	$10,756.09	$2.46	0.0%
Hours Use: 400											
		100	40,000	$2,611.24	$4,238.00	$6,849.24	$2,612.84	$4,238.00	$6,850.84	$1.60	0.0%
		150	60,000	$3,731.87	$6,357.00	$10,088.87	$3,734.27	$6,357.00	$10,091.27	$2.40	0.0%
		200	80,000	$4,852.49	$8,476.00	$13,328.49	$4,855.69	$8,476.00	$13,331.69	$3.20	0.0%
		300	120,000	$7,093.73	$12,714.00	$19,807.73	$7,098.53	$12,714.00	$19,812.53	$4.80	0.0%
		500	200,000	$11,576.22	$21,190.00	$32,766.22	$11,584.22	$21,190.00	$32,774.22	$8.00	0.0%
Avg		214	85,600	$5,166.26	$9,069.32	$14,235.58	$5,169.69	$9,069.32	$14,239.01	$3.43	0.0%
Hours Use: 500											
		100	50,000	$2,965.81	$5,297.50	$8,263.31	$2,967.81	$5,297.50	$8,265.31	$2.00	0.0%
		150	75,000	$4,263.71	$7,946.25	$12,209.96	$4,266.71	$7,946.25	$12,212.96	$3.00	0.0%
		200	100,000	$5,561.61	$10,595.00	$16,156.61	$5,565.61	$10,595.00	$16,160.61	$4.00	0.0%
		300	150,000	$8,157.42	$15,892.50	$24,049.92	$8,163.42	$15,892.50	$24,055.92	$6.00	0.0%
		500	250,000	$13,349.03	$26,487.50	$39,836.53	$13,359.03	$26,487.50	$39,846.53	$10.00	0.0%
Avg		253	126,500	$6,937.39	$13,402.68	$20,340.07	$6,942.45	$13,402.68	$20,345.13	$5.06	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$370.00	$370.00	$ -
Distribution Demand	$1.58	$1.58	$ -
Transmission Demand	$6.65	$6.65	$ -
Distribution Energy - Peak	$0.01843	$0.01843	$ -
Distribution Energy - Low A	$0.01551	$0.01551	$ -
Distribution Energy - Low B	$0.01006	$0.01006	$ -
Revenue Decoupling	($0.00022)	($0.00022)	$ -
Solar Massachusetts Renewable Target	$0.00033	$0.00033	$ -
Residential Assistance Adjustment Factor	$0.00183	$0.00183	$ -
Pension Adjustment Factor	$0.00044	$0.00044	$ -
Net Metering Recovery Surcharge	$0.00239	$0.00239	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00139	$0.00139	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00009)	($0.00009)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00029	$0.00029	$ -
Vegetation Management	$0.00078	$0.00078	$ -
Tax Act Credit Factor	($0.00051)	($0.00051)	$ -
Grid Modernization	$0.00000	$0.00004	$0.00004
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00236	$0.00236	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy	$0.00050	$0.00050	$ -
Basic Service	$0.10595	$0.10595	$ -

Peak Use:	28%
Low A Use:	25%
Low B Use:	47%

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly kVA	Monthly kWh	Current Monthly Bill Delivery	Current Monthly Bill Supplier	Current Monthly Bill Total	Proposed Monthly Bill Delivery	Proposed Monthly Bill Supplier	Proposed Monthly Bill Total	Total Bill Impact Change	Total Bill Impact % Change
Hours Use: 350											
		500	175,000	$9,812.48	$18,541.25	$28,353.73	$9,815.98	$18,541.25	$28,357.23	$3.50	0.0%
		750	262,500	$14,253.72	$27,811.88	$42,065.60	$14,258.97	$27,811.88	$42,070.85	$5.25	0.0%
		1,000	350,000	$18,694.96	$37,082.50	$55,777.46	$18,701.96	$37,082.50	$55,784.46	$7.00	0.0%
		2,000	700,000	$36,459.91	$74,165.00	$110,624.91	$36,473.91	$74,165.00	$110,638.91	$14.00	0.0%
		3,000	1,050,000	$54,224.87	$111,247.50	$165,472.37	$54,245.87	$111,247.50	$165,493.37	$21.00	0.0%
	Avg	1,066	373,100	$19,867.44	$39,529.95	$59,397.39	$19,874.90	$39,529.95	$59,404.85	$7.46	0.0%
Hours Use: 450											
		500	225,000	$11,196.04	$23,838.75	$35,034.79	$11,200.54	$23,838.75	$35,039.29	$4.50	0.0%
		750	337,500	$16,329.06	$35,758.13	$52,087.19	$16,335.81	$35,758.13	$52,093.94	$6.75	0.0%
		1,000	450,000	$21,462.09	$47,677.50	$69,139.59	$21,471.09	$47,677.50	$69,148.59	$9.00	0.0%
		2,000	900,000	$41,994.17	$95,355.00	$137,349.17	$42,012.17	$95,355.00	$137,367.17	$18.00	0.0%
		3,000	1,350,000	$62,526.26	$143,032.50	$205,558.76	$62,553.26	$143,032.50	$205,585.76	$27.00	0.0%
	Avg	788	354,600	$17,109.28	$37,569.87	$54,679.15	$17,116.37	$37,569.87	$54,686.24	$7.09	0.0%
Hours Use: 550											
		500	275,000	$12,579.61	$29,136.25	$41,715.86	$12,585.11	$29,136.25	$41,721.36	$5.50	0.0%
		750	412,500	$18,404.41	$43,704.38	$62,108.79	$18,412.66	$43,704.38	$62,117.04	$8.25	0.0%
		1,000	550,000	$24,229.22	$58,272.50	$82,501.72	$24,240.22	$58,272.50	$82,512.72	$11.00	0.0%
		2,000	1,100,000	$47,528.43	$116,545.00	$164,073.43	$47,550.43	$116,545.00	$164,095.43	$22.00	0.0%
		3,000	1,650,000	$70,827.65	$174,817.50	$245,645.15	$70,860.65	$174,817.50	$245,678.15	$33.00	0.0%
	Avg	1,118	614,900	$26,978.52	$65,148.66	$92,127.18	$26,990.82	$65,148.66	$92,139.48	$12.30	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$930.00	$930.00	$ -
Distribution Demand	$0.90	$0.90	$ -
Transmission Demand	$7.18	$7.18	$ -
Distribution Energy - Peak	$0.01291	$0.01291	$ -
Distribution Energy - Low A	$0.01188	$0.01188	$ -
Distribution Energy - Low B	$0.00822	$0.00822	$ -
Revenue Decoupling	($0.00015)	($0.00015)	$ -
Solar Massachusetts Renewable Target	$0.00023	$0.00023	$ -
Residential Assistance Adjustment Factor	$0.00124	$0.00124	$ -
Pension Adjustment Factor	$0.00033	$0.00033	$ -
Net Metering Recovery Surcharge	$0.00161	$0.00161	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00094	$0.00094	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00006)	($0.00006)	$ -
Solar Program Cost Adjustment Factor	$0.00001	$0.00001	$ -
Solar Expansion Cost Recovery Factor	$0.00019	$0.00019	$ -
Vegetation Management	$0.00059	$0.00059	$ -
Tax Act Credit Factor	($0.00034)	($0.00034)	$ -
Grid Modernization	$0.00000	$0.00002	$0.00002
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy	$0.00050	$0.00050	$ -
Basic Service	$0.10595	$0.10595	$ -

Peak Use:	27%
Low A Use:	25%
Low B Use:	48%

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 150										
		20	3,000	$232.59	$395.55	$628.14	$232.74	$395.55	$628.29	$0.15	0.0%
		30	4,500	$345.89	$593.33	$939.22	$346.11	$593.33	$939.44	$0.22	0.0%
		40	6,000	$459.18	$791.10	$1,250.28	$459.48	$791.10	$1,250.58	$0.30	0.0%
		70	10,500	$799.07	$1,384.43	$2,183.50	$799.59	$1,384.43	$2,184.02	$0.52	0.0%
		100	15,000	$1,138.95	$1,977.75	$3,116.70	$1,139.70	$1,977.75	$3,117.45	$0.75	0.0%
Avg		52	7,800	$595.13	$1,028.43	$1,623.56	$595.52	$1,028.43	$1,623.95	$0.39	0.0%
	Hours Use: 250										
		20	5,000	$326.85	$659.25	$986.10	$327.10	$659.25	$986.35	$0.25	0.0%
		30	7,500	$487.28	$988.88	$1,476.16	$487.65	$988.88	$1,476.53	$0.37	0.0%
		40	10,000	$647.70	$1,318.50	$1,966.20	$648.20	$1,318.50	$1,966.70	$0.50	0.0%
		70	17,500	$1,128.98	$2,307.38	$3,436.36	$1,129.85	$2,307.38	$3,437.23	$0.87	0.0%
		100	25,000	$1,610.25	$3,296.25	$4,906.50	$1,611.50	$3,296.25	$4,907.75	$1.25	0.0%
Avg		27	6,750	$439.15	$889.99	$1,329.14	$439.49	$889.99	$1,329.48	$0.34	0.0%
	Hours Use: 350										
		20	7,000	$421.11	$922.95	$1,344.06	$421.46	$922.95	$1,344.41	$0.35	0.0%
		30	10,500	$628.67	$1,384.43	$2,013.10	$629.19	$1,384.43	$2,013.62	$0.52	0.0%
		40	14,000	$836.22	$1,845.90	$2,682.12	$836.92	$1,845.90	$2,682.82	$0.70	0.0%
		70	24,500	$1,458.89	$3,230.33	$4,689.22	$1,460.11	$3,230.33	$4,690.44	$1.22	0.0%
		100	35,000	$2,081.55	$4,614.75	$6,696.30	$2,083.30	$4,614.75	$6,698.05	$1.75	0.0%
Avg		27	9,450	$566.40	$1,245.98	$1,812.38	$566.87	$1,245.98	$1,812.85	$0.47	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$6.00	$6.00	$ -
Distribution Demand	$1.80	$1.80	$ -
Transmission Demand	$2.46	$2.46	$ -
Distribution Energy	$0.02067	$0.02067	$ -
Revenue Decoupling	($0.00034)	($0.00034)	$ -
Solar Massachusetts Renewable Target	$0.00053	$0.00053	$ -
Residential Assistance Adjustment Factor	$0.00289	$0.00289	$ -
Pension Adjustment Factor	$0.00078	$0.00078	$ -
Net Metering Recovery Surcharge	$0.00376	$0.00376	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00215	$0.00215	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00014)	($0.00014)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00045	$0.00045	$ -
Vegetation Management	$0.00139	$0.00139	$ -
Tax Act Credit Factor	($0.00080)	($0.00080)	$ -
Grid Modernization	$0.00000	$0.00005	$0.00005
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00307	$0.00307	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy	$0.00050	$0.00050	$ -
Basic Service	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		100	$14.86	$13.19	$28.05	$14.87	$13.19	$28.06	$0.01	0.0%
		200	$23.72	$26.37	$50.09	$23.73	$26.37	$50.10	$0.01	0.0%
		300	$32.58	$39.56	$72.14	$32.60	$39.56	$72.16	$0.02	0.0%
		500	$50.30	$65.93	$116.23	$50.33	$65.93	$116.26	$0.03	0.0%
		750	$72.44	$98.89	$171.33	$72.50	$98.89	$171.39	$0.06	0.0%
		1,000	$94.59	$131.85	$226.44	$94.66	$131.85	$226.51	$0.07	0.0%
		1,500	$138.89	$197.78	$336.67	$138.99	$197.78	$336.77	$0.10	0.0%
		3,000	$271.77	$395.55	$667.32	$271.98	$395.55	$667.53	$0.21	0.0%
		5,000	$448.95	$659.25	$1,108.20	$449.30	$659.25	$1,108.55	$0.35	0.0%
	Avg	1,472	$136.40	$194.08	$330.48	$136.51	$194.08	$330.59	$0.11	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$6.00	$6.00	$ -
Distribution Energy	$0.03697	$0.03697	$ -
Revenue Decoupling	($0.00040)	($0.00040)	$ -
Solar Massachusetts Renewable Target	$0.00061	$0.00061	$ -
Residential Assistance Adjustment Factor	$0.00337	$0.00337	$ -
Pension Adjustment Factor	$0.00129	$0.00129	$ -
Net Metering Recovery Surcharge	$0.00439	$0.00439	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00255	$0.00255	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00017)	($0.00017)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00052	$0.00052	$ -
Vegetation Management	$0.00231	$0.00231	$ -
Tax Act Credit Factor	($0.00093)	($0.00093)	$ -
Grid Modernization	$0.00000	$0.00007	$0.00007
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02536	$0.02536	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
		25,000	$1,549.75	$3,296.25	$4,846.00	$1,550.50	$3,296.25	$4,846.75	$0.75	0.0%
		40,000	$2,461.60	$5,274.00	$7,735.60	$2,462.80	$5,274.00	$7,736.80	$1.20	0.0%
		50,000	$3,069.50	$6,592.50	$9,662.00	$3,071.00	$6,592.50	$9,663.50	$1.50	0.0%
		60,000	$3,677.40	$7,911.00	$11,588.40	$3,679.20	$7,911.00	$11,590.20	$1.80	0.0%
		150,000	$9,148.50	$19,777.50	$28,926.00	$9,153.00	$19,777.50	$28,930.50	$4.50	0.0%
	Avg	60,748	$3,722.87	$8,009.62	$11,732.49	$3,724.69	$8,009.62	$11,734.31	$1.82	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$30.00	$30.00	$ -
Distribution Energy	$0.01689	$0.01689	$ -
Revenue Decoupling	($0.00018)	($0.00018)	$ -
Solar Massachusetts Renewable Target	$0.00028	$0.00028	$ -
Residential Assistance Adjustment Factor	$0.00156	$0.00156	$ -
Pension Adjustment Factor	$0.00067	$0.00067	$ -
Net Metering Recovery Surcharge	$0.00203	$0.00203	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00116	$0.00116	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00008)	($0.00008)	$ -
Solar Program Cost Adjustment Factor	$0.00001	$0.00001	$ -
Solar Expansion Cost Recovery Factor	$0.00024	$0.00024	$ -
Vegetation Management	$0.00119	$0.00119	$ -
Tax Act Credit Factor	($0.00043)	($0.00043)	$ -
Grid Modernization	$0.00000	$0.00003	$0.00003
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.02477	$0.02477	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kVA	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 350										
		5	1,750	$136.08	$230.74	$366.82	$136.18	$230.74	$366.92	$0.10	0.0%
		10	3,500	$262.15	$461.48	$723.63	$262.36	$461.48	$723.84	$0.21	0.0%
		20	7,000	$514.30	$922.95	$1,437.25	$514.72	$922.95	$1,437.67	$0.42	0.0%
		50	17,500	$1,270.75	$2,307.38	$3,578.13	$1,271.80	$2,307.38	$3,579.18	$1.05	0.0%
		75	26,250	$1,901.13	$3,461.06	$5,362.19	$1,902.70	$3,461.06	$5,363.76	$1.57	0.0%
Avg		20	7,000	$514.30	$922.95	$1,437.25	$514.72	$922.95	$1,437.67	$0.42	0.0%
	Hours Use: 500										
		5	2,500	$167.48	$329.63	$497.11	$167.63	$329.63	$497.26	$0.15	0.0%
		10	5,000	$324.96	$659.25	$984.21	$325.26	$659.25	$984.51	$0.30	0.0%
		20	10,000	$639.92	$1,318.50	$1,958.42	$640.52	$1,318.50	$1,959.02	$0.60	0.0%
		50	25,000	$1,584.79	$3,296.25	$4,881.04	$1,586.29	$3,296.25	$4,882.54	$1.50	0.0%
		75	37,500	$2,372.19	$4,944.38	$7,316.57	$2,374.44	$4,944.38	$7,318.82	$2.25	0.0%
Avg		31	15,500	$986.37	$2,043.68	$3,030.05	$987.30	$2,043.68	$3,030.98	$0.93	0.0%
	Hours Use: 650										
		5	3,250	$198.88	$428.51	$627.39	$199.08	$428.51	$627.59	$0.20	0.0%
		10	6,500	$387.77	$857.03	$1,244.80	$388.16	$857.03	$1,245.19	$0.39	0.0%
		20	13,000	$765.53	$1,714.05	$2,479.58	$766.31	$1,714.05	$2,480.36	$0.78	0.0%
		50	32,500	$1,898.83	$4,285.13	$6,183.96	$1,900.78	$4,285.13	$6,185.91	$1.95	0.0%
		75	48,750	$2,843.24	$6,427.69	$9,270.93	$2,846.17	$6,427.69	$9,273.86	$2.93	0.0%
Avg		18	11,700	$689.98	$1,542.65	$2,232.63	$690.68	$1,542.65	$2,233.33	$0.70	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$10.00	$10.00	$ -
Distribution Demand	$3.45	$3.45	$ -
Transmission Demand	$7.11	$7.11	$ -
Distribution Energy - Peak	$0.02369	$0.02369	$ -
Distribution Energy - Low Load	$0.01660	$0.01660	$ -
Revenue Decoupling	($0.00036)	($0.00036)	$ -
Solar Massachusetts Renewable Target	$0.00055	$0.00055	$ -
Residential Assistance Adjustment Factor	$0.00301	$0.00301	$ -
Pension Adjustment Factor	$0.00070	$0.00070	$ -
Net Metering Recovery Surcharge	$0.00393	$0.00393	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00228	$0.00228	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00015)	($0.00015)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00047	$0.00047	$ -
Vegetation Management	$0.00125	$0.00125	$ -
Tax Act Credit Factor	($0.00083)	($0.00083)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Peak Use:	24%
Low A Use:	76%

Eastern Massachusetts
Calculation of Monthly Typical Bill
Proposed July 1, 2019

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

	Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
	kVA	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
Hours Use: 50										
	5	250	$58.36	$32.96	$91.32	$58.38	$32.96	$91.34	$0.02	0.0%
	10	500	$106.72	$65.93	$172.65	$106.75	$65.93	$172.68	$0.03	0.0%
	20	1,000	$203.45	$131.85	$335.30	$203.51	$131.85	$335.36	$0.06	0.0%
	50	2,500	$493.61	$329.63	$823.24	$493.76	$329.63	$823.39	$0.15	0.0%
	75	3,750	$735.42	$494.44	$1,229.86	$735.65	$494.44	$1,230.09	$0.23	0.0%
Avg	9	450	$97.05	$59.33	$156.38	$97.08	$59.33	$156.41	$0.03	0.0%
Hours Use: 150										
	5	750	$90.38	$98.89	$189.27	$90.43	$98.89	$189.32	$0.05	0.0%
	10	1,500	$170.77	$197.78	$368.55	$170.86	$197.78	$368.64	$0.09	0.0%
	20	3,000	$331.54	$395.55	$727.09	$331.72	$395.55	$727.27	$0.18	0.0%
	50	7,500	$813.84	$988.88	$1,802.72	$814.29	$988.88	$1,803.17	$0.45	0.0%
	75	11,250	$1,215.77	$1,483.31	$2,699.08	$1,216.44	$1,483.31	$2,699.75	$0.67	0.0%
Avg	10	1,500	$170.77	$197.78	$368.55	$170.86	$197.78	$368.64	$0.09	0.0%
Hours Use: 300										
	5	1,500	$138.42	$197.78	$336.20	$138.51	$197.78	$336.29	$0.09	0.0%
	10	3,000	$266.84	$395.55	$662.39	$267.02	$395.55	$662.57	$0.18	0.0%
	20	6,000	$523.68	$791.10	$1,314.78	$524.04	$791.10	$1,315.14	$0.36	0.0%
	50	15,000	$1,294.19	$1,977.75	$3,271.94	$1,295.09	$1,977.75	$3,272.84	$0.90	0.0%
	75	22,500	$1,936.28	$2,966.63	$4,902.91	$1,937.63	$2,966.63	$4,904.26	$1.35	0.0%
Avg	13	3,900	$343.89	$514.22	$858.11	$344.12	$514.22	$858.34	$0.23	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$10.00	$10.00	$ -
Distribution Demand	$3.48	$3.48	$ -
Transmission Demand	$2.99	$2.99	$ -
Distribution Energy - Peak	$0.04612	$0.04612	$ -
Distribution Energy - Low Load	$0.03879	$0.03879	$ -
Revenue Decoupling	($0.00036)	($0.00036)	$ -
Solar Massachusetts Renewable Target	$0.00055	$0.00055	$ -
Residential Assistance Adjustment Factor	$0.00301	$0.00301	$ -
Pension Adjustment Factor	$0.00070	$0.00070	$ -
Net Metering Recovery Surcharge	$0.00393	$0.00393	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00228	$0.00228	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00015)	($0.00015)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00047	$0.00047	$ -
Vegetation Management	$0.00125	$0.00125	$ -
Tax Act Credit Factor	($0.00083)	($0.00083)	$ -
Grid Modernization	$0.00000	$0.00006	$0.00006
Transition	($0.00052)	($0.00052)	$ -
Energy Efficiency Reconciliation Factor	$0.00846	$0.00846	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.13185	$0.13185	$ -

Peak Use:	23%
Low A Use:	77%

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed January 1, 2019

Schedule 23 Optional Water Heating

		Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
3		50	$20.58	$6.18	$26.76	$20.59	$6.18	$26.76	$0.00	0.0%
4		100	$24.17	$12.36	$36.52	$24.17	$12.36	$36.53	$0.01	0.0%
5		150	$27.75	$18.53	$46.28	$27.76	$18.53	$46.29	$0.01	0.0%
6		300	$38.50	$37.07	$75.56	$38.52	$37.07	$75.58	$0.02	0.0%
7		500	$52.83	$61.78	$114.60	$52.86	$61.78	$114.64	$0.03	0.0%
8		1,000	$88.65	$123.55	$212.20	$88.72	$123.55	$212.27	$0.07	0.0%
9		2,000	$160.30	$247.10	$407.40	$160.44	$247.10	$407.54	$0.14	0.0%
10	Avg	644	$63.14	$79.57	$142.71	$63.19	$79.57	$142.75	$0.05	0.0%

		Current Rates	Proposed Rates	Change
13	Customer Charge	$17.00	$17.00	$ -
14	Distribution Energy	$0.02574	$0.02574	$ -
15	Revenue Decoupling	($0.00043)	($0.00043)	$ -
16	Solar Massachusetts Renewable Target	$0.00067	$0.00067	$ -
17	Residential Assistance Adjustment Factor	$0.00365	$0.00365	$ -
18	Pension Adjustment Factor	$0.00064	$0.00064	$ -
19	Net Metering Recovery Surcharge	$0.00477	$0.00477	$ -
20	Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
21	AG Consulting Expense	$0.00001	$0.00001	$ -
22	Storm Cost Recovery Adjustment Factor	$0.00275	$0.00275	$ -
23	Storm Reserve Adjustment	$0.00000	$0.00000	$ -
24	Basic Service Cost True Up Factor	($0.00018)	($0.00018)	$ -
25	Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
26	Solar Expansion Cost Recovery Factor	$0.00057	$0.00057	$ -
27	Vegetation Management	$0.00114	$0.00114	$ -
28	Tax Act Credit Factor	($0.00101)	($0.00101)	$ -
29	Grid Modernization	$0.00000	$0.00007	$0.00007
30	Transition	($0.00052)	($0.00052)	$ -
31	Transmission Energy	$0.01936	$0.01936	$ -
32	Energy Efficiency Reconciliation Factor	$0.00972	$0.00972	$ -
33	System Benefits Charge	$0.00250	$0.00250	$ -
34	Renewable Energy Charge	$0.00050	$0.00050	$ -
35	Basic Service Charge	$0.12355	$0.12355	$ -

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed January 1, 2019

Rate 24 Optional Church Service

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 100										
		5	500	$103.44	$61.78	$165.22	$103.48	$61.78	$165.25	$0.03	0.0%
		10	1,000	$156.92	$123.55	$280.47	$156.99	$123.55	$280.54	$0.07	0.0%
		15	1,500	$210.40	$185.33	$395.73	$210.51	$185.33	$395.83	$0.11	0.0%
		30	3,000	$370.84	$370.65	$741.49	$371.05	$370.65	$741.70	$0.21	0.0%
		60	6,000	$691.72	$741.30	$1,433.02	$692.14	$741.30	$1,433.44	$0.42	0.0%
		100	10,000	$1,119.56	$1,235.50	$2,355.06	$1,120.26	$1,235.50	$2,355.76	$0.70	0.0%
Avg		13	1,300	$189.01	$160.62	$349.62	$189.10	$160.62	$349.71	$0.09	0.0%
	Hours Use: 200										
		5	1,000	$119.32	$123.55	$242.87	$119.39	$123.55	$242.94	$0.07	0.0%
		10	2,000	$188.68	$247.10	$435.78	$188.82	$247.10	$435.92	$0.14	0.0%
		15	3,000	$258.04	$370.65	$628.69	$258.25	$370.65	$628.90	$0.21	0.0%
		30	6,000	$466.12	$741.30	$1,207.42	$466.54	$741.30	$1,207.84	$0.42	0.0%
		60	12,000	$882.28	$1,482.60	$2,364.88	$883.12	$1,482.60	$2,365.72	$0.84	0.0%
		100	20,000	$1,437.16	$2,471.00	$3,908.16	$1,438.56	$2,471.00	$3,909.56	$1.40	0.0%
Avg		21	4,200	$341.27	$518.91	$860.18	$341.57	$518.91	$860.48	$0.29	0.0%
	Hours Use: 300										
		5	1,500	$135.20	$185.33	$320.53	$135.31	$185.33	$320.63	$0.11	0.0%
		10	3,000	$220.44	$370.65	$591.09	$220.65	$370.65	$591.30	$0.21	0.0%
		15	4,500	$305.68	$555.98	$861.66	$306.00	$555.98	$861.97	$0.32	0.0%
		30	9,000	$561.40	$1,111.95	$1,673.35	$562.03	$1,111.95	$1,673.98	$0.63	0.0%
		60	18,000	$1,072.84	$2,223.90	$3,296.74	$1,074.10	$2,223.90	$3,298.00	$1.26	0.0%
		100	30,000	$1,754.76	$3,706.50	$5,461.26	$1,756.86	$3,706.50	$5,463.36	$2.10	0.0%
Avg		24	7,200	$459.11	$889.56	$1,348.67	$459.62	$889.56	$1,349.18	$0.50	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$65.00	$65.00	$ -
Distribution Demand >2 KW	$4.08	$4.08	$ -
Transmission Demand >2 KW	$3.44	$3.44	$ -
Distribution Energy	$0.00521	$0.00521	$ -
Revenue Decoupling	($0.00043)	($0.00043)	$ -
Solar Massachusetts Renewable Target	$0.00067	$0.00067	$ -
Residential Assistance Adjustment Factor	$0.00365	$0.00365	$ -
Pension Adjustment Factor	$0.00064	$0.00064	$ -
Net Metering Recovery Surcharge	$0.00477	$0.00477	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00275	$0.00275	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00018)	($0.00018)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00057	$0.00057	$ -
Vegetation Management	$0.00114	$0.00114	$ -
Tax Act Credit Factor	($0.00101)	($0.00101)	$ -
Grid Modernization	$0.00000	$0.00007	$0.00007
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00972	$0.00972	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.12355	$0.12355	$ -

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed January 1, 2019

Rate G-0 Small General Service

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 150										
		5	750	$85.99	$92.66	$178.65	$86.04	$92.66	$178.70	$0.05	0.0%
		10	1,500	$190.10	$185.33	$375.42	$190.20	$185.33	$375.53	$0.10	0.0%
		15	2,250	$294.20	$277.99	$572.19	$294.36	$277.99	$572.35	$0.16	0.0%
		20	3,000	$398.31	$370.65	$768.96	$398.52	$370.65	$769.17	$0.21	0.0%
		50	7,500	$1,022.96	$926.63	$1,949.58	$1,023.48	$926.63	$1,950.11	$0.52	0.0%
Avg		6	900	$106.81	$111.20	$218.00	$106.87	$111.20	$218.07	$0.06	0.0%
	Hours Use: 300										
		5	1,500	$107.30	$185.33	$292.62	$107.40	$185.33	$292.73	$0.11	0.0%
		10	3,000	$232.71	$370.65	$603.36	$232.92	$370.65	$603.57	$0.21	0.0%
		15	4,500	$358.13	$555.98	$914.10	$358.44	$555.98	$914.42	$0.32	0.0%
		20	6,000	$483.54	$741.30	$1,224.84	$483.96	$741.30	$1,225.26	$0.42	0.0%
		50	15,000	$1,236.03	$1,853.25	$3,089.28	$1,237.08	$1,853.25	$3,090.33	$1.05	0.0%
Avg		11	3,300	$257.79	$407.72	$665.51	$258.02	$407.72	$665.74	$0.23	0.0%
	Hours Use: 450										
		5	2,250	$128.60	$277.99	$406.59	$128.76	$277.99	$406.75	$0.16	0.0%
		10	4,500	$275.33	$555.98	$831.30	$275.64	$555.98	$831.62	$0.32	0.0%
		15	6,750	$422.05	$833.96	$1,256.01	$422.52	$833.96	$1,256.48	$0.47	0.0%
		20	9,000	$568.77	$1,111.95	$1,680.72	$569.40	$1,111.95	$1,681.35	$0.63	0.0%
		50	22,500	$1,449.11	$2,779.88	$4,228.98	$1,450.68	$2,779.88	$4,230.56	$1.58	0.0%
Avg		17	7,650	$480.74	$945.16	$1,425.89	$481.27	$945.16	$1,426.43	$0.54	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$15.00	$15.00	$ -
Distribution Demand >2 KW	$9.47	$9.47	$ -
Transmission Demand >2 KW	$7.09	$7.09	$ -
Distribution Energy	$0.00186	$0.00186	$ -
Revenue Decoupling	($0.00043)	($0.00043)	$ -
Solar Massachusetts Renewable Target	$0.00067	$0.00067	$ -
Residential Assistance Adjustment Factor	$0.00365	$0.00365	$ -
Pension Adjustment Factor	$0.00064	$0.00064	$ -
Net Metering Recovery Surcharge	$0.00477	$0.00477	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00275	$0.00275	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00018)	($0.00018)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00057	$0.00057	$ -
Vegetation Management	$0.00114	$0.00114	$ -
Tax Act Credit Factor	($0.00101)	($0.00101)	$ -
Grid Modernization	$0.00000	$0.00007	$0.00007
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00972	$0.00972	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.12355	$0.12355	$ -

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed January 1, 2019

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

	Monthly kW	Monthly kWh	Current Monthly Bill Delivery	Current Monthly Bill Supplier	Current Monthly Bill Total	Proposed Monthly Bill Delivery	Proposed Monthly Bill Supplier	Proposed Monthly Bill Total	Total Bill Impact Change	Total Bill Impact % Change
Hours Use: 150										
	5	750	$100.49	$92.66	$193.15	$100.54	$92.66	$193.20	$0.05	0.0%
	10	1,500	$204.03	$185.33	$389.36	$204.14	$185.33	$389.46	$0.10	0.0%
	15	2,250	$307.58	$277.99	$585.56	$307.73	$277.99	$585.72	$0.16	0.0%
	20	3,000	$411.12	$370.65	$781.77	$411.33	$370.65	$781.98	$0.21	0.0%
	50	7,500	$1,032.40	$926.63	$1,959.02	$1,032.92	$926.63	$1,959.55	$0.52	0.0%
Avg	1	150	$34.18	$18.53	$52.71	$34.19	$18.53	$52.72	$0.01	0.0%
Hours Use: 300										
	5	1,500	$121.38	$185.33	$306.71	$121.49	$185.33	$306.81	$0.11	0.0%
	10	3,000	$245.82	$370.65	$616.47	$246.03	$370.65	$616.68	$0.21	0.0%
	15	4,500	$370.26	$555.98	$926.24	$370.58	$555.98	$926.55	$0.31	0.0%
	20	6,000	$494.70	$741.30	$1,236.00	$495.12	$741.30	$1,236.42	$0.42	0.0%
	50	15,000	$1,241.35	$1,853.25	$3,094.60	$1,242.40	$1,853.25	$3,095.65	$1.05	0.0%
Avg	4	1,200	$96.49	$148.26	$244.75	$96.58	$148.26	$244.84	$0.08	0.0%
Hours Use: 450										
	5	2,250	$142.28	$277.99	$420.26	$142.43	$277.99	$420.42	$0.16	0.0%
	10	4,500	$287.61	$555.98	$843.59	$287.93	$555.98	$843.90	$0.32	0.0%
	15	6,750	$432.95	$833.96	$1,266.91	$433.42	$833.96	$1,267.39	$0.47	0.0%
	20	9,000	$578.29	$1,111.95	$1,690.24	$578.92	$1,111.95	$1,690.87	$0.63	0.0%
	50	22,500	$1,450.31	$2,779.88	$4,230.18	$1,451.88	$2,779.88	$4,231.76	$1.57	0.0%
Avg	10	4,500	$287.61	$555.98	$843.59	$287.93	$555.98	$843.90	$0.32	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$30.00	$30.00	$ -
Distribution Demand >2 KW	$9.44	$9.44	$ -
Transmission Demand >2 KW	$7.09	$7.09	$ -
Distribution Energy - Peak	$0.00296	$0.00296	$ -
Distribution Energy - Off Peak	$0.00079	$0.00079	$ -
Revenue Decoupling	($0.00043)	($0.00043)	$ -
Solar Massachusetts Renewable Target	$0.00067	$0.00067	$ -
Residential Assistance Adjustment Factor	$0.00365	$0.00365	$ -
Pension Adjustment Factor	$0.00064	$0.00064	$ -
Net Metering Recovery Surcharge	$0.00477	$0.00477	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00001	$0.00001	$ -
Storm Cost Recovery Adjustment Factor	$0.00275	$0.00275	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00018)	($0.00018)	$ -
Solar Program Cost Adjustment Factor	$0.00003	$0.00003	$ -
Solar Expansion Cost Recovery Factor	$0.00057	$0.00057	$ -
Vegetation Management	$0.00114	$0.00114	$ -
Tax Act Credit Factor	($0.00101)	($0.00101)	$ -
Grid Modernization	$0.00000	$0.00007	$0.00007
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00972	$0.00972	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.12355	$0.12355	$ -

On-Peak Use:	24%
Off-Peak Use:	76%

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed January 1, 2019

Rate G-2 Primary General Service

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 250										
		50	12,500	$1,079.88	$1,235.25	$2,315.13	$1,080.50	$1,235.25	$2,315.75	$0.63	0.0%
		75	18,750	$1,600.81	$1,852.88	$3,453.69	$1,601.75	$1,852.88	$3,454.63	$0.94	0.0%
		100	25,000	$2,121.75	$2,470.50	$4,592.25	$2,123.00	$2,470.50	$4,593.50	$1.25	0.0%
		150	37,500	$3,163.63	$3,705.75	$6,869.38	$3,165.50	$3,705.75	$6,871.25	$1.88	0.0%
		200	50,000	$4,205.50	$4,941.00	$9,146.50	$4,208.00	$4,941.00	$9,149.00	$2.50	0.0%
		300	75,000	$6,289.25	$7,411.50	$13,700.75	$6,293.00	$7,411.50	$13,704.50	$3.75	0.0%
Avg		95	23,750	$2,017.56	$2,346.98	$4,364.54	$2,018.75	$2,346.98	$4,365.73	$1.19	0.0%
	Hours Use: 350										
		50	10,000	$1,020.70	$988.20	$2,008.90	$1,021.20	$988.20	$2,009.40	$0.50	0.0%
		75	22,500	$1,689.58	$2,223.45	$3,913.03	$1,690.70	$2,223.45	$3,914.15	$1.12	0.0%
		100	40,000	$2,476.80	$3,952.80	$6,429.60	$2,478.80	$3,952.80	$6,431.60	$2.00	0.0%
		150	75,000	$4,051.25	$7,411.50	$11,462.75	$4,055.00	$7,411.50	$11,466.50	$3.75	0.0%
		200	100,000	$5,389.00	$9,882.00	$15,271.00	$5,394.00	$9,882.00	$15,276.00	$5.00	0.0%
		300	150,000	$8,064.50	$14,823.00	$22,887.50	$8,072.00	$14,823.00	$22,895.00	$7.50	0.0%
Avg		84	42,000	$2,285.42	$4,150.44	$6,435.86	$2,287.52	$4,150.44	$6,437.96	$2.10	0.0%
	Hours Use: 450										
		50	22,500	$1,316.58	$2,223.45	$3,540.03	$1,317.70	$2,223.45	$3,541.15	$1.12	0.0%
		75	33,750	$1,955.86	$3,335.18	$5,291.04	$1,957.55	$3,335.18	$5,292.73	$1.69	0.0%
		100	45,000	$2,595.15	$4,446.90	$7,042.05	$2,597.40	$4,446.90	$7,044.30	$2.25	0.0%
		150	67,500	$3,873.73	$6,670.35	$10,544.08	$3,877.10	$6,670.35	$10,547.45	$3.38	0.0%
		200	90,000	$5,152.30	$8,893.80	$14,046.10	$5,156.80	$8,893.80	$14,050.60	$4.50	0.0%
		300	135,000	$7,709.45	$13,340.70	$21,050.15	$7,716.20	$13,340.70	$21,056.90	$6.75	0.0%
Avg		94	42,300	$2,441.72	$4,180.09	$6,621.81	$2,443.84	$4,180.09	$6,623.92	$2.11	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$353.00	$353.00	$ -
Distribution Demand <= 50 kW	$1.70	$1.70	$ -
Distribution Demand Charge >50 kW	$8.00	$8.00	$ -
Transmission Demand	$6.92	$6.92	$ -
Distribution Energy	$0.00179	$0.00179	$ -
Revenue Decoupling	($0.00028)	($0.00028)	$ -
Solar Massachusetts Renewable Target	$0.00043	$0.00043	$ -
Residential Assistance Adjustment Factor	$0.00234	$0.00234	$ -
Pension Adjustment Factor	$0.00037	$0.00037	$ -
Net Metering Recovery Surcharge	$0.00305	$0.00305	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00176	$0.00176	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00012)	($0.00012)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00036	$0.00036	$ -
Vegetation Management	$0.00066	$0.00066	$ -
Tax Act Credit Factor	($0.00065)	($0.00065)	$ -
Grid Modernization	$0.00000	$0.00005	$0.00005
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00972	$0.00972	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.09882	$0.09882	$ -

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed January 1, 2019

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

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 250										
		50	12,500	$1,073.27	$1,235.25	$2,308.52	$1,073.90	$1,235.25	$2,309.15	$0.63	0.0%
		75	18,750	$1,591.16	$1,852.88	$3,444.03	$1,592.10	$1,852.88	$3,444.97	$0.94	0.0%
		100	25,000	$2,109.05	$2,470.50	$4,579.55	$2,110.30	$2,470.50	$4,580.80	$1.25	0.0%
		150	37,500	$3,144.82	$3,705.75	$6,850.57	$3,146.69	$3,705.75	$6,852.44	$1.88	0.0%
		200	50,000	$4,180.59	$4,941.00	$9,121.59	$4,183.09	$4,941.00	$9,124.09	$2.50	0.0%
		300	75,000	$6,252.14	$7,411.50	$13,663.64	$6,255.89	$7,411.50	$13,667.39	$3.75	0.0%
	Avg	70	17,500	$1,487.58	$1,729.35	$3,216.93	$1,488.46	$1,729.35	$3,217.81	$0.88	0.0%
	Hours Use: 350										
		50	17,500	$1,188.98	$1,729.35	$2,918.33	$1,189.86	$1,729.35	$2,919.21	$0.88	0.0%
		75	26,250	$1,764.72	$2,594.03	$4,358.75	$1,766.03	$2,594.03	$4,360.06	$1.31	0.0%
		100	35,000	$2,340.46	$3,458.70	$5,799.16	$2,342.21	$3,458.70	$5,800.91	$1.75	0.0%
		150	52,500	$3,491.94	$5,188.05	$8,679.99	$3,494.57	$5,188.05	$8,682.62	$2.63	0.0%
		200	70,000	$4,643.43	$6,917.40	$11,560.83	$4,646.93	$6,917.40	$11,564.33	$3.50	0.0%
		300	105,000	$6,946.39	$10,376.10	$17,322.49	$6,951.64	$10,376.10	$17,327.74	$5.25	0.0%
	Avg	106	37,100	$2,478.64	$3,666.22	$6,144.86	$2,480.50	$3,666.22	$6,146.72	$1.86	0.0%
	Hours Use: 450										
		50	22,500	$1,304.69	$2,223.45	$3,528.14	$1,305.82	$2,223.45	$3,529.27	$1.13	0.0%
		75	33,750	$1,938.29	$3,335.18	$5,273.46	$1,939.97	$3,335.18	$5,275.15	$1.69	0.0%
		100	45,000	$2,571.88	$4,446.90	$7,018.78	$2,574.13	$4,446.90	$7,021.03	$2.25	0.0%
		150	67,500	$3,839.07	$6,670.35	$10,509.42	$3,842.45	$6,670.35	$10,512.80	$3.38	0.0%
		200	90,000	$5,106.26	$8,893.80	$14,000.06	$5,110.76	$8,893.80	$14,004.56	$4.50	0.0%
		300	135,000	$7,640.64	$13,340.70	$20,981.34	$7,647.39	$13,340.70	$20,988.09	$6.75	0.0%
	Avg	119	53,550	$3,053.41	$5,291.81	$8,345.22	$3,056.09	$5,291.81	$8,347.90	$2.68	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$353.00	$353.00	$ -
Distribution Demand <= 50 kW	$1.70	$1.70	$ -
Distribution Demand Charge >50 kW	$8.01	$8.01	$ -
Transmission Demand	$6.92	$6.92	$ -
Distribution Energy - Peak	$0.00269	$0.00269	$ -
Distribution Energy - Off Peak	$0.00076	$0.00076	$ -
Revenue Decoupling	($0.00028)	($0.00028)	$ -
Solar Massachusetts Renewable Target	$0.00043	$0.00043	$ -
Residential Assistance Adjustment Factor	$0.00234	$0.00234	$ -
Pension Adjustment Factor	$0.00037	$0.00037	$ -
Net Metering Recovery Surcharge	$0.00305	$0.00305	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00176	$0.00176	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00012)	($0.00012)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00036	$0.00036	$ -
Vegetation Management	$0.00066	$0.00066	$ -
Tax Act Credit Factor	($0.00065)	($0.00065)	$ -
Grid Modernization	$0.00000	$0.00005	$0.00005
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00972	$0.00972	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.09882	$0.09882	$ -

On-Peak Use:	26%
Off-Peak Use:	74%

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed January 1, 2019

Rate T-2 Large Primary General Service Time-of-Use

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 350										
		350	122,500	$8,575.26	$12,105.45	$20,680.71	$8,578.93	$12,105.45	$20,684.38	$3.67	0.0%
		425	148,750	$10,249.95	$14,699.48	$24,949.43	$10,254.42	$14,699.48	$24,953.89	$4.46	0.0%
		500	175,000	$11,924.65	$17,293.50	$29,218.15	$11,929.90	$17,293.50	$29,223.40	$5.25	0.0%
		650	227,500	$15,274.05	$22,481.55	$37,755.60	$15,280.87	$22,481.55	$37,762.42	$6.82	0.0%
		1,000	350,000	$23,954.30	$34,587.00	$58,541.30	$23,964.80	$34,587.00	$58,551.80	$10.50	0.0%
		1,500	525,000	$36,193.95	$51,880.50	$88,074.45	$36,209.70	$51,880.50	$88,090.20	$15.75	0.0%
		2,000	700,000	$47,358.60	$69,174.00	$116,532.60	$47,379.60	$69,174.00	$116,553.60	$21.00	0.0%
Avg		410	143,500	$9,915.01	$14,180.67	$24,095.68	$9,919.32	$14,180.67	$24,099.99	$4.31	0.0%
	Hours Use: 450										
		350	157,500	$9,317.19	$15,564.15	$24,881.34	$9,321.91	$15,564.15	$24,886.06	$4.73	0.0%
		425	191,250	$11,150.87	$18,899.33	$30,050.19	$11,156.61	$18,899.33	$30,055.93	$5.74	0.0%
		500	225,000	$12,984.55	$22,234.50	$35,219.05	$12,991.30	$22,234.50	$35,225.80	$6.75	0.0%
		650	292,500	$16,651.92	$28,904.85	$45,556.77	$16,660.69	$28,904.85	$45,565.54	$8.78	0.0%
		1,000	450,000	$26,074.10	$44,469.00	$70,543.10	$26,087.60	$44,469.00	$70,556.60	$13.50	0.0%
		1,500	675,000	$39,373.65	$66,703.50	$106,077.15	$39,393.90	$66,703.50	$106,097.40	$20.25	0.0%
		2,000	900,000	$51,598.20	$88,938.00	$140,536.20	$51,625.20	$88,938.00	$140,563.20	$27.00	0.0%
Avg		571	256,950	$14,720.44	$25,391.80	$40,112.24	$14,728.14	$25,391.80	$40,119.94	$7.71	0.0%
	Hours Use: 550										
		350	192,500	$10,059.12	$19,022.85	$29,081.97	$10,064.89	$19,022.85	$29,087.74	$5.77	0.0%
		425	233,750	$12,051.78	$23,099.18	$35,150.96	$12,058.80	$23,099.18	$35,157.97	$7.01	0.0%
		500	275,000	$14,044.45	$27,175.50	$41,219.95	$14,052.70	$27,175.50	$41,228.20	$8.25	0.0%
		650	357,500	$18,029.79	$35,328.15	$53,357.94	$18,040.51	$35,328.15	$53,368.66	$10.73	0.0%
		1,000	550,000	$28,193.90	$54,351.00	$82,544.90	$28,210.40	$54,351.00	$82,561.40	$16.50	0.0%
		1,500	825,000	$42,553.35	$81,526.50	$124,079.85	$42,578.10	$81,526.50	$124,104.60	$24.75	0.0%
		2,000	1,100,000	$55,837.80	$108,702.00	$164,539.80	$55,870.80	$108,702.00	$164,572.80	$33.00	0.0%
Avg		580	319,000	$16,169.96	$31,523.58	$47,693.54	$16,179.53	$31,523.58	$47,703.11	$9.57	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge <1000 kW	$760.00	$760.00	$ -
Customer Charge 1000 <= kW <1500kW	$1,625.00	$1,625.00	$ -
Customer Charge 1500 <= kW <2500kW	$2,700.00	$2,700.00	$ -
Distribution Demand - Peak	$6.47	$6.47	$ -
Transmission Demand - Peak	$8.44	$8.44	$ -
Distribution Energy - Peak	$0.00263	$0.00263	$ -
Distribution Energy - Off Peak	$0.00078	$0.00078	$ -
Revenue Decoupling	($0.00020)	($0.00020)	$ -
Solar Massachusetts Renewable Target	$0.00032	$0.00032	$ -
Residential Assistance Adjustment Factor	$0.00173	$0.00173	$ -
Pension Adjustment Factor	$0.00030	$0.00030	$ -
Net Metering Recovery Surcharge	$0.00225	$0.00225	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00130	$0.00130	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00009)	($0.00009)	$ -
Solar Program Cost Adjustment Factor	$0.00002	$0.00002	$ -
Solar Expansion Cost Recovery Factor	$0.00027	$0.00027	$ -
Vegetation Management	$0.00054	$0.00054	$ -
Tax Act Credit Factor	($0.00048)	($0.00048)	$ -
Grid Modernization	$0.00000	$0.00003	$0.00003
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00972	$0.00972	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.09882	$0.09882	$ -

On-Peak Use:	28%
Off-Peak Use:	72%

Western Massachusetts
Calculation of Monthly Typical Bill
Proposed January 1, 2019

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

		Monthly	Monthly	Current Monthly Bill			Proposed Monthly Bill			Total Bill Impact	
		kW	kWh	Delivery	Supplier	Total	Delivery	Supplier	Total	Change	% Change
	Hours Use: 350										
		2,500	875,000	$57,418.18	$86,467.50	$143,885.68	$57,435.68	$86,467.50	$143,903.18	$17.50	0.0%
		3,000	1,050,000	$68,141.81	$103,761.00	$171,902.81	$68,162.81	$103,761.00	$171,923.81	$21.00	0.0%
		5,000	1,750,000	$111,036.35	$172,935.00	$283,971.35	$111,071.35	$172,935.00	$284,006.35	$35.00	0.0%
		10,000	3,500,000	$218,272.70	$345,870.00	$564,142.70	$218,342.70	$345,870.00	$564,212.70	$70.00	0.0%
Avg		3,983	1,394,050	$89,224.48	$137,760.02	$226,984.50	$89,252.36	$137,760.02	$227,012.38	$27.88	0.0%
	Hours Use: 450										
		2,500	1,125,000	$62,066.23	$111,172.50	$173,238.73	$62,088.73	$111,172.50	$173,261.23	$22.50	0.0%
		3,000	1,350,000	$73,719.47	$133,407.00	$207,126.47	$73,746.47	$133,407.00	$207,153.47	$27.00	0.0%
		5,000	2,250,000	$120,332.45	$222,345.00	$342,677.45	$120,377.45	$222,345.00	$342,722.45	$45.00	0.0%
		10,000	4,500,000	$236,864.90	$444,690.00	$681,554.90	$236,954.90	$444,690.00	$681,644.90	$90.00	0.0%
Avg		6,855	3,084,750	$163,565.99	$304,835.00	$468,400.98	$163,627.68	$304,835.00	$468,462.68	$61.70	0.0%
	Hours Use: 550										
		2,500	1,375,000	$66,714.28	$135,877.50	$202,591.78	$66,741.78	$135,877.50	$202,619.28	$27.50	0.0%
		3,000	1,650,000	$79,297.13	$163,053.00	$242,350.13	$79,330.13	$163,053.00	$242,383.13	$33.00	0.0%
		5,000	2,750,000	$129,628.55	$271,755.00	$401,383.55	$129,683.55	$271,755.00	$401,438.55	$55.00	0.0%
		10,000	5,500,000	$255,457.10	$543,510.00	$798,967.10	$255,567.10	$543,510.00	$799,077.10	$110.00	0.0%
Avg		4,519	2,485,450	$117,523.84	$245,612.17	$363,136.01	$117,573.55	$245,612.17	$363,185.72	$49.71	0.0%

	Current Rates	Proposed Rates	Change
Customer Charge	$3,800.00	$3,800.00	$ -
Distribution Demand - Peak	$4.62	$4.62	$ -
Transmission Demand - Peak	$10.32	$10.32	$ -
Distribution Energy - Peak	$0.00264	$0.00264	$ -
Distribution Energy - Off Peak	$0.00078	$0.00078	$ -
Revenue Decoupling	($0.00011)	($0.00011)	$ -
Solar Massachusetts Renewable Target	$0.00017	$0.00017	$ -
Residential Assistance Adjustment Factor	$0.00096	$0.00096	$ -
Pension Adjustment Factor	$0.00019	$0.00019	$ -
Net Metering Recovery Surcharge	$0.00125	$0.00125	$ -
Long Term Renewable Contract Adjustment	$0.00174	$0.00174	$ -
AG Consulting Expense	$0.00000	$0.00000	$ -
Storm Cost Recovery Adjustment Factor	$0.00072	$0.00072	$ -
Storm Reserve Adjustment	$0.00000	$0.00000	$ -
Basic Service Cost True Up Factor	($0.00005)	($0.00005)	$ -
Solar Program Cost Adjustment Factor	$0.00001	$0.00001	$ -
Solar Expansion Cost Recovery Factor	$0.00015	$0.00015	$ -
Vegetation Management	$0.00034	$0.00034	$ -
Tax Act Credit Factor	($0.00026)	($0.00026)	$ -
Grid Modernization	$0.00000	$0.00002	$0.00002
Transition	($0.00052)	($0.00052)	$ -
Transmission Energy	$0.00000	$0.00000	$ -
Energy Efficiency Reconciliation Factor	$0.00972	$0.00972	$ -
System Benefits Charge	$0.00250	$0.00250	$ -
Renewable Energy Charge	$0.00050	$0.00050	$ -
Basic Service Charge	$0.09882	$0.09882	$ -

On-Peak Use: 27%
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

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

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.

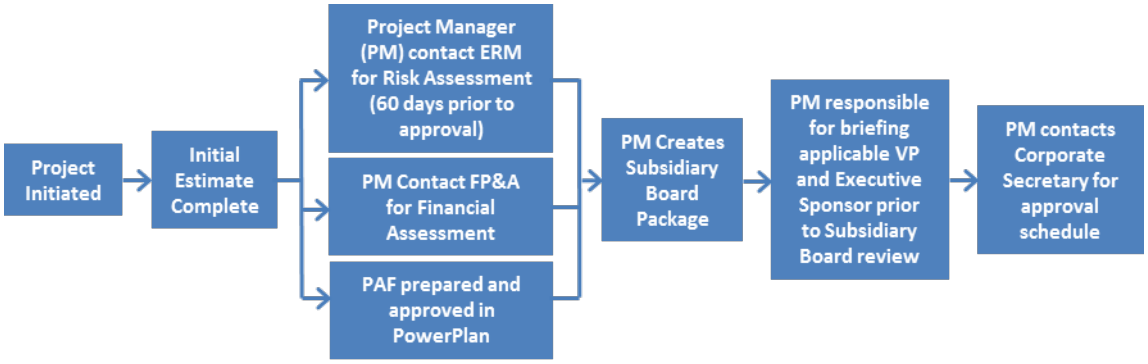
The project initiator or project manager is responsible for working with Plant Accounting to ensure that the PAF has a proper break-out of capital and O&M amounts prior to submitting it for approval through the DOA and for Software as a Service (SaaS)/Cloud projects, that a separate analysis has been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

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

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

Business	Project Authorization Form is Required at this Level Annual Program Type	Work Orders Track Actual Installations 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.

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:

<u>For Corporate Shared Services Projects:</u>

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

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

- 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

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

        - 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.

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

- 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

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

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

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: *Specific / Annual / Prelim Project / Parent*
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	$ -	$ -	$ -	$ -	$ -

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).

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.

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

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

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: *Specific / Annual / Prelim Project / Parent*
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: Total Funding Request:	Software Projects Only – Estimated Life of Asset: ____ 5 years ____ 10 Years ____15 Years

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.)

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.

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*

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).

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.

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.

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.

Supplement Request Form

Date Prepared:	Project Title:
Company/Companies:	Project ID Number:
Organization:	Plant Class/(F.P.Type):
Project Initiator:	Project Type: *Specific / Annual / Prelim Project / Parent*
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

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	**$ -**	**$ -**	**$ -**	**$ -**

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

2018 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 2018
	Additions																
1			12170	Automated Feeder Reconfiguration	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,920	$ 11,489	$ 12,833	$ 36,241
2	Grid Modernization - 2018 Projects	364	12175	Urban Underground Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 31,077	$ 130,842	$ 76,766	$ 238,685
3			12190	Advanced Sensing Technology	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,714	$ 8,309	$ 3,058	$ 14,080
4					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 45,711**	**$ 150,639**	**$ 92,657**	**$ 289,007**
5			12170	Automated Feeder Reconfiguration	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 243,821	$ 167,981	$ 484,791	$ 896,593
6	Grid Modernization - 2018 Projects	365	12175	Urban Underground Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 31,077	$ 130,842	$ 76,766	$ 238,685
7			12190	Advanced Sensing Technology	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,219	$ 73,769	$ 371,461	$ 236,130	$ 686,580
8					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,219**	**$ 348,668**	**$ 670,284**	**$ 797,688**	**$ 1,821,858**
9	Grid Modernization - 2018 Projects	366	12165	Electric Vehicle Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ 43,457	$ 43,457
10			12175	Urban Underground Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 31,077	$ 130,842	$ 76,766	$ 238,685
11					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 31,077**	**$ 130,842**	**$ 120,224**	**$ 282,142**
12	Grid Modernization - 2018 Projects	367	12175	Urban Underground Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 31,077	$ 130,842	$ 76,766	$ 238,685
13					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 31,077**	**$ 130,842**	**$ 76,766**	**$ 238,685**
14	Grid Modernization - 2018 Projects	369	12165	Electric Vehicle Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 19,624	$ -	$ 1,233,105	$ 1,252,729
15					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 19,624**	**$ -**	**$ 1,233,105**	**$ 1,252,729**
16	Grid Modernization - Subtotal Additions - 2018 Projects				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,219	$ 476,157	$ 1,082,606	$ 2,320,439	$ 3,884,422
17																	
18	**Grid Modernization - Total Additions in 2018**				**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,219**	**$ 476,157**	**$ 1,082,606**	**$ 2,320,439**	**$ 3,884,422**

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 2018
	Cost of Removal																
23			12170	Automated Feeder Reconfiguration	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1	$ 151	$ 475	$ 816	$ 101	$ 1,544
24	Grid Modernization - 2018 Projects	364	12175	Urban Underground Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,154	$ 466	$ 8,218	$ 7,243	$ 7,908	$ 24,989
25			12190	Advanced Sensing Technology	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3	$ 47	$ 116	$ 92	$ 137	$ 394
26					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,157**	**$ 664**	**$ 8,809**	**$ 8,151**	**$ 8,146**	**$ 26,927**
27			12170	Automated Feeder Reconfiguration	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17	$ 2,894	$ 9,719	$ 10,327	$ 2,593	$ 25,549
28	Grid Modernization - 2018 Projects	365	12175	Urban Underground Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,154	$ 466	$ 8,218	$ 7,243	$ 7,908	$ 24,989
29			12190	Advanced Sensing Technology	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 193	$ 1,325	$ 3,641	$ 4,037	$ 5,617	$ 14,814
30					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,364**	**$ 4,686**	**$ 21,578**	**$ 21,606**	**$ 16,118**	**$ 65,352**
31	Grid Modernization - 2018 Projects	366	12175	Urban Underground Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,154	$ 466	$ 8,218	$ 7,243	$ 7,908	$ 24,989
32					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,154**	**$ 466**	**$ 8,218**	**$ 7,243**	**$ 7,908**	**$ 24,989**
33	Grid Modernization - 2018 Projects	367	12175	Urban Underground Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,154	$ 466	$ 8,218	$ 7,243	$ 7,908	$ 24,989
34					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,154**	**$ 466**	**$ 8,218**	**$ 7,243**	**$ 7,908**	**$ 24,989**
35	Grid Modernization - 2018 Projects	369	12165	Electric Vehicle Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2	$ 2
36					**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 2**	**$ 2**
37	Grid Modernization - Subtotal Cost of Removal - 2018 Projects				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,829	$ 6,282	$ 46,823	$ 44,243	$ 40,081	$ 142,258
38																	
39	**Grid Modernization - Total Cost of Removal in 2018**				**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 4,829**	**$ 6,282**	**$ 46,823**	**$ 44,243**	**$ 40,081**	**$ 142,258**
40																	
41	**Grid Modernization - Total Investment**				**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 4,829**	**$ 11,501**	**$ 522,980**	**$ 1,126,849**	**$ 2,360,520**	**$ 4,026,680**

2018 Total Additions by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect / Overheads	Labor	Material	Other	Total Additions
12165Electric Vehicle Infrastructure	**18296**	02288353	EVL2NEJC BED 125 EV MIDDLESEX TPK	102,220.88	1,165.56	1,851.35			105,237.79
		02288360	EVL2NEJC WIN EV LARAWAY RD WINCHES	87,646.88	5,132.86	3,637.27	11,195.96		107,612.97
		02288493	EVL2NEJC WTD 247 EV-1 STATION DR	108,623.88	2,356.56	3,405.15		9.00	114,394.59
		02288673	EVL2NEJC LIN 208 S GREAT RD MASS	135,786.55	8,512.63	13,433.56	283.99	36.00	158,052.73
		02293085	EVL2NEJC LEX 300 EV CHARGER SHIR	122,390.88	6,245.14	5,947.66	8,438.58	63.00	143,085.26
		02294136	EVL2NEJC NEW 1000 COMM AVE. C OF NE	171,780.55	4,646.68	7,005.77	712.33	36.00	184,181.33
		02296316	EVL2NEJC PLY 5 EV RUSSELL ST PLYM	96,336.89	1,254.06	2,043.63			99,634.58
		02300157	EVL2NEJC MIL 525 EV CHARGER CANT	67,199.88	8,479.91	8,094.51	14,354.20		98,128.50
		02300187	EVL2NEJC MDW 155 EV CHARGE VILLAG	63,000.07	1,763.99	3,044.06	273.21		68,081.33
		02300215	EVL2NEJC MDW 26 EV CHARGE HIGH ST	68,809.29	1,618.55	2,666.73	487.35		73,581.92
	18296 Total			**1,023,795.75**	**41,175.94**	**51,129.69**	**35,745.62**	**144.00**	**1,151,991.00**
	EV41L2EJ	6A821844	NJC - Greenfield, Olive St - Elec V	63,660.45	387.09	145.19			64,192.73
		6B821194	ETB - PITTSFIELD, KENT AVE; Elec Ve	76,908.20	1,098.97	1,995.05			80,002.22
	EV41L2EJ Total			**140,568.65**	**1,486.06**	**2,140.24**			**144,194.95**
12165Electric Vehicle Infrastructure Total				**1,164,364.40**	**42,662.00**	**53,269.93**	**35,745.62**	**144.00**	**1,296,185.95**
12170Automated Feeder Reconfiguration	**WD00298**	6A821670	GRID MOD; INSTALL RECLOSER 21C7-62R	1,468.40	18,464.68	5,931.29	33,841.10	75.67	59,781.14
		6A821672	GRID MOD: INSTALL VS RECLOSER 21C7-	1,680.88	23,158.84	8,615.28	34,383.61	247.17	68,085.78
		6A821673	GRID MOD; INSTALL TRIPLE SINGLE REC	1,542.43	21,045.04	7,906.82	30,946.01	209.44	61,649.74
		6A821674	GRID MOD; INSTALL RECLOSER VS 22B7-	1,511.77	22,020.52	8,129.11	32,940.22	169.59	64,771.21
		6A821675	GRID MOD; INSTALL RECLOSER AND FORM	2,199.70	21,231.69	5,251.12	33,687.43	171.39	62,541.33
		6A821676	GRID MOD - NJC - Montague, N. Lever		18,237.41	5,458.34	32,641.57	150.38	56,487.70
		6A822178	GRID MOD: INSTALL VS RECLOSER 21C4-	7,409.52	21,715.16	2,486.17	33,292.71	88.29	64,991.85
		6A822179	GRID MOD: INSTALL VS RECL 21C4-XXXX	7,913.60	21,082.61	2,397.92	31,211.20	83.29	62,688.62
		6B820912	GRID MOD; INSTALL RECLOSER 19A1-81	1,585.04	19,798.82	6,515.30	34,469.12	132.83	62,501.11
		6B820914	GRID MOD; NEW RECLOSER LOCATION SR	1,493.84	23,155.25	7,295.43	32,899.95	253.65	65,098.12
		6S821808	GRID MOD; INSTALL RECLOSER 16C17-92	30,554.63	35,919.01	2,237.25	31,918.36	126.40	100,755.65
		6S821809	GRID MOD; INSTALL SR RECLOSER 30A1-	22,026.88	34,756.65	2,586.53	34,303.63	64.34	93,738.03
		6S821810	GRID MOD; INSTALL SR RECLOSER 16C17	21,697.75	28,287.23	1,842.63	34,271.78	73.18	86,172.57
		6S822178	AGAWAM 16C17 30A1 GRID MOD FUSING	12,132.98	10,484.08		944.95	9.56	23,571.57
	WD00298 Total			**113,217.42**	**319,356.99**	**66,653.19**	**431,751.64**	**1,855.18**	**932,834.42**
12170Automated Feeder Reconfiguration Total				**113,217.42**	**319,356.99**	**66,653.19**	**431,751.64**	**1,855.18**	**932,834.42**
12175Urban Underground Automation	**18328**	02291488	ASU ROX TREMONT ST-RPL OIL SW	41,131.30	97,452.22	30,209.29	61,058.95	1,239.05	231,090.81
		02291489	ASU ROX HUNTINGTON AVE-RPL OI	6,875.75	33,523.19	16,081.80	16,082.75	210.69	72,774.18
		02291492	ASU BOS CLARENDON ST-RPL OIL	11,311.42	63,406.54	28,377.39	28,081.01	720.11	131,896.47
		02291493	ASU BOS CHANDLER ST-RPL OIL S	1,665.43	16,267.08	2,828.64	26,827.76	53.14	47,642.05
		02291596	ASU H-P HYDE PARK AVE REPLACE	4,351.15	7,194.99	1,452.14	14,635.24	28.41	27,661.93
		02291599	ASU W-R SOUTH ST REPL OIL SW	9,692.71	29,232.59	10,596.65	16,357.61	152.49	66,032.05
		02291634	ASU DOR BIRD ST OIL SW REPL M	43,755.22	116,376.46	46,723.45	30,818.43	1,032.22	238,705.78
		02291640	ASU DOR RIVER ST OIL SW REPL	11,124.86	63,498.40	28,740.75	34,919.46	654.54	138,938.01
	18328 Total			**129,907.84**	**426,951.47**	**165,010.11**	**228,781.21**	**4,090.65**	**954,741.28**
12175Urban Underground Automation Total				**129,907.84**	**426,951.47**	**165,010.11**	**228,781.21**	**4,090.65**	**954,741.28**
12190Advanced Sensing Technology	**WD00300**	6A821472	GRID MOD; RPL OIL RECLOSER 21C7-70S	835.19	25,773.61	6,378.61	33,713.90	231.00	66,932.31
		6A821474	REPL OIL RECLOSER 21C7-90T WITH VAC	1,072.84	22,510.86	5,228.48	30,851.74	146.03	59,809.95
		6A821475	RPL 3 SGL HYDROLIC RECLOSERS ON PO	903.71	29,313.67	9,243.55	31,507.43	374.44	71,342.80
		6A821563	French King HWY @ Wunsch Rd; INST 2	199.50	2,118.59	1,137.22	100.16	13.78	3,569.25
		6A821564		99.75	1,269.27	624.85	91.78	8.38	2,094.03
		6A821565	Greenfield Rd @ Childs Cross Rd; IN	99.75	1,769.49	974.84	84.44	10.53	2,939.05
		6A822180	GRD MOD: REPLACE SR RECLOSER 21C4-7	6,974.96	19,260.62	1,720.42	32,726.67	76.57	60,759.24
		6A822185	GRID MOD: INSTALL TR RECLOSER 19J1-	7,047.13	19,387.36	1,784.55	30,214.70	62.81	58,496.55
		6A822186	GRID MOD: INSTALL TR RECLOSER 19J1-	6,729.45	18,002.99	1,439.41	31,096.41	62.52	57,330.78
		6A822362	S. Maple St @ Russell St; Add radio	133.00	2,299.31	1,134.14	57.06	11.79	3,635.30
		6B820766	GRID MOD; RPL OIL RECLOSER 18C2-70S	997.50	24,246.94	5,541.47	33,699.22	323.53	64,808.66
		6B820767	GRID MOD; RPL OIL RECLOSER 18C2-90T	1,112.88	22,934.55	5,324.14	31,362.10	368.12	61,101.79
		6B820768	GRID MOD; RPL OIL RECLOSER 19A505 W	939.84	24,187.75	5,506.89	32,920.77	418.10	63,973.35
		6B820769	GRID MOD; RPL OIL RECLOSER 19A525 W	2,435.17	22,111.77	4,310.39	33,504.52	243.31	62,605.16
		6S821675	Kings HWY @ Pine St; Add radio to 2	325.00	4,329.83	2,192.42	67.57	1.63	6,916.45
		6S821677	South St @ Mark Dr; Add radio to 30	133.00	880.66	446.84	67.57	0.26	1,528.33
		6S822290	REPLACE TIE RECLOSER; NEW NOMENCLAT		17,779.13	4,785.29	30,169.26	83.49	52,817.17
	WD00300 Total			**30,038.67**	**258,176.40**	**57,773.51**	**352,235.30**	**2,436.29**	**700,660.17**
12190Advanced Sensing Technology Total				**30,038.67**	**258,176.40**	**57,773.51**	**352,235.30**	**2,436.29**	**700,660.17**
Total Additions				**1,437,528.33**	**1,047,146.86**	**342,706.74**	**1,048,513.77**	**8,526.12**	**3,884,421.82**

2018 Total Cost of Removal by Investment Type

Line of Business	Funding Project	Accounting Work Order	Accounting Work Order Description	Contractor	Indirect / Overheads	Labor	Material	Other	Total Cost of Removal
12165Electric Vehicle Infrastructure	**EV41L2EJ**	6B821194	ETB - PITTSFIELD, KENT AVE; Elec Ve		2.26	-			2.26
	EV41L2EJ Total				**2.26**	**-**			**2.26**
12165Electric Vehicle Infrastructure Total					**2.26**	**-**			**2.26**
12170Automated Feeder Reconfiguration	**WD00298**	6A821670	GRID MOD; INSTALL RECLOSER 21C7-62R	105.48	839.16	426.05		0.34	1,371.03
		6A821672	GRID MOD: INSTALL VS RECLOSER 21C7-	67.73	654.65	347.20			1,069.58
		6A821673	GRID MOD; INSTALL TRIPLE SINGLE REC	47.27	454.43	242.35		1.18	745.23
		6A821674	GRID MOD; INSTALL RECLOSER VS 22B7-	19.47	196.50	104.75			320.72
		6A821675	GRID MOD; INSTALL RECLOSER AND FORM	50.71	253.68	121.06		0.45	425.90
		6A821676	GRID MOD - NJC - Montague, N. Lever		1,377.17	808.38			2,185.55
		6A822178	GRID MOD: INSTALL VS RECLOSER 21C4-	159.56	238.16	53.53		0.42	451.67
		6A822179	GRID MOD: INSTALL VS RECL 21C4-XXXX	180.71	246.93	54.72		0.43	482.79
		6B820912	GRID MOD; INSTALL RECLOSER 19A1-81	68.32	562.24	280.84			911.40
		6B820914	GRID MOD; NEW RECLOSER LOCATION SR	12.50	138.24	61.08		0.32	212.14
		6S821808	GRID MOD; INSTALL RECLOSER 16C17-92	3,727.56	3,588.62	272.94		0.80	7,589.92
		6S821809	GRID MOD; INSTALL SR RECLOSER 30A1-	5,617.43	0.00	-			5,617.43
		6S821810	GRID MOD; INSTALL SR RECLOSER 16C17	2,743.06	2,733.61	232.94			5,709.61
	WD00298 Total			**12,799.80**	**11,283.39**	**3,005.84**		**3.94**	**27,092.97**
12170Automated Feeder Reconfiguration Total				**12,799.80**	**11,283.39**	**3,005.84**		**3.94**	**27,092.97**
12175Urban Underground Automation	**18328**	02291488	ASU ROX TREMONT ST-RPL OIL SW	9,491.86	22,489.20	6,971.50	14,090.51	55.35	53,098.42
		02291489	ASU ROX HUNTINGTON AVE-RPL OI	1,586.71	7,736.32	3,711.28	3,711.42	28.35	16,774.08
		02291492	ASU BOS CLARENDON ST-RPL OIL	416.19	2,007.04	1,044.15		19.59	3,486.97
		02291493	ASU BOS CHANDLER ST-RPL OIL S	70.35	250.89	119.52		-	440.76
		02291596	ASU H-P HYDE PARK AVE REPLACE	1,004.11	1,660.38	335.13	3,377.36	1.35	6,378.33
		02291599	ASU W-R SOUTH ST REPL OIL SW	2,236.80	6,746.09	2,445.43	3,774.87	16.20	15,219.39
		02291634	ASU DOR BIRD ST OIL SW REPL M	691.95	1,713.44	738.92	-	11.35	3,155.66
		02291640	ASU DOR RIVER ST OIL SW REPL	168.95	812.65	415.35		4.28	1,401.23
	18328 Total			**15,666.92**	**43,416.01**	**15,781.28**	**24,954.16**	**136.47**	**99,954.84**
12175Urban Underground Automation Total				**15,666.92**	**43,416.01**	**15,781.28**	**24,954.16**		**99,954.84**
12190Advanced Sensing Technology	**WD00300**	6A821472	GRID MOD; RPL OIL RECLOSER 21C7-70S	103.17	1,424.47	787.85			2,315.49
		6A821474	REPL OIL RECLOSER 21C7-90T WITH VAC	132.90	1,160.36	647.75		2.16	1,943.17
		6A821475	RPL 3 SGL HYDROLIC RECLOSERS ON PO	27.29	496.41	279.11		5.31	808.12
		6A822180	GRD MOD: REPLACE SR RECLOSER 21C4-7	339.89	427.41	83.84		0.45	851.59
		6A822185	GRID MOD: INSTALL TR RECLOSER 19J1-	516.88	711.84	130.88			1,359.60
		6A822186	GRID MOD: INSTALL TR RECLOSER 19J1-	840.70	1,004.31	179.82			2,024.83
		6B820766	GRID MOD; RPL OIL RECLOSER 18C2-70S		464.24	285.01			749.25
		6B820767	GRID MOD; RPL OIL RECLOSER 18C2-90T	115.57	999.73	552.85		16.60	1,684.75
		6B820768	GRID MOD; RPL OIL RECLOSER 19A505 W	56.10	604.94	328.70		5.60	995.34
		6B820769	GRID MOD; RPL OIL RECLOSER 19A525 W	178.71	607.56	316.31		1.36	1,103.94
		6S822290	REPLACE TIE RECLOSER; NEW NOMENCLAT		866.39	498.57		7.05	1,372.01
	WD00300 Total			**2,311.21**	**8,767.66**	**4,090.69**		**38.53**	**15,208.09**
12190Advanced Sensing Technology Total				**2,311.21**	**8,767.66**	**4,090.69**		**38.53**	**15,208.09**
Total Cost of Removal				**30,777.93**	**63,469.32**	**22,877.81**	**24,954.16**	**178.94**	**142,258.16**

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	Total Capital Spend
1	1	18328	Replace 4kV Oil Switches Grid Mod	12175	Urban Underground Automation	18328	Replace 4kV Oil Switches Grid Mod	$ 635,789	$ 511,996	$ 1,147,785	$ 8,340,000	$ 5,325,027	$ 13,665,027	$ 954,741	$ 99,955	$ 93,089	$ 1,147,784
2	17	EV41L2EJ	WMECO EV Level 2 Chargers - EJC	12165	Electric Vehicle Infrastucture	EVL2FC01	EV Level 2 and Fast Chargers	276,486	7,305	283,791	39,481,950	8,668,221	48,150,171	144,195	2	139,594	283,791
3	31	WD00300	MA Grid Mod - Recloser SCADA	12190	Advanced Sensing Technology	WD00300	MA Grid Mod - Recloser SCADA	604,788	357,887	962,675	1,634,500	279,400	1,913,900	700,660	15,208	246,807	962,677
4	45	18296	NSTAR EV Level 2 Chargers - NonEJC	12165	Electric Vehicle Infrastucture	EVL2FC01	EV Level 2 and Fast Chargers	2,268,349	102,924	2,371,273	39,481,950	8,668,221	48,150,171	1,151,991	-	1,219,282	2,371,273
5	60	WD00298	MA Grid Mod - OH Dist. Automation	12170	Automated Feeder Reconfiguration	WD00298	MA Grid Mod - OH Dist. Automation	949,056	497,102	1,446,158	4,071,600	659,800	4,731,400	932,834	27,093	486,230	1,446,158
5	Total							$ 4,734,467	$ 1,477,214	$ 6,211,681	$ 93,010,000	$ 23,600,669	$ 116,610,669	$ 3,884,422	$ 142,258	$ 2,185,001	$ 6,211,682

NSTAR ELECTRIC COMPANY D/B/A EVERSOURCE ENERGY
CAPITAL AUTHORIZATION ANALYSIS

Line of Business	12175	Urban Underground Automation
Parent Project	18328	Replace 4KV Oil Switches Grid Mod
Child Project	18328	Replace 4KV Oil Switches Grid Mod
Work Orders	Please refer to the following page for a list of Work Orders	

	PAF Estimate (A)	Additions Total (B)	Cost of Removal Total (C)	CWIP Total (D)	Total Capital Spend (B+C+D) (E)	Variance (E-A)
Direct Costs	8,340,000	527,790	56,539	51,460	635,789	(7,704,211)
Indirect Costs	5,325,027	426,951	43,416	41,628	511,996	(4,813,031)
Total Project Costs	13,665,027	954,741	99,955	93,089	1,147,785	(12,517,242)

By Cost Element

Direct Costs						
Labor	2,085,000	165,010	15,781	184,317	365,109	(1,719,891)
Contractor	2,085,000	129,908	15,667	134,424	279,999	(1,805,001)
Material	4,170,000	228,781	24,954	248,118	501,853	(3,668,147)
Other	-	4,091	136	(515,399)	(511,172)	(511,172)
Total Direct	8,340,000	527,790	56,539	51,460	635,789	(7,704,211)
Indirect Costs	5,325,027	426,951	43,416	41,628	511,996	(4,813,031)
Total Project	13,665,027	954,741	99,955	93,089	1,147,785	(12,517,242)

Accounting Work Order	Accounting Work Order Description
02290365	IMPRV DOR OIL SWITCH REPLACEMEN
02290396	IMPRV DOR OIL SWITCH REPLACEMEN
02291488	ASU ROX TREMONT ST-RPL OIL SW
02291489	ASU ROX HUNTINGTON AVE-RPL OI
02291492	ASU BOS CLARENDON ST-RPL OIL
02291493	ASU BOS CHANDLER ST-RPL OIL S
02291494	ASU BOS CHANDLER ST-RPL OIL S
02291589	ASU BRI COMM AVE REPL 4KV OIL
02291595	ASU H-P RIVER ST REPL OIL SW
02291596	ASU H-P HYDE PARK AVE REPLACE
02291598	ASU W-R CENTRE ST REPL OIL SW
02291599	ASU W-R SOUTH ST REPL OIL SW
02291604	ASU BKL HARVARD ST RPL 4KV SWT
02291634	ASU DOR BIRD ST OIL SW REPL M
02291640	ASU DOR RIVER ST OIL SW REPL
02313358	ASU DOR HANCOCK ST OIL SW REP

EVERSOURCE
Project Authorization Form

Operations Project Authorization Form

Date Prepared: 6-5-18	**Project Title:** Replace 4kV Oil Switches (Grid Mod)
Company/ies: Eversource Energy EMA	**Project ID Number:** 18328
Organization: System Engineering	**Class(es) of Plant:** Distribution
Project Initiator: Tyler Thibault	**Project Category:** Reliability
Project Manager: Tyler Thibault	**Project Type:** Specific
Project Sponsor: Amin Jessa	**Project Purpose:** Grid Mod
Estimated in service date: 12/31/20	**If Transmission Project:** N/A
Eng. /Constr. Resources Budgeted? Yes	**Capital Investment Part of Original Operating Plan?** Y
Authorization Type: Engineering	**O&M Expenses Part of the Original Operating Plan?** Y
Total Request: $1M	

Financial Requirements:

Project Authorization
ERM: _____

FP&A: _____

Executive Summary
The purpose of the MA Grid Modernization 4kV Oil Switch Replacement PAF is to capture the costs associated with the Grid Modernization Program in Massachusetts for engineering and the purchasing of long lead equipment. In the event the Grid Mod project changes the equipment can be utilized on other projects. This PAF does not authorize any construction for this Grid Mod project.

Project Costs Summary
Project cost summary will be supplied after design engineering is complete.

Technical Justification:

Project Need Statement
This project represents Eversource's Grid Modernization plan in accordance with the Department of Public Utilities decision on Order D.P.U. 15-122 dated 5/10/18 as it relates to 4kV Oil Switch Replacement.

Project Objectives
The project objective is to capture the costs associated with the engineering and purchasing of long lead time equipment to be used in the 4kV oil switch replacement component of Grid Modernization.

Project Scope
Engineer and purchase long lead time equipment in order to replace 4kV oil switches.

EVERSOURCE
Project Authorization Form

Background / Justification
The 4kV oil switches are targeted for replacement because they are obsolete, prone to failure and often negatively impact outage restoration. Further, these switches cannot be used to break load and are in non-strategic locations on the system.

Business Process and / or Technical Improvements:
By replacing these switches from the system, we will be removing obsolete prone to failure equipment, as well as adding new modernized equipment to the system that can be automated to improve circuit reliability.

Alternatives Considered with Cost Estimates
Since these switches are obsolete and cannot be automated there is not an alternative to replacing them. An alternative would be to keep them, but to modernize our grid, we need to replace them with modernized equipment.
An alternative that can be considered is the type of switch that will be used to replace the oil switches. The current two options are the G&W VFI switch, which can for the most part be a direct replacement in the same manhole that the oil switch resided. However, the oil switches are a smaller piece of equipment and some VFI switches cannot fit in the same foot print that the oil switch did, but it may be able to be placed in an adjacent manhole, if it still maintains the same or a better electric design location.
The other option, for locations where a VFI switch cannot fit in the same manhole and there is not a suitable adjacent manhole that meets the electrical design of the circuit, is the ISG switch. The ISG switch is a larger switch that requires a new manhole that is installed in the sidewalk. This is a better switch than the G&W because it has a visible break, however it is a much larger switch and requires a much larger manhole to be installed in the sidewalk, which has been very troublesome to find locations in the sidewalk that can support this large of a manhole.

Project Schedule

Milestone/Phase Name	Estimated Completion Date
Engineering	7/31/18
Design	8/31/18
Approval	9/14/18
Installation	12/28/18

EVERSOURCE

APS 1 - Project Authorization Policy

Supplement Request Form

Supplement Request Form

Date Prepared: 10/15/18	**Project Title: Replace 4kV Oil Switches (Grid Mod)**
Company/Companies: Eversource	**Project ID Number: 18328**
Organization: Distribution Engineering	**Plant Class/(F.P.Type): Distribution**
Project Initiator: Tyler Thibault	**Project Type: Reliability**
Project Manager: Tyler Thibault	**Capital Investment Part of Original Operating Plan? Y**
Project Sponsor: Amin Jessa	**O&M Expenses Part of the Original Operating Plan? Y**
Current Authorized Amount: $1M	**Estimated in service date(s): 12/31/20**
Supplement Request: $12.6M	**Other:**
Total Request: $13.6M	

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:

Executive Summary

This a supplemental request of $12.6M is requested for the completion of EMA Grid Modernization 4kV Oil Switch Replacement Project. The original authorization of $1M was to capture the initial costs associated with the engineering and procurement of the distribution automation components as part of the Grid Modernization Program in Eastern Massachusetts. This request will cover the entire cost of replacing all 105 4kV oil switches with either G&W or ISG switches in EMA as required by the Grid Mod Filing.

Technical Justification:

Project Need Statement
This project represents Eversource's Grid Modernization plan in accordance with the Department of Public Utilities decision on Order D.P.U. 15-122 dated 5/10/18 as it relates to 4kV Oil Switch Replacement.

Project Objectives
The overall objective is to remove and replace all of the 4kV oil switches in Eversource EMA with either a G&W or ISG switch. These new switches will allow these switch locations to be controlled remotely, since the 4kV oil switches do not allow for any type of remote control connected to them.

Project Scope
There are approximately 600 4kV oil switches remaining on the system in Eversource EMA. This particular Grid Mod project is to replace 105 of these switches with either G&W or ISG switches in the Eversource EMA area through 2020. See below spreadsheet for breakdown by AWC:

EVERSOURCE

APS 1 - Project Authorization Policy

Supplement Request Form

AWC	2018	2019	2020
Boston	10	38	18
Somerville		26	
Southborough			
Walpole		1	
Waltham		12	
Cape & Vinyard			
New Bedford			
Plymouth			
Total	10	77	18

Supplement Cost Summary

Note: Dollar values are in thousands:

	Prior Authorized	Supplement Request	Total
Capital Additions - Direct	$ 1,000	$ 7,340	$ 8,340
Less Customer Contribution	$ -	$ -	$ -
Removals net of Salvage ____%	$ -	$ -	$ -
Total Direct Spending	$ 1,000	$ 7,340	$ 8,340
Capital Additions - Indirect	$ -	$ 5,125	$ 5,125
AFUDC	$ -	$ 201	$ 201
Total Capital Request	$ 1,000	$ 12,666	$ 13,666
O&M	$ -	$ -	$ -
Total Request	**$ 1,000**	**$ 12,666**	**$ 13,666**

Note: Dollar values are in thousands:

Total Supplement Request by year view:

	Year 2018	Year 2019	Year 2020+	Total
Capital Additions - Direct	$ 800	$ 6,100	$ 1,440	$ 8,340
Less Customer Contribution	$ -	$ -	$ -	$ -
Removals net of Salvage ____%	$ -	$ -	$ -	$ -
Total Direct Spending	$ 800	$ 6,100	$ 1,440	$ 8,340
Capital Additions - Indirect	$ 492	$ 3,748	$ 885	$ 5,125
AFUDC	$ 19	$ 147	$ 35	$ 201
Total Capital Request	$ 1,311	$ 9,995	$ 2,360	$ 13,666
O&M	$ -	$ -	$ -	$ -
Total Request	**$ 1,311**	**$ 9,995**	**$ 2,360**	**$ 13,666**

EVERSOURCE

APS 1 - Project Authorization Policy

Supplement Request Form

Cost Breakdown

Line Work					
	Prior Authorized	2018	2019	2020	Total
Labor	$ 155,000	$ 45,000	$ 1,525,000	$ 360,000	$ 2,085,000
Materials	$ 300,000	$ 100,000	$ 3,050,000	$ 720,000	$ 4,170,000
Outside Services	$ 153,000	$ 47,000	$ 1,525,000	$ 360,000	$ 2,085,000
Other (Salvage Credit)		$ -			$ -
Total Direct Costs	**$ 608,000**	**$ 192,000**	**$ 6,100,000**	**$ 1,440,000**	**$ 8,340,000**
Customer Contribution		**$ -**			**$ -**
NPT	$ 29,001	$ 8,420	$ 285,328	$ 67,356	$ 390,104
Payroll Benefits	$ 31,482.49	$ 9,140.08	$ 309,747.04	$ 73,120.61	$ 423,490
MDEC	$ 12,897	$ 3,835	$ 127,578	$ 30,117	$ 174,426
E&S	$ 221,090	$ 65,736	$ 2,187,045	$ 516,286	$ 2,990,156
AS&E	$ 3,612	$ 1,138	$ 36,220	$ 8,550	$ 49,521
Lobby Stock	$ 27,000.00	$ 9,000.00	$ 274,500.00	$ 64,800.00	$ 375,300
Stores	$ 27,000.00	$ 9,000.00	$ 274,500.00	$ 64,800.00	$ 375,300
NSTAR Vehicles	$ 25,730.00	$ 7,470.00	$ 253,150.00	$ 59,760.00	$ 346,110
Total Indirect Costs	**$ 377,812**	**$ 113,738**	**$ 3,748,067**	**$ 884,790**	**$ 5,124,407**
AFUDC	**$ 14,626**	**$ 4,619**	**$ 146,736**	**$ 34,639**	**$ 200,620**
Total Capital	**$ 1,000,438**	**$ 310,356**	**$ 9,994,803**	**$ 2,359,429**	**$ 13,665,026**

Background / Justification
The 4kV oil switches are targeted for replacement because they are obsolete, prone to failure and often negatively impact outage restoration. Further, these switches cannot be remotely controlled, automated or used to break load.

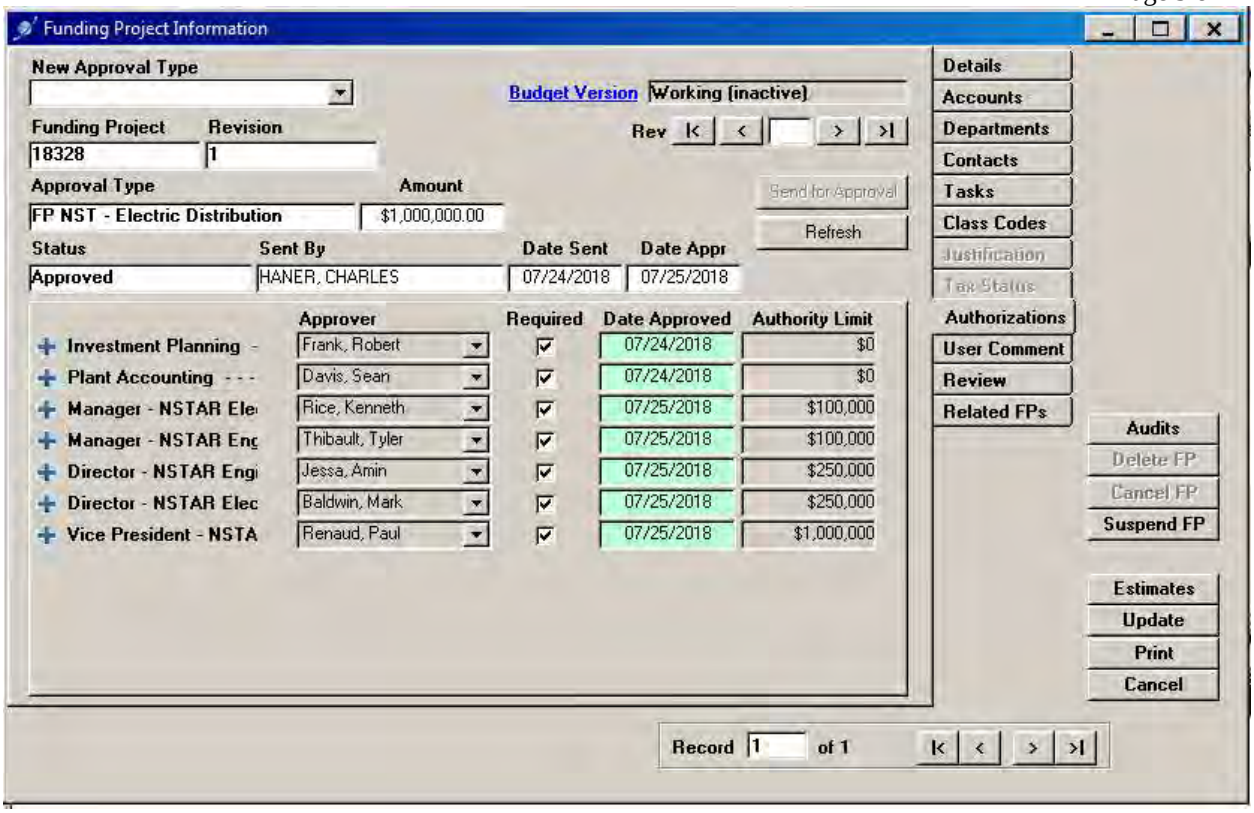
Business Process and / or Technical Improvements:
By replacing these switches from the system, we will be removing obsolete prone to failure equipment, as well as adding new modernized equipment to the system that will be automated to improve circuit reliability.

Alternatives Considered with Cost Estimates
Since these switches are obsolete and cannot be automated there is not an alternative to replacing them. An alternative would be to keep them, but to modernize our grid, we need to replace them with modernized equipment.
An alternative that can be considered is the type of switch that will be used to replace the oil switches. There are currently two options to replace the oil switches. One option is the G&W VFI switch, which for the most part can be a direct replacement in the same manhole that the oil switch resided. However, the oil switches are a smaller piece of equipment and some G&W switches cannot fit in the same foot print that the oil switch did. In this instance an adjacent

manhole would be investigated, as long as it still maintains the same or better circuit configuration.
The other option is the ISG switch. This would be used for locations where a G&W switch cannot fit in the same manhole or any adjacent manhole that meet the electrical design of the circuit. The ISG switch is a larger switch that requires a new manhole that is installed in the sidewalk. This switch has advantages over the G&W such as having a visible break and is also rated for 13.8kV for possible future 4kV conversions to 13.8kV. However, one disadvantage is the ISG switch is larger than a G&W and requires its own satellite manhole in the sidewalk, which has been very troublesome to find locations in the sidewalk due to other utilities as well as obtain rights from the city.
The other big difference is the cost difference between each option. Not only is the ISG switch more expensive but the total installation cost also increases considerably because it requires a new manhole as well. The total install cost to install an ISG switch with sidewalk manhole is about 4 times as much as replacing an oil switch with a G&W switch in the same or adjacent manhole. Due to this cost difference the G&W switch will be utilized as a first option where possible.

Justification for Additional Resources

See attach a copy of the prior authorized PAF as reference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New Approval Type
Budget Version
Working (inactive)
Rev
Funding Project
Revision
18328
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Amount
FP NST - Electric Distribution
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Send for Approval
Refresh
Status
Sent By
Date Sent
Date Appr
Approved
HANER, CHARLES
07/24/2018
07/25/2018
Approver
Required
Date Approved
Authority Limit
Investment Planning -
Frank, Robert
07/24/2018
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Plant Accounting - - -
Davis, Sean
07/24/2018
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Manager - NSTAR Ele
Rice, Kenneth
07/25/2018
$100,000
Manager - NSTAR Eng
Thibault, Tyler
07/25/2018
$100,000
Director - NSTAR Engi
Jessa, Amin
07/25/2018
$250,000
Director - NSTAR Elec
Baldwin, Mark
07/25/2018
$250,000
Vice President - NSTA
Renaud, Paul
07/25/2018
$1,000,000
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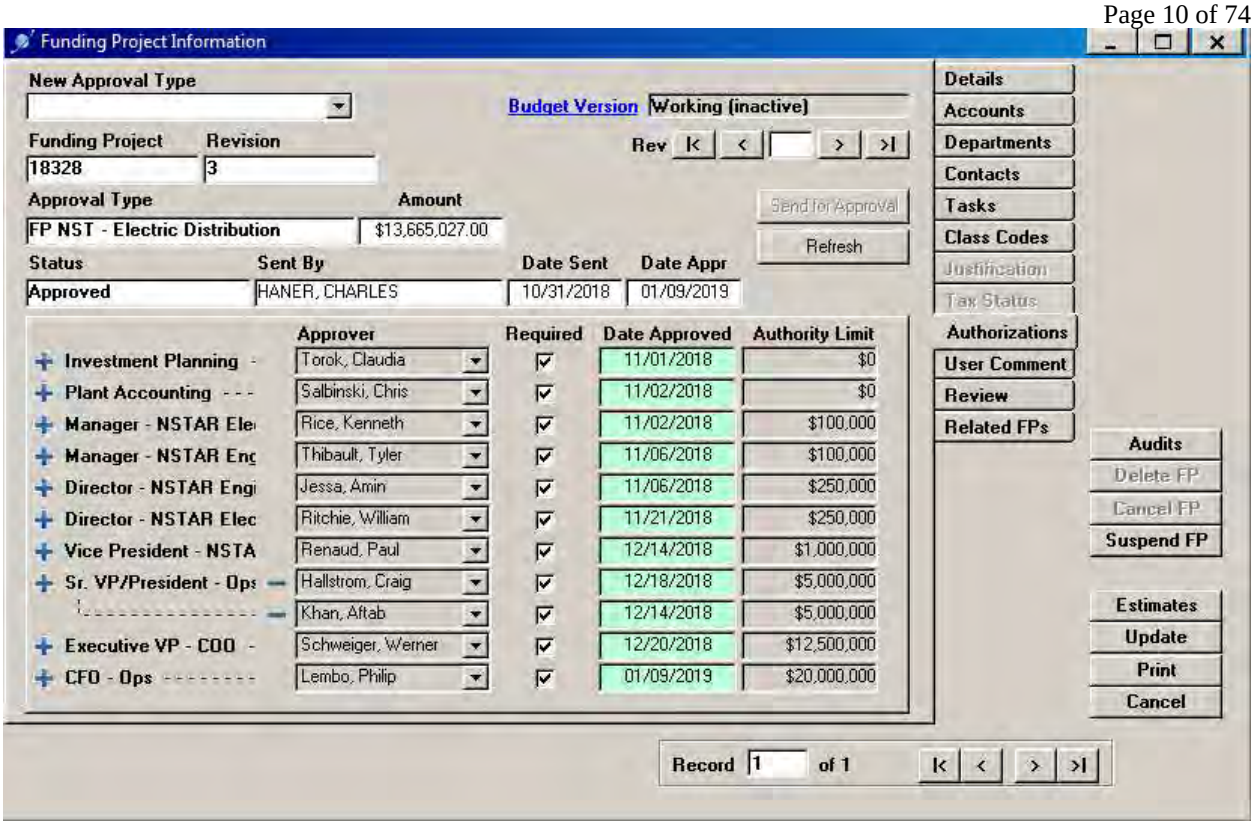
of 1


Funding Project Information
New Approval Type
Budget Version
Working (inactive)
Rev
Funding Project
Revision
18328
3
Approval Type
Amount
FP NST - Electric Distribution
$13,665,027.00
Send for Approval
Refresh
Status
Sent By
Date Sent
Date Appr
Approved
HANER, CHARLES
10/31/2018
01/09/2019
Approver
Required
Date Approved
Authority Limit
Investment Planning
Torok, Claudia
11/01/2018
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Plant Accounting
Salbinski, Chris
11/02/2018
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Manager - NSTAR Ele
Rice, Kenneth
11/02/2018
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Manager - NSTAR Eng
Thibault, Tyler
11/06/2018
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Director - NSTAR Engi
Jessa, Amin
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Director - NSTAR Elec
Ritchie, William
11/21/2018
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Vice President - NSTA
Renaud, Paul
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Sr. VP/President - Ops
Hallstrom, Craig
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Khan, Aftab
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Executive VP - COO
Schweiger, Werner
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CFO - Ops
Lembo, Philip
01/09/2019
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FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Additions	Contractor	201808	Accrual	3.58
Additions	Contractor	201809	Accrual	213.86
Additions	Contractor	201810	Accrual	1,498.02
Additions	Contractor	201810	CLEAN HARBORS ENV SERVICES INC	1,249.97
Additions	Contractor	201810	RILEY BROTHERS INC	20,747.73
Additions	Contractor	201811		643.12
Additions	Contractor	201811	Accrual	15,767.33
Additions	Contractor	201811	CLEAN HARBORS ENV SERVICES INC	5,279.47
Additions	Contractor	201811	RILEY BROTHERS INC	8,551.51
Additions	Contractor	201811	SUNBELT RENTALS INC	29,242.78
Additions	Contractor	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(36,936.23)
Additions	Contractor	201812	201812 QTR 4 REMD0021 G GREENE to FWOs	610.67
Additions	Contractor	201812	201812 QTR 4 REMD0021 JOSEPH BOTTI to FWOs	176.62
Additions	Contractor	201812	201812 QTR 4 REMD0021 MIRRA CO INC to FWOs	762.26
Additions	Contractor	201812	201812 QTR 4 REMD0021 RILEY BROTHERS to FWOs	11,434.10
Additions	Contractor	201812	201812 QTR 4 REMD0021 SHEERIN CO to FWOs	40,331.47
Additions	Contractor	201812	Accrual	18,345.61
Additions	Contractor	201812	RILEY BROTHERS INC	47.54
Additions	Contractor	201812	SUNBELT RENTALS INC	11,938.43
Additions	**Contractor Total**			**129,907.84**
Additions	Indirect/Overheads	201808		5,354.64
Additions	Indirect/Overheads	201809		10,843.12
Additions	Indirect/Overheads	201810		80,852.31
Additions	Indirect/Overheads	201811		245,439.63
Additions	Indirect/Overheads	201812		84,461.77
Additions	**Indirect/Overheads Total**			**426,951.47**
Additions	Labor	201808		1,692.54
Additions	Labor	201809		4,095.99
Additions	Labor	201810		28,201.05
Additions	Labor	201811		104,497.47
Additions	Labor	201812		26,435.08
Additions	Labor	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(290.99)
Additions	Labor	201812	201812 QTR 4 REMD0021 010754 to FWOs	64.15
Additions	Labor	201812	201812 QTR 4 REMD0021 010760 to FWOs	45.52
Additions	Labor	201812	201812 QTR 4 REMD0021 010934 to FWOs	8.30
Additions	Labor	201812	201812 QTR 4 REMD0021 039481 to FWOs	28.10
Additions	Labor	201812	201812 QTR 4 REMD0021 041281 to FWOs	27.10
Additions	Labor	201812	201812 QTR 4 REMD0021 097683 to FWOs	4.31
Additions	Labor	201812	201812 QTR 4 REMD0021 660990 to FWOs	60.65
Additions	Labor	201812	201812 QTR 4 REMD0021 661990 to FWOs	78.75
Additions	Labor	201812	201812 QTR 4 REMD0021 664690 to FWOs	45.54
Additions	Labor	201812	201812 QTR 4 REMD0021 751593 to FWOs	16.55
Additions	**Labor Total**			**165,010.11**
Additions	Material	201808	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	12,938.86
Additions	Material	201810	ADAPTER,ELECTRICAL, 15 KV, 1.09-1.28 IN CABLE DIA, 500 KCMIL	126.20
Additions	Material	201810	BATTERY,ALKALINE, 1.5 V, AA, REPLACED WITH IN 500035	1.29
Additions	Material	201810	BATTERY,ALKALINE, 1.5 V, SIZE: AAA	4.92
Additions	Material	201810	BATTERY,ALKALINE, 9 V	1.20
Additions	Material	201810	BUSHING,ELECTRICAL, LOADBREAK CONNECTOR, 15 KV, 200 A	(13.33)
Additions	Material	201810	BUSHING,ELECTRICAL, PARKING / STAND-OFF, 15 KV, 200 A , 1-POSITION, INSULATED , BASE: SS, INTERFACE,	25.00
Additions	Material	201810	CABLE, COMPRESSED STRANDED, 500 KCMIL, 600 V, EPR INSULATED, HYPALON JACKET, CU, 1000 FT Reel	1,134.34
Additions	Material	201810	CABLE, FLAT STRAP, 500 KCMIL, 15 KV, EPR INSULATED, CU, 1200 FT/Steel Reel Lot	290.03
Additions	Material	201810	CABLE, FLAT STRAP, TRIPLEX, 500 KCMIL, 15 KV, EPR INSULATED, CU, 1200 FT Steel Reel/Lot	11,333.86
Additions	Material	201810	CABLE, NEUTRAL, CONCENTRIC, #2 AWG, 15 KV, EPR INSULATED, CU, 2000 FT Wood Reel/Lot	67.82
Additions	Material	201810	CABLE,ELECTRICAL, 1/C, 4/0 AWG, 600 V, EP INSULATED, CU, 1000 FT Wood Reel	68.50
Additions	Material	201810	CAP,ELECTRICAL, INSULATING, DEADEND, LOADBREAK, 15 KV, 200 A	566.57
Additions	Material	201810	CONNECTOR,ELECTRICAL, HYCRAB, 500 KCMIL, 12 POSITION, COMPRESSION, RUBBER, RESTRICTED PURCHASE	318.50
Additions	Material	201810	CONNECTOR,ELECTRICAL, MAIN 500 TAP1 250 1/0 TAP2 #1#6 TAP3 #8#14, 500 KCMIL, 15 KV, TINNED CU, COMPR	221.06
Additions	Material	201810	CONNECTOR,ELECTRICAL, T-BODY, 500 KCMIL COMPACT, 600 A, CU TOP, CONDUCTOR: AL/CU, CONTACT	226.43
Additions	Material	201810	CONNECTOR,ELECTRICAL, TEE, DEADBREAK, 15 OR 25 KV, 600 A, W/ STUD	475.22
Additions	Material	201810	CONNECTOR,JUNCTION, LOADBREAK, 15 KV, 4-WAY, W/ ADJUST BRACKET, SS, FOR FLAT OR CURVED WALL MOUNT	88.35
Additions	Material	201810	ELBOW,FITTING, LOADBREAK, 15 KV, 200 A, #1 SOLID OR #2 STRANDED, FOR URD-A-22-000	66.87
Additions	Material	201810	GLOVE, SPLICER, NO DRIP NO MELT, L, LEVELS: CUT A7, PUNCTURE 4, KEVLAR LINED	193.66
Additions	Material	201810	GLOVE, WINTER, XL, LEVELS: CUT A4, PUNCTURE 5, KEVLAR LINED, GOAT LEATHER	26.85
Additions	Material	201810	GLOVE, WINTER, XXL, LEVELS: CUT A4, PUNCTURE 5, KEVLAR LINED, GOAT LEATHER	187.92
Additions	Material	201810	GLOVE,PROTECTIVE, DRIVING, M, KEVLAR/SILICA INFUSED FIBER COMPOSITE LINED, GRAIN GOAT SKIN, BRAND: E	142.25
Additions	Material	201810	GLOVE,SAFETY, DRIVING, L, KEVLAR LINED, GRAIN GOAT SKIN, CUT LEVEL 4, PUNCTURE LEVEL 2, ALTERNATE IT	200.56
Additions	Material	201810	JOINT,ELECTRICAL, CRAB, 4/0 AWG, 4 WAY- 4 WAY	66.42
Additions	Material	201810	JOINT,ELECTRICAL, CRAB, 4/0 AWG, 4 WAY- 4 WAY, NEUTRAL	18.08
Additions	Material	201810	JOINT,ELECTRICAL, CRAB, 500 KCMIL, 4 WAY- 4 WAY, NEUTRAL, TINNED BARE CU, USE UP CATID 9600 INVENTOR	38.51
Additions	Material	201810	JOINT,KIT, HEAT SHRINK, 4/0-500 KCMIL, EPR	225.26
Additions	Material	201810	KIT, HEAT SHRINK BONDING, FOR UG 600A ELBOWS	242.49
Additions	Material	201810	KNIFE,CABLE, HAWKBILL, HANDLE: HARDWOOD, W/ ROUNDED TIP, TOOL	64.58
Additions	Material	201810	LOADBREAK KIT, 15 KV, W/ TAP, T-OP II, LOAD REDUCING TAP PLUG (LRTP), FOR ADAPTS 600 TBODY TO 200 AM	1,494.41
Additions	Material	201810	LUG,COMPRESSION, HYLUG, 500 KCMIL, 2 HOLE, CU	84.06
Additions	Material	201810	PADLOCK, W/O KEYS, MODEL: 3C, MFR: PASEK	101.04
Additions	Material	201810	PLIER,SIDE CUTTING, 5/8 IN DIA, 11 THREADED OPENING AT HINGE W HIGH-DIELECTRIC, FOR OVERHEAD LINE WO	67.33
Additions	Material	201810	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	243.85
Additions	Material	201810	SPLICE,KIT, GROUNDING/BOND, FOR JACKETED CABLE BONDING, UGK1	36.32
Additions	Material	201810	SPLICE,KIT, HEAT SHRINK, 4/0-500 KCMIL, FOR SECONDARY UTILITY POWER SUPPLY	90.81
Additions	Material	201810	SPLICE,KIT, HEAT SHRINK, SINGLE/MULTIPLE, 5 KV, #4-500 KCMIL	599.82
Additions	Material	201810	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	32,844.81
Additions	Material	201810	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	68.55
Additions	Material	201810	WIRE,ELECTRICAL, BARE, 500 KCMIL, STRANDED, TINNED, CU	668.83
Additions	Material	201810	WIRE,ELECTRICAL, BONDING, 1/0 AWG, 19 STR, TINNED, SOFT-DRAWN CU, 1500 FT WOOD REEL	134.28
Additions	Material	201811		9,572.36
Additions	Material	201811	ADAPTER,ELECTRICAL, 15 KV, 1.09-1.28 IN CABLE DIA, 500 KCMIL	395.50
Additions	Material	201811	ADAPTER,ELECTRICAL, JOINT COMPRESSION, 350 STRANDED TO 1/0 STRANDED	67.82
Additions	Material	201811	ADAPTER,ELECTRICAL, JOINT COMPRESSION, 4/0 STRANDED TO 4 SOLID	10.47
Additions	Material	201811	ANODE,ELECTRICAL, 10 FT, #12 AWG STANDARD LEAD WIRE, 17LB, CAST MAGNESIUM	32.43
Additions	Material	201811	ANTENNA, 902-928 MHZ, 3 DB GAIN, 125 W, N MALE , SIGMA 1000, TRAFFIC RATED, BLACK, ISM SPREAD SPECTR	604.43
Additions	Material	201811	BLANKET,FIRE, 8 X 5 FT, CANVAS	151.46
Additions	Material	201811	BOOT, OVER THE SHOE, L, W/ ICE CLEATS	308.67
Additions	Material	201811	BOOT, OVER THE SHOE, XL, W/ ICE CLEATS	316.05
Additions	Material	201811	BOOT, OVER THE SHOE, XXL, W/ ICE CLEATS	211.84
Additions	Material	201811	BOOT, OVER THE SHOE, XXXL, W/ ICE CLEATS	317.01
Additions	Material	201811	CABLE, #10 AWG, 2 KV, XLPE INSULATED, TINNED, SOFT DRAWN CU, 250FT COIL	227.38
Additions	Material	201811	CABLE, FLAT STRAP, 500 KCMIL, 15 KV, EPR INSULATED, CU, 1200 FT/Steel Reel Lot	7,616.16

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Additions	Material	201811	CABLE, NEUTRAL, CONCENTRIC, #2 AWG, 15 KV, EPR INSULATED, CU, 2000 FT Wood Reel/Lot	79.13
Additions	Material	201811	CAP, 20 KV, RUBBER, FOR 4/0-500M, 20 KV CABLE ENDS, TEMPORARY	129.34
Additions	Material	201811	CAP,ELECTRICAL, CABLE END, LARGE, 350-750 KCMIL, 2.25 IN ID, RUBBER, CLASS 2	325.54
Additions	Material	201811	CAP,ELECTRICAL, INSULATING, DEADEND, LOADBREAK, 15 KV, 200 A	2,010.87
Additions	Material	201811	CLOTHING,PROTECTIVE, RAIN COAT, XXXL, SNAP AND HOOD, YELLOW, W/ ARCLITE, EVERSOURCE LOGO ON CHEST AN	68.28
Additions	Material	201811	CLOTHING,PROTECTIVE, RAIN COAT, XXXXL, SNAP AND HOOD, YELLOW, W/ ARCLITE, EVERSOURCE LOGO ON CHEST A	210.67
Additions	Material	201811	CONNECTOR,ELECTRICAL, 350 KCMIL, CU, COMPRESSION	177.16
Additions	Material	201811	CONNECTOR,ELECTRICAL, 800 KCMIL, CU, COMPRESSION	112.29
Additions	Material	201811	CONNECTOR,ELECTRICAL, COUPLER, HYTEE, TEE TAP, 4/0 AWG RUN & 4/0 AWG TAP, CU, COMPRESSION	520.06
Additions	Material	201811	CONNECTOR,ELECTRICAL, COUPLING, HYTEE, 1/0 AWG TEE TAP W/1/0 RUN AND 1/0 TAP, CU, RESTRICTED PURCHAS	130.67
Additions	Material	201811	CONNECTOR,ELECTRICAL, COUPLING, HYTEE, 2/0 AWG TEE TAP W/2/0 RUN AND 2/0 TAP, CU, RESTRICTED PURCHAS	305.98
Additions	Material	201811	CONNECTOR,ELECTRICAL, ROUND, 700 KCMIL COMPACT, CU, COMPRESSION, ALSO USE FOR 600 STRANDED	88.56
Additions	Material	201811	CONNECTOR,ELECTRICAL, STAKON, TOOL	25.06
Additions	Material	201811	CONNECTOR,ELECTRICAL, T-BODY, 500 KCMIL COMPACT, 600 A, CU TOP, CONDUCTOR: AL/CU, CONTACT	473.66
Additions	Material	201811	CONNECTOR,ELECTRICAL, TEE, DEADBREAK, 15 OR 25 KV, 600 A, W/ STUD	1,533.17
Additions	Material	201811	CUTTER,CABLE, RATCHET, SOFT, 27-1/2 IN LG HANDLE, CABLE: 1500 KCML CU TO 2500 KCME, INSULATED, 20 KV	263.80
Additions	Material	201811	CYLINDER, DISPOSABLE, FOR BERNZ-O-MATIC FUEL	6.99
Additions	Material	201811	DEICER, LOCK, 3/4 OZ CONTAINER	1.58
Additions	Material	201811	DETECTOR,VOLTAGE, W/ HOT STICK EYE, TIC TRACER-BEEPER, TIF300HV, HIGH/LOW RANGE	136.74
Additions	Material	201811	DRIVER,NUT, WRENCH,INSULATED, 1/4 IN, TOOL	6.23
Additions	Material	201811	ELBOW,FITTING, LOADBREAK, 15 KV, 200 A, #1 SOLID OR #2 STRANDED, FOR URD-A-22-000	101.94
Additions	Material	201811	GLASSES,SAFETY, LENS CLEANING TOWELETTE, CLEAR LENS, 100/BOX, 10/CASE, S468	10.80
Additions	Material	201811	GLOVE, L, LEVELS: CUT A4, PUNCTURE 5, KEVLAR LINED, GOAT LEATHER	40.32
Additions	Material	201811	GLOVE,PROTECTIVE, DRIVING, S, KEVLAR/SILICA INFUSED FIBER COMPOSITE LINED, GRAIN GOAT SKIN, BRAND: E	10.85
Additions	Material	201811	GLOVE,WORK, REFLECTIVE, WINTER, WATERPROOF, L, ORANGE/TAN/YELLOW STRIP	7.49
Additions	Material	201811	HAMMER, STRIKING, 36 IN LG HANDLE, 12 LB, W/ HICKORY HANDLE, TOOL	37.24
Additions	Material	201811	HOOK, SHAVE, FOR CLEANING/PREPARE LEAD CABLES	35.85
Additions	Material	201811	JOINT,ELECTRICAL, CRAB, 500 KCMIL, 4 WAY- 4 WAY, INSULATED	255.08
Additions	Material	201811	JOINT,ELECTRICAL, CRAB, 500 KCMIL, 4 WAY- 4 WAY, NEUTRAL, TINNED BARE CU, USE UP CATID 9600 INVENTOR	211.92
Additions	Material	201811	JOINT,KIT, HEAT SHRINK, 4/0-500 KCMIL, EPR	3,762.42
Additions	Material	201811	KIT, HEAT SHRINK BONDING, FOR UG 600A ELBOWS	918.94
Additions	Material	201811	KNIFE, HACKING, 1-1/4 IN BLADE, HANDLE: LEATHER, TOOL	27.24
Additions	Material	201811	LADDER, STEP, TYPE 1A, 4 FT LG, FIBERGLASS, ORANGE, 300 LB RATING	141.69
Additions	Material	201811	LAMP, HANDLAMP, 115 V, 75-100 W, W/ 25 FT LG CORD	152.16
Additions	Material	201811	LIGHT, FLEXIBLE HEAD , RECHARGEABLE WORK, W/ MAGNETIC BASE, CLASS 1, DIV 2-ELECTRIC ONLY	411.06
Additions	Material	201811	LIVE END, CAP, INSULATING, 15 KV, 4-4/0 AWG, 1/C PILC, RUBBER	502.94
Additions	Material	201811	LOADBREAK KIT, 15 KV, W/ TAP, T-OP II, LOAD REDUCING TAP PLUG (LRTP), FOR ADAPTS 600 TBODY TO 200 AM	4,819.28
Additions	Material	201811	LUBRICANT, SILICONE, 5 OZ SQUEEZE	56.68
Additions	Material	201811	MIRROR, SPLICERS, W/ FRAME	19.72
Additions	Material	201811	NOZZLE, HEAT SHRINK TORCH, W/ SELF-IGNITING, FOR FITS SMALL PROPANE BOTTLES, NOT AVAILABLE FROM GRAY	54.84
Additions	Material	201811	PLIER, 9-1/2 IN, W/ GRIP, FOR WATER PUMP, TOOL, MFR: CHANNELLOCK	13.27
Additions	Material	201811	PLIER,DIAGONAL CUTTING, 6 IN, TOOL	15.01
Additions	Material	201811	PLIER,SIDE CUTTING, 5/8 IN DIA, 11 THREADED OPENING AT HINGE W HIGH-DIELECTRIC, FOR OVERHEAD LINE WO	44.75
Additions	Material	201811	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	1,201.58
Additions	Material	201811	SPLICE,ELECTRICAL, JOINT, 4/0 TO 1/0 AWG STR, COMPRESSION	15.76
Additions	Material	201811	SPLICE,ELECTRICAL, JOINT, 500-350 KCMIL STR, COMPRESSION	16.79
Additions	Material	201811	SPLICE,KIT, COLD SHRINK, 15 KV, #2-350, W/ 3X1/C JOINTS	1,899.60
Additions	Material	201811	SPLICE,KIT, COLD SHRINK, 15-25 KV, #1-4/0, 350-750 KCMIL, W/ 3X1/C JOINTS	428.15
Additions	Material	201811	SPLICE,KIT, GROUNDING/BOND, FOR JACKETED CABLE BONDING, UGK1	55.39
Additions	Material	201811	SPLICE,KIT, HEAT SHRINK, 4/0-500 KCMIL, FOR SECONDARY UTILITY POWER SUPPLY	102.29
Additions	Material	201811	SPLICE,KIT, HEAT SHRINK, LIVE END CAP, 4 KV, #4/0 AWG, 500 KCMIL, 350	337.80
Additions	Material	201811	SWITCH, GALV STEEL, G&W TRIDENT H BRACKET	446.55
Additions	Material	201811	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	103,762.38
Additions	Material	201811	TUBE,KIT, HEAT SHRINK, #2 AWG, REJACKETED, FOR LOAD BREAK ELBOW	58.11
Additions	Material	201811	WIPES,HAND, SAFETY, PRE-MEASURED AND PRE-MOISTENED ANTI-MICROBIAL, 135/PAC, 12/CS	5.66
Additions	Material	201811	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	143.63
Additions	Material	201811	WIRE,ELECTRICAL, BONDING, #6 AWG, STRANDED, CU, 100 FT COIL	43.45
Additions	Material	201811	WIRE,ELECTRICAL, BONDING, 1/0 AWG, 19 STR, TINNED, SOFT-DRAWN CU, 1500 FT WOOD REEL	248.99
Additions	Material	201811	WRENCHE,BOX END, RATCHET, INSULATED MID- SECTION, 1/2 X 9/16 IN	12.95
Additions	Material	201812	BATTERY,ALKALINE, 1.5 V, AA	1.95
Additions	Material	201812	BATTERY,ALKALINE, 9 V	7.52
Additions	Material	201812	CABLE, #4 AWG, 600 V, EPR INSULATED, HYPALON JACKET, CU, 3000 FT Wood Reel	17.12
Additions	Material	201812	CABLE, COMMUNICATION, PREMIUM MOLDED D-SUB, 5 FT LG, DB9 MALE TO DB9 FEMALE	13.64
Additions	Material	201812	CABLE,ELECTRICAL, 1/0 AWG, 600 V, EPR INSULATED, CU, 2000 FT Wood Reel, CPE JACKETED	34.81
Additions	Material	201812	CABLE,ELECTRICAL, 1/C, 4/0 AWG, 600 V, EP INSULATED, CU, 1000 FT Wood Reel	66.82
Additions	Material	201812	CUTTER,CABLE, RATCHET, CU/AL, CABLE: 750 KCMIL	365.58
Additions	Material	201812	CYLINDER, DISPOSABLE, FOR BERNZ-O-MATIC FUEL	14.26
Additions	Material	201812	FIRST AID, BURN DRESSING, 4 IN, FOR TRAUMA KITS, WATER GEL PACKET, 2 PACS REQUIRED FOR SMALL KIT, 4	2.81
Additions	Material	201812	FIRST AID, BURN WRAP DRESSING, 3 X 2-1/2 FT, WATER GEL	41.31
Additions	Material	201812	GLOVE,WORK, REFLECTIVE, WINTER, WATERPROOF, L, ORANGE/TAN/YELLOW STRIP	89.98
Additions	Material	201812	HAT,HARD, SAFETY, STANDARD SUSPENSION, FULL BRIM, W/ EVERSOURCE LOGO, BRAND: TOP GARD	534.35
Additions	Material	201812	KNIFE,CABLE, HAWKBILL, HANDLE: HARDWOOD, W/ ROUNDED TIP, TOOL	128.62
Additions	Material	201812	PADLOCK, COMBINATION, CORBIN K-436.	17.35
Additions	Material	201812	PADLOCK, KEYED DIFFERENT	5.69
Additions	Material	201812	PADLOCK, W/O KEYS, MODEL: 3C, MFR: PASEK	6.96
Additions	Material	201812	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	24.20
Additions	Material	201812	SPLICE,KIT, COLD SHRINK, 15 KV, #2-350, W/ 3X1/C JOINTS	380.82
Additions	Material	201812	SPLICE,KIT, HEAT SHRINK, 15 KV, 250-500 CR, PILC OR EPR, W/ 3 SINGLE CONDUCTOR SPLICES/KIT, 3 IN ONE	390.67
Additions	Material	201812	STONE, SHARPENING, 8 X 2 X 1 IN	35.00
Additions	Material	201812	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	12,938.87
Additions	Material	201812	TESTER, VOLTAGE, AC/DC, 110-600 V, 25-60 HZ	77.20
Additions	Material	201812	VEST,SAFETY, XXL/XXXL, NON CARBON FIBER, LIME/YELLOW, CLASS 2, FOR ELECTRIC, REPLACED BY 509173 OR 5	935.37
Additions	Material Total			228,781.21
Additions	Other	201808		62.05
Additions	Other	201809		167.20
Additions	Other	201810		892.55
Additions	Other	201811		2,329.16
Additions	Other	201812		639.69
Additions	Other	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(0.75)
Additions	Other	201812	201812 QTR 4 REMD0021 661990 to FWOs	0.75
Additions	Other Total			4,090.65
Additions Total				954,741.28
CWIP	Contractor	201808	Accrual	3.58
CWIP	Contractor	201808	RILEY BROTHERS INC	5.20
CWIP	Contractor	201809	Accrual	231.45
CWIP	Contractor	201810	Accrual	2,082.76
CWIP	Contractor	201810	CLEAN HARBORS ENV SERVICES INC	1,249.97
CWIP	Contractor	201810	RILEY BROTHERS INC	20,747.73

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
CWIP	Contractor	201811		643.12
CWIP	Contractor	201811	Accrual	15,851.95
CWIP	Contractor	201811	CLEAN HARBORS ENV SERVICES INC	5,279.47
CWIP	Contractor	201811	RILEY BROTHERS INC	8,551.51
CWIP	Contractor	201811	SUNBELT RENTALS INC	30,882.32
CWIP	Contractor	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(36,936.23)
CWIP	Contractor	201812	201812 QTR 4 REMD0021 G GREENE to FWOs	610.67
CWIP	Contractor	201812	201812 QTR 4 REMD0021 JOSEPH BOTTI to FWOs	176.62
CWIP	Contractor	201812	201812 QTR 4 REMD0021 MIRRA CO INC to FWOs	762.26
CWIP	Contractor	201812	201812 QTR 4 REMD0021 RILEY BROTHERS to FWOs	11,434.10
CWIP	Contractor	201812	201812 QTR 4 REMD0021 SHEERIN CO to FWOs	40,331.47
CWIP	Contractor	201812	Accrual	18,353.10
CWIP	Contractor	201812	JOSEPH BOTTI CO	2,177.03
CWIP	Contractor	201812	RILEY BROTHERS INC	47.54
CWIP	Contractor	201812	SUNBELT RENTALS INC	11,938.43
CWIP	**Contractor Total**			**134,424.05**
CWIP	Indirect/Overheads	201808		5,359.05
CWIP	Indirect/Overheads	201809		11,327.35
CWIP	Indirect/Overheads	201810		5,598.74
CWIP	Indirect/Overheads	201811		13,446.98
CWIP	Indirect/Overheads	201812		5,896.02
CWIP	**Indirect/Overheads Total**			**41,628.14**
CWIP	Labor	201808		1,692.56
CWIP	Labor	201809		4,391.07
CWIP	Labor	201810		39,425.22
CWIP	Labor	201811		104,974.76
CWIP	Labor	201812		33,745.73
CWIP	Labor	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(290.99)
CWIP	Labor	201812	201812 QTR 4 REMD0021 010754 to FWOs	64.15
CWIP	Labor	201812	201812 QTR 4 REMD0021 010760 to FWOs	45.52
CWIP	Labor	201812	201812 QTR 4 REMD0021 010934 to FWOs	8.30
CWIP	Labor	201812	201812 QTR 4 REMD0021 039481 to FWOs	28.10
CWIP	Labor	201812	201812 QTR 4 REMD0021 041281 to FWOs	27.10
CWIP	Labor	201812	201812 QTR 4 REMD0021 097683 to FWOs	4.31
CWIP	Labor	201812	201812 QTR 4 REMD0021 660990 to FWOs	60.65
CWIP	Labor	201812	201812 QTR 4 REMD0021 661990 to FWOs	78.75
CWIP	Labor	201812	201812 QTR 4 REMD0021 664690 to FWOs	45.54
CWIP	Labor	201812	201812 QTR 4 REMD0021 751593 to FWOs	16.55
CWIP	**Labor Total**			**184,317.32**
CWIP	Material	201808	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	12,938.86
CWIP	Material	201810	ADAPTER,ELECTRICAL, 15 KV, 1.09-1.28 IN CABLE DIA, 500 KCMIL	126.20
CWIP	Material	201810	BATTERY,ALKALINE, 1.5 V, AA, REPLACED WITH IN 500035	1.29
CWIP	Material	201810	BATTERY,ALKALINE, 1.5 V, SIZE: AAA	4.92
CWIP	Material	201810	BATTERY,ALKALINE, 9 V	1.20
CWIP	Material	201810	BUSHING,ELECTRICAL, LOADBREAK CONNECTOR, 15 KV, 200 A	(13.33)
CWIP	Material	201810	BUSHING,ELECTRICAL, PARKING / STAND-OFF, 15 KV, 200 A , 1-POSITION, INSULATED , BASE: SS, INTERFACE,	25.00
CWIP	Material	201810	CABLE, COMPRESSED STRANDED, 500 KCMIL, 600 V, EPR INSULATED, HYPALON JACKET, CU, 1000 FT Reel	1,134.34
CWIP	Material	201810	CABLE, FLAT STRAP, 500 KCMIL, 15 KV, EPR INSULATED, CU, 1200 FT/Steel Reel Lot	290.03
CWIP	Material	201810	CABLE, FLAT STRAP, TRIPLEX, 500 KCMIL, 15 KV, EPR INSULATED, CU, 1200 FT Steel Reel/Lot	14,248.53
CWIP	Material	201810	CABLE, NEUTRAL, CONCENTRIC, #2 AWG, 15 KV, EPR INSULATED, CU, 2000 FT Wood Reel/Lot	67.82
CWIP	Material	201810	CABLE,ELECTRICAL, 1/C, 4/0 AWG, 600 V, EP INSULATED, CU, 1000 FT Wood Reel	68.50
CWIP	Material	201810	CAP,ELECTRICAL, INSULATING, DEADEND, LOADBREAK, 15 KV, 200 A	566.57
CWIP	Material	201810	CONNECTOR,ELECTRICAL, 4/0 AWG, TINNED CU, COMPRESSION	13.50
CWIP	Material	201810	CONNECTOR,ELECTRICAL, HYCRAB, 500 KCMIL, 12 POSITION, COMPRESSION, RUBBER, RESTRICTED PURCHASE	318.50
CWIP	Material	201810	CONNECTOR,ELECTRICAL, MAIN 500 TAP1 250 1/0 TAP2 #1#6 TAP3 #8#14, 500 KCMIL, 15 KV, TINNED CU, COMPR	221.06
CWIP	Material	201810	CONNECTOR,ELECTRICAL, T-BODY, 500 KCMIL COMPACT, 600 A, CU TOP, CONDUCTOR: AL/CU, CONTACT	226.43
CWIP	Material	201810	CONNECTOR,ELECTRICAL, TEE, DEADBREAK, 15 OR 25 KV, 600 A, W/ STUD	475.22
CWIP	Material	201810	CONNECTOR,JUNCTION, LOADBREAK, 15 KV, 4-WAY, W/ ADJUST BRACKET, SS, FOR FLAT OR CURVED WALL MOUNT	88.35
CWIP	Material	201810	ELBOW,FITTING, LOADBREAK, 15 KV, 200 A, #1 SOLID OR #2 STRANDED, FOR URD-A-22-000	66.87
CWIP	Material	201810	GLOVE, SPLICER, NO DRIP NO MELT, L, LEVELS: CUT A7, PUNCTURE 4, KEVLAR LINED	193.66
CWIP	Material	201810	GLOVE, WINTER, XL, LEVELS: CUT A4, PUNCTURE 5, KEVLAR LINED, GOAT LEATHER	26.85
CWIP	Material	201810	GLOVE, WINTER, XXL, LEVELS: CUT A4, PUNCTURE 5, KEVLAR LINED, GOAT LEATHER	187.92
CWIP	Material	201810	GLOVE,PROTECTIVE, DRIVING, M, KEVLAR/SILICA INFUSED FIBER COMPOSITE LINED, GRAIN GOAT SKIN, BRAND: E	142.25
CWIP	Material	201810	GLOVE,SAFETY, DRIVING, L, KEVLAR LINED, GRAIN GOAT SKIN, CUT LEVEL 4, PUNCTURE LEVEL 2, ALTERNATE IT	200.56
CWIP	Material	201810	JOINT,ELECTRICAL, CRAB, 4/0 AWG, 4 WAY- 4 WAY	66.42
CWIP	Material	201810	JOINT,ELECTRICAL, CRAB, 4/0 AWG, 4 WAY- 4 WAY, NEUTRAL	18.08
CWIP	Material	201810	JOINT,ELECTRICAL, CRAB, 500 KCMIL, 4 WAY- 4 WAY, NEUTRAL, TINNED BARE CU, USE UP CATID 9600 INVENTOR	38.51
CWIP	Material	201810	JOINT,KIT, HEAT SHRINK, 4/0-500 KCMIL, EPR	825.94
CWIP	Material	201810	KIT, HEAT SHRINK BONDING, FOR UG 600A ELBOWS	242.49
CWIP	Material	201810	KNIFE,CABLE, HAWKBILL, HANDLE: HARDWOOD, W/ ROUNDED TIP, TOOL	64.58
CWIP	Material	201810	LOADBREAK KIT, 15 KV, W/ TAP, T-OP II, LOAD REDUCING TAP PLUG (LRTP), FOR ADAPTS 600 TBODY TO 200 AM	1,494.41
CWIP	Material	201810	LUG,COMPRESSION, HYLUG, 500 KCMIL, 2 HOLE, CU	84.06
CWIP	Material	201810	PADLOCK, W/O KEYS, MODEL: 3C, MFR: PASEK	101.04
CWIP	Material	201810	PLIER,SIDE CUTTING, 5/8 IN DIA, 11 THREADED OPENING AT HINGE W HIGH-DIELECTRIC, FOR OVERHEAD LINE WO	67.33
CWIP	Material	201810	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	243.85
CWIP	Material	201810	SPLICE,KIT, GROUNDING/BOND, FOR JACKETED CABLE BONDING, UGK1	36.32
CWIP	Material	201810	SPLICE,KIT, HEAT SHRINK, 15 KV, 2-4/0 AWG, PILC OR EPR, W/ 3 SINGLE CONDUCTOR SPLICES/KIT, NEED OIL	722.80
CWIP	Material	201810	SPLICE,KIT, HEAT SHRINK, 4/0-500 KCMIL, FOR SECONDARY UTILITY POWER SUPPLY	90.81
CWIP	Material	201810	SPLICE,KIT, HEAT SHRINK, LIVE END CAP, 4 KV, #4/0 AWG, 500 KCMIL, 350	37.50
CWIP	Material	201810	SPLICE,KIT, HEAT SHRINK, LIVE END CAP, ELECTRICAL, 15 KV, #4-1/0, 3 PH, TENSILE LOAD: 1000 POUNDS	30.13
CWIP	Material	201810	SPLICE,KIT, HEAT SHRINK, SINGLE/MULTIPLE, 5 KV, #4-500 KCMIL	599.82
CWIP	Material	201810	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	32,844.81
CWIP	Material	201810	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	103.09
CWIP	Material	201810	WIRE,ELECTRICAL, BARE, 500 KCMIL, STRANDED, TINNED, CU	668.83
CWIP	Material	201810	WIRE,ELECTRICAL, BONDING, 1/0 AWG, 19 STR, TINNED, SOFT-DRAWN CU, 1500 FT WOOD REEL	211.00
CWIP	Material	201811		9,572.36
CWIP	Material	201811	ADAPTER,ELECTRICAL, 15 KV, 1.09-1.28 IN CABLE DIA, 500 KCMIL	395.50
CWIP	Material	201811	ADAPTER,ELECTRICAL, JOINT COMPRESSION, 350 STRANDED TO 1/0 STRANDED	67.82
CWIP	Material	201811	ADAPTER,ELECTRICAL, JOINT COMPRESSION, 4/0 STRANDED TO 4 SOLID	10.47
CWIP	Material	201811	ANODE,ELECTRICAL, 10 FT, #12 AWG STANDARD LEAD WIRE, 17LB, CAST MAGNESIUM	32.43
CWIP	Material	201811	ANTENNA, 902-928 MHZ, 3 DB GAIN, 125 W, N MALE , SIGMA 1000, TRAFFIC RATED, BLACK, ISM SPREAD SPECTR	604.43
CWIP	Material	201811	BLANKET,FIRE, 8 X 5 FT, CANVAS	151.46
CWIP	Material	201811	BOOT, OVER THE SHOE, L, W/ ICE CLEATS	308.67
CWIP	Material	201811	BOOT, OVER THE SHOE, XL, W/ ICE CLEATS	316.05
CWIP	Material	201811	BOOT, OVER THE SHOE, XXL, W/ ICE CLEATS	211.84
CWIP	Material	201811	BOOT, OVER THE SHOE, XXXL, W/ ICE CLEATS	317.01
CWIP	Material	201811	CABLE, #10 AWG, 2 KV, XLPE INSULATED, TINNED, SOFT DRAWN CU, 250FT COIL	227.38
CWIP	Material	201811	CABLE, FLAT STRAP, 500 KCMIL, 15 KV, EPR INSULATED, CU, 1200 FT/Steel Reel Lot	7,616.16

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
CWIP	Material	201811	CABLE, NEUTRAL, CONCENTRIC, #2 AWG, 15 KV, EPR INSULATED, CU, 2000 FT Wood Reel/Lot	79.13
CWIP	Material	201811	CAP, 20 KV, RUBBER, FOR 4/0-500M, 20 KV CABLE ENDS, TEMPORARY	129.34
CWIP	Material	201811	CAP,ELECTRICAL, CABLE END, LARGE, 350-750 KCMIL, 2.25 IN ID, RUBBER, CLASS 2	325.54
CWIP	Material	201811	CAP,ELECTRICAL, INSULATING, DEADEND, LOADBREAK, 15 KV, 200 A	2,010.87
CWIP	Material	201811	CLOTHING,PROTECTIVE, RAIN COAT, XXXL, SNAP AND HOOD, YELLOW, W/ ARCLITE, EVERSOURCE LOGO ON CHEST AN	68.28
CWIP	Material	201811	CLOTHING,PROTECTIVE, RAIN COAT, XXXXL, SNAP AND HOOD, YELLOW, W/ ARCLITE, EVERSOURCE LOGO ON CHEST A	210.67
CWIP	Material	201811	CONNECTOR,ELECTRICAL, 350 KCMIL, CU, COMPRESSION	177.16
CWIP	Material	201811	CONNECTOR,ELECTRICAL, 800 KCMIL, CU, COMPRESSION	112.29
CWIP	Material	201811	CONNECTOR,ELECTRICAL, COUPLER, HYTEE, TEE TAP, 4/0 AWG RUN & 4/0 AWG TAP, CU, COMPRESSION	520.06
CWIP	Material	201811	CONNECTOR,ELECTRICAL, COUPLING, HYTEE, 1/0 AWG TEE TAP W/1/0 RUN AND 1/0 TAP, CU, RESTRICTED PURCHAS	130.67
CWIP	Material	201811	CONNECTOR,ELECTRICAL, COUPLING, HYTEE, 2/0 AWG TEE TAP W/2/0 RUN AND 2/0 TAP, CU, RESTRICTED PURCHAS	305.98
CWIP	Material	201811	CONNECTOR,ELECTRICAL, ROUND, 700 KCMIL COMPACT, CU, COMPRESSION, ALSO USE FOR 600 STRANDED	88.56
CWIP	Material	201811	CONNECTOR,ELECTRICAL, STAKON, TOOL	25.06
CWIP	Material	201811	CONNECTOR,ELECTRICAL, T-BODY, 500 KCMIL COMPACT, 600 A, CU TOP, CONDUCTOR: AL/CU, CONTACT	473.66
CWIP	Material	201811	CONNECTOR,ELECTRICAL, TEE, DEADBREAK, 15 OR 25 KV, 600 A, W/ STUD	1,533.17
CWIP	Material	201811	CUTTER,CABLE, RATCHET, SOFT, 27-1/2 IN LG HANDLE, CABLE: 1500 KCML CU TO 2500 KCME, INSULATED, 20 KV	263.80
CWIP	Material	201811	CYLINDER, DISPOSABLE, FOR BERNZ-O-MATIC FUEL	6.99
CWIP	Material	201811	DEICER, LOCK, 3/4 OZ CONTAINER	1.58
CWIP	Material	201811	DETECTOR,VOLTAGE, W/ HOT STICK EYE, TIC TRACER-BEEPER, TIF300HV, HIGH/LOW RANGE	136.74
CWIP	Material	201811	DRIVER,NUT, WRENCH,INSULATED, 1/4 IN, TOOL	6.23
CWIP	Material	201811	ELBOW,FITTING, LOADBREAK, 15 KV, 200 A, #1 SOLID OR #2 STRANDED, FOR URD-A-22-000	101.94
CWIP	Material	201811	GLASSES,SAFETY, LENS CLEANING TOWELETTE, CLEAR LENS, 100/BOX, 10/CASE, S468	10.80
CWIP	Material	201811	GLOVE, L, LEVELS: CUT A4, PUNCTURE 5, KEVLAR LINED, GOAT LEATHER	40.32
CWIP	Material	201811	GLOVE,PROTECTIVE, DRIVING, S, KEVLAR/SILICA INFUSED FIBER COMPOSITE LINED, GRAIN GOAT SKIN, BRAND: E	10.85
CWIP	Material	201811	GLOVE,WORK, REFLECTIVE, WINTER, WATERPROOF, L, ORANGE/TAN/YELLOW STRIP	7.49
CWIP	Material	201811	HAMMER, STRIKING, 36 IN LG HANDLE, 12 LB, W/ HICKORY HANDLE, TOOL	37.24
CWIP	Material	201811	HOOK, SHAVE, FOR CLEANING/PREPARE LEAD CABLES	35.85
CWIP	Material	201811	JOINT,ELECTRICAL, CRAB, 500 KCMIL, 4 WAY- 4 WAY, INSULATED	255.08
CWIP	Material	201811	JOINT,ELECTRICAL, CRAB, 500 KCMIL, 4 WAY- 4 WAY, NEUTRAL, TINNED BARE CU, USE UP CATID 9600 INVENTOR	211.92
CWIP	Material	201811	JOINT,KIT, HEAT SHRINK, 4/0-500 KCMIL, EPR	3,762.42
CWIP	Material	201811	KIT, HEAT SHRINK BONDING, FOR UG 600A ELBOWS	918.94
CWIP	Material	201811	KNIFE, HACKING, 1-1/4 IN BLADE, HANDLE: LEATHER, TOOL	27.24
CWIP	Material	201811	LADDER, STEP, TYPE 1A, 4 FT LG, FIBERGLASS, ORANGE, 300 LB RATING	141.69
CWIP	Material	201811	LAMP, HANDLAMP, 115 V, 75-100 W, W/ 25 FT LG CORD	152.16
CWIP	Material	201811	LIGHT, FLEXIBLE HEAD , RECHARGEABLE WORK, W/ MAGNETIC BASE, CLASS 1, DIV 2-ELECTRIC ONLY	411.06
CWIP	Material	201811	LIVE END, CAP, INSULATING, 15 KV, 4-4/0 AWG, 1/C PILC, RUBBER	502.94
CWIP	Material	201811	LOADBREAK KIT, 15 KV, W/ TAP, T-OP II, LOAD REDUCING TAP PLUG (LRTP), FOR ADAPTS 600 TBODY TO 200 AM	4,819.28
CWIP	Material	201811	LUBRICANT, SILICONE, 5 OZ SQUEEZE	56.68
CWIP	Material	201811	MIRROR, SPLICERS, W/ FRAME	19.72
CWIP	Material	201811	NOZZLE, HEAT SHRINK TORCH, W/ SELF-IGNITING, FOR FITS SMALL PROPANE BOTTLES, NOT AVAILABLE FROM GRAY	54.84
CWIP	Material	201811	PLIER, 9-1/2 IN, W/ GRIP, FOR WATER PUMP, TOOL, MFR: CHANNELLOCK	13.27
CWIP	Material	201811	PLIER,DIAGONAL CUTTING, 6 IN, TOOL	15.01
CWIP	Material	201811	PLIER,SIDE CUTTING, 5/8 IN DIA, 11 THREADED OPENING AT HINGE W HIGH-DIELECTRIC, FOR OVERHEAD LINE WO	44.75
CWIP	Material	201811	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	1,201.58
CWIP	Material	201811	SPLICE,ELECTRICAL, JOINT, 4/0 TO 1/0 AWG STR, COMPRESSION	15.76
CWIP	Material	201811	SPLICE,ELECTRICAL, JOINT, 500-350 KCMIL STR, COMPRESSION	16.79
CWIP	Material	201811	SPLICE,KIT, COLD SHRINK, 15 KV, #2-350, W/ 3X1/C JOINTS	1,899.60
CWIP	Material	201811	SPLICE,KIT, COLD SHRINK, 15-25 KV, #1-4/0, 350-750 KCMIL, W/ 3X1/C JOINTS	428.15
CWIP	Material	201811	SPLICE,KIT, GROUNDING/BOND, FOR JACKETED CABLE BONDING, UGK1	55.39
CWIP	Material	201811	SPLICE,KIT, HEAT SHRINK, 4/0-500 KCMIL, FOR SECONDARY UTILITY POWER SUPPLY	102.29
CWIP	Material	201811	SPLICE,KIT, HEAT SHRINK, LIVE END CAP, 4 KV, #4/0 AWG, 500 KCMIL, 350	337.80
CWIP	Material	201811	SWITCH, GALV STEEL, G&W TRIDENT H BRACKET	446.55
CWIP	Material	201811	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	103,762.38
CWIP	Material	201811	TUBE,KIT, HEAT SHRINK, #2 AWG, REJACKETED, FOR LOAD BREAK ELBOW	58.11
CWIP	Material	201811	WIPES,HAND, SAFETY, PRE-MEASURED AND PRE-MOISTENED ANTI-MICROBIAL, 135/PAC, 12/CS	5.66
CWIP	Material	201811	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	143.63
CWIP	Material	201811	WIRE,ELECTRICAL, BONDING, #6 AWG, STRANDED, CU, 100 FT COIL	43.45
CWIP	Material	201811	WIRE,ELECTRICAL, BONDING, 1/0 AWG, 19 STR, TINNED, SOFT-DRAWN CU, 1500 FT WOOD REEL	248.99
CWIP	Material	201811	WRENCHE,BOX END, RATCHET, INSULATED MID- SECTION, 1/2 X 9/16 IN	12.95
CWIP	Material	201812	BATTERY,ALKALINE, 1.5 V, AA	1.95
CWIP	Material	201812	BATTERY,ALKALINE, 9 V	7.52
CWIP	Material	201812	CABLE, #4 AWG, 600 V, EPR INSULATED, HYPALON JACKET, CU, 3000 FT Wood Reel	17.12
CWIP	Material	201812	CABLE, COMMUNICATION, PREMIUM MOLDED D-SUB, 5 FT LG, DB9 MALE TO DB9 FEMALE	13.64
CWIP	Material	201812	CABLE,ELECTRICAL, 1/0 AWG, 600 V, EPR INSULATED, CU, 2000 FT Wood Reel, CPE JACKETED	34.81
CWIP	Material	201812	CABLE,ELECTRICAL, 1/C, 4/0 AWG, 600 V, EP INSULATED, CU, 1000 FT Wood Reel	66.82
CWIP	Material	201812	CUTTER,CABLE, RATCHET, CU/AL, CABLE: 750 KCMIL	365.58
CWIP	Material	201812	CYLINDER, DISPOSABLE, FOR BERNZ-O-MATIC FUEL	14.26
CWIP	Material	201812	FIRST AID, BURN DRESSING, 4 IN, FOR TRAUMA KITS, WATER GEL PACKET, 2 PACS REQUIRED FOR SMALL KIT, 4	2.81
CWIP	Material	201812	FIRST AID, BURN WRAP DRESSING, 3 X 2-1/2 FT, WATER GEL	41.31
CWIP	Material	201812	GLOVE,WORK, REFLECTIVE, WINTER, WATERPROOF, L, ORANGE/TAN/YELLOW STRIP	89.98
CWIP	Material	201812	HAT,HARD, SAFETY, STANDARD SUSPENSION, FULL BRIM, W/ EVERSOURCE LOGO, BRAND: TOP GARD	534.35
CWIP	Material	201812	KNIFE,CABLE, HAWKBILL, HANDLE: HARDWOOD, W/ ROUNDED TIP, TOOL	128.62
CWIP	Material	201812	PADLOCK, COMBINATION, CORBIN K-436.	17.35
CWIP	Material	201812	PADLOCK, KEYED DIFFERENT	5.69
CWIP	Material	201812	PADLOCK, W/O KEYS, MODEL: 3C, MFR: PASEK	6.96
CWIP	Material	201812	SLING, ENDLESS, 4 FT LG	6.28
CWIP	Material	201812	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	316.59
CWIP	Material	201812	SPLICE,KIT, COLD SHRINK, 15 KV, #2-350, W/ 3X1/C JOINTS	1,507.90
CWIP	Material	201812	SPLICE,KIT, HEAT SHRINK, 15 KV, 250-500 CR, PILC OR EPR, W/ 3 SINGLE CONDUCTOR SPLICES/KIT, 3 IN ONE	390.67
CWIP	Material	201812	SPLICE,KIT, HEAT SHRINK, 4/0-500 KCMIL, FOR SECONDARY UTILITY POWER SUPPLY	82.61
CWIP	Material	201812	SPLICE,KIT, HEAT SHRINK, SINGLE/MULTIPLE, 5 KV, #4-500 KCMIL	438.29
CWIP	Material	201812	STONE, SHARPENING, 8 X 2 X 1 IN	35.00
CWIP	Material	201812	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	25,877.69
CWIP	Material	201812	TESTER, VOLTAGE, AC/DC, 110-600 V, 25-60 HZ	77.20
CWIP	Material	201812	VEST,SAFETY, XXL/XXXL, NON CARBON FIBER, LIME/YELLOW, CLASS 2, FOR ELECTRIC, REPLACED BY 509173 OR 5	935.37
CWIP	Material	201812	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	20.81
CWIP	**Material Total**			**248,118.03**
CWIP	Other	201808		62.08
CWIP	Other	201809		174.56
CWIP	Other	201810		(66,884.99)
CWIP	Other	201811		(282,681.41)
CWIP	Other	201812		(166,069.25)
CWIP	Other	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(0.75)
CWIP	Other	201812	201812 QTR 4 REMD0021 661990 to FWOs	0.75
CWIP	**Other Total**			**(515,399.00)**
CWIP Total				**93,088.54**
Cost of Removal	Contractor	201808	Accrual	0.82
Cost of Removal	Contractor	201809	Accrual	31.99

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Cost of Removal	Contractor	201810	Accrual	339.79
Cost of Removal	Contractor	201810	CLEAN HARBORS ENV SERVICES INC	288.45
Cost of Removal	Contractor	201810	RILEY BROTHERS INC	4,787.95
Cost of Removal	Contractor	201811		(258.51)
Cost of Removal	Contractor	201811	Accrual	1,129.35
Cost of Removal	Contractor	201811	CLEAN HARBORS ENV SERVICES INC	83.49
Cost of Removal	Contractor	201811	RILEY BROTHERS INC	1,973.43
Cost of Removal	Contractor	201811	SUNBELT RENTALS INC	462.46
Cost of Removal	Contractor	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(7,972.26)
Cost of Removal	Contractor	201812	201812 QTR 4 REMD0021 G GREENE to FWOs	131.81
Cost of Removal	Contractor	201812	201812 QTR 4 REMD0021 JOSEPH BOTTI to FWOs	38.12
Cost of Removal	Contractor	201812	201812 QTR 4 REMD0021 MIRRA CO INC to FWOs	164.52
Cost of Removal	Contractor	201812	201812 QTR 4 REMD0021 RILEY BROTHERS to FWOs	2,467.92
Cost of Removal	Contractor	201812	201812 QTR 4 REMD0021 SHEERIN CO to FWOs	8,705.10
Cost of Removal	Contractor	201812	Accrual	2,261.74
Cost of Removal	Contractor	201812	RILEY BROTHERS INC	10.97
Cost of Removal	Contractor	201812	SUNBELT RENTALS INC	1,019.78
Cost of Removal	**Contractor Total**			**15,666.92**
Cost of Removal	Indirect/Overheads	201808		1,235.69
Cost of Removal	Indirect/Overheads	201809		1,538.20
Cost of Removal	Indirect/Overheads	201810		16,463.69
Cost of Removal	Indirect/Overheads	201811		8,578.54
Cost of Removal	Indirect/Overheads	201812		15,599.89
Cost of Removal	**Indirect/Overheads Total**			**43,416.01**
Cost of Removal	Labor	201808		390.59
Cost of Removal	Labor	201809		292.57
Cost of Removal	Labor	201810		6,398.80
Cost of Removal	Labor	201811		2,919.55
Cost of Removal	Labor	201812		5,760.72
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(62.81)
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 010754 to FWOs	13.85
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 010760 to FWOs	9.83
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 010934 to FWOs	1.78
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 039481 to FWOs	6.07
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 041281 to FWOs	5.84
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 097683 to FWOs	0.93
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 660990 to FWOs	13.11
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 661990 to FWOs	17.00
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 664690 to FWOs	9.87
Cost of Removal	Labor	201812	201812 QTR 4 REMD0021 751593 to FWOs	3.58
Cost of Removal	**Labor Total**			**15,781.28**
Cost of Removal	Material	201808	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	2,985.89
Cost of Removal	Material	201810	ADAPTER,ELECTRICAL, 15 KV, 1.09-1.28 IN CABLE DIA, 500 KCMIL	13.67
Cost of Removal	Material	201810	BATTERY,ALKALINE, 1.5 V, AA, REPLACED WITH IN 500035	0.30
Cost of Removal	Material	201810	BATTERY,ALKALINE, 1.5 V, SIZE: AAA	1.13
Cost of Removal	Material	201810	BATTERY,ALKALINE, 9 V	0.28
Cost of Removal	Material	201810	BUSHING,ELECTRICAL, LOADBREAK CONNECTOR, 15 KV, 200 A	(3.08)
Cost of Removal	Material	201810	BUSHING,ELECTRICAL, PARKING / STAND-OFF, 15 KV, 200 A , 1-POSITION, INSULATED , BASE: SS, INTERFACE,	5.77
Cost of Removal	Material	201810	CABLE, COMPRESSED STRANDED, 500 KCMIL, 600 V, EPR INSULATED, HYPALON JACKET, CU, 1000 FT Reel	261.77
Cost of Removal	Material	201810	CABLE, FLAT STRAP, 500 KCMIL, 15 KV, EPR INSULATED, CU, 1200 FT/Steel Reel Lot	66.93
Cost of Removal	Material	201810	CABLE, NEUTRAL, CONCENTRIC, #2 AWG, 15 KV, EPR INSULATED, CU, 2000 FT Wood Reel/Lot	15.65
Cost of Removal	Material	201810	CABLE,ELECTRICAL, 1/C, 4/0 AWG, 600 V, EP INSULATED, CU, 1000 FT Wood Reel	15.81
Cost of Removal	Material	201810	CAP,ELECTRICAL, INSULATING, DEADEND, LOADBREAK, 15 KV, 200 A	64.55
Cost of Removal	Material	201810	CONNECTOR,ELECTRICAL, HYCRAB, 500 KCMIL, 12 POSITION, COMPRESSION, RUBBER, RESTRICTED PURCHASE	73.50
Cost of Removal	Material	201810	CONNECTOR,ELECTRICAL, MAIN 500 TAP1 250 1/0 TAP2 #1#6 TAP3 #8#14, 500 KCMIL, 15 KV, TINNED CU, COMPR	51.01
Cost of Removal	Material	201810	CONNECTOR,ELECTRICAL, T-BODY, 500 KCMIL COMPACT, 600 A, CU TOP, CONDUCTOR: AL/CU, CONTACT	24.25
Cost of Removal	Material	201810	CONNECTOR,ELECTRICAL, TEE, DEADBREAK, 15 OR 25 KV, 600 A, W/ STUD	50.92
Cost of Removal	Material	201810	CONNECTOR,JUNCTION, LOADBREAK, 15 KV, 4-WAY, W/ ADJUST BRACKET, SS, FOR FLAT OR CURVED WALL MOUNT	20.39
Cost of Removal	Material	201810	ELBOW,FITTING, LOADBREAK, 15 KV, 200 A, #1 SOLID OR #2 STRANDED, FOR URD-A-22-000	15.43
Cost of Removal	Material	201810	GLOVE, WINTER, XL, LEVELS: CUT A4, PUNCTURE 5, KEVLAR LINED, GOAT LEATHER	6.20
Cost of Removal	Material	201810	GLOVE, WINTER, XXL, LEVELS: CUT A4, PUNCTURE 5, KEVLAR LINED, GOAT LEATHER	43.37
Cost of Removal	Material	201810	GLOVE,PROTECTIVE, DRIVING, M, KEVLAR/SILICA INFUSED FIBER COMPOSITE LINED, GRAIN GOAT SKIN, BRAND: E	32.83
Cost of Removal	Material	201810	JOINT,ELECTRICAL, CRAB, 4/0 AWG, 4 WAY- 4 WAY	15.33
Cost of Removal	Material	201810	JOINT,ELECTRICAL, CRAB, 4/0 AWG, 4 WAY- 4 WAY, NEUTRAL	4.17
Cost of Removal	Material	201810	JOINT,ELECTRICAL, CRAB, 500 KCMIL, 4 WAY- 4 WAY, NEUTRAL, TINNED BARE CU, USE UP CATID 9600 INVENTOR	8.89
Cost of Removal	Material	201810	JOINT,KIT, HEAT SHRINK, 4/0-500 KCMIL, EPR	51.98
Cost of Removal	Material	201810	KIT, HEAT SHRINK BONDING, FOR UG 600A ELBOWS	13.84
Cost of Removal	Material	201810	KNIFE,CABLE, HAWKBILL, HANDLE: HARDWOOD, W/ ROUNDED TIP, TOOL	14.90
Cost of Removal	Material	201810	LOADBREAK KIT, 15 KV, W/ TAP, T-OP II, LOAD REDUCING TAP PLUG (LRTP), FOR ADAPTS 600 TBODY TO 200 AM	159.93
Cost of Removal	Material	201810	LUG,COMPRESSION, HYLUG, 500 KCMIL, 2 HOLE, CU	19.40
Cost of Removal	Material	201810	PADLOCK, W/O KEYS, MODEL: 3C, MFR: PASEK	23.32
Cost of Removal	Material	201810	PLIER,SIDE CUTTING, 5/8 IN DIA, 11 THREADED OPENING AT HINGE W HIGH-DIELECTRIC, FOR OVERHEAD LINE WO	15.54
Cost of Removal	Material	201810	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	56.27
Cost of Removal	Material	201810	SPLICE,KIT, GROUNDING/BOND, FOR JACKETED CABLE BONDING, UGK1	8.38
Cost of Removal	Material	201810	SPLICE,KIT, HEAT SHRINK, 4/0-500 KCMIL, FOR SECONDARY UTILITY POWER SUPPLY	20.96
Cost of Removal	Material	201810	SPLICE,KIT, HEAT SHRINK, SINGLE/MULTIPLE, 5 KV, #4-500 KCMIL	138.42
Cost of Removal	Material	201810	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	2,985.89
Cost of Removal	Material	201810	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	10.71
Cost of Removal	Material	201810	WIRE,ELECTRICAL, BARE, 500 KCMIL, STRANDED, TINNED, CU	154.35
Cost of Removal	Material	201810	WIRE,ELECTRICAL, BONDING, 1/0 AWG, 19 STR, TINNED, SOFT-DRAWN CU, 1500 FT WOOD REEL	30.98
Cost of Removal	Material	201811		(4,102.47)
Cost of Removal	Material	201811	ADAPTER,ELECTRICAL, 15 KV, 1.09-1.28 IN CABLE DIA, 500 KCMIL	29.52
Cost of Removal	Material	201811	ADAPTER,ELECTRICAL, JOINT COMPRESSION, 350 STRANDED TO 1/0 STRANDED	15.65
Cost of Removal	Material	201811	ADAPTER,ELECTRICAL, JOINT COMPRESSION, 4/0 STRANDED TO 4 SOLID	2.42
Cost of Removal	Material	201811	ANODE,ELECTRICAL, 10 FT, #12 AWG STANDARD LEAD WIRE, 17LB, CAST MAGNESIUM	7.49
Cost of Removal	Material	201811	CABLE, FLAT STRAP, 500 KCMIL, 15 KV, EPR INSULATED, CU, 1200 FT/Steel Reel Lot	407.74
Cost of Removal	Material	201811	CABLE, NEUTRAL, CONCENTRIC, #2 AWG, 15 KV, EPR INSULATED, CU, 2000 FT Wood Reel/Lot	18.26
Cost of Removal	Material	201811	CAP, 20 KV, RUBBER, FOR 4/0-500M, 20 KV CABLE ENDS, TEMPORARY	29.85
Cost of Removal	Material	201811	CAP,ELECTRICAL, CABLE END, LARGE, 350-750 KCMIL, 2.25 IN ID, RUBBER, CLASS 2	75.13
Cost of Removal	Material	201811	CAP,ELECTRICAL, INSULATING, DEADEND, LOADBREAK, 15 KV, 200 A	193.40
Cost of Removal	Material	201811	CLOTHING,PROTECTIVE, RAIN COAT, XXXL, SNAP AND HOOD, YELLOW, W/ ARCLITE, EVERSOURCE LOGO ON CHEST AN	15.75
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, 350 KCMIL, CU, COMPRESSION	40.88
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, 800 KCMIL, CU, COMPRESSION	25.91
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, COUPLER, HYTEE, TEE TAP, 4/0 AWG RUN & 4/0 AWG TAP, CU, COMPRESSION	120.01
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, COUPLING, HYTEE, 1/0 AWG TEE TAP W/1/0 RUN AND 1/0 TAP, CU, RESTRICTED PURCHAS	30.15
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, COUPLING, HYTEE, 2/0 AWG TEE TAP W/2/0 RUN AND 2/0 TAP, CU, RESTRICTED PURCHAS	70.62
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, ROUND, 700 KCMIL COMPACT, CU, COMPRESSION, ALSO USE FOR 600 STRANDED	20.44
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, STAKON, TOOL	5.78

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, T-BODY, 500 KCMIL COMPACT, 600 A, CU TOP, CONDUCTOR: AL/CU, CONTACT	54.59
Cost of Removal	Material	201811	CONNECTOR,ELECTRICAL, TEE, DEADBREAK, 15 OR 25 KV, 600 A, W/ STUD	114.42
Cost of Removal	Material	201811	CUTTER,CABLE, RATCHET, SOFT, 27-1/2 IN LG HANDLE, CABLE: 1500 KCML CU TO 2500 KCME, INSULATED, 20 KV	60.88
Cost of Removal	Material	201811	CYLINDER, DISPOSABLE, FOR BERNZ-O-MATIC FUEL	1.61
Cost of Removal	Material	201811	DEICER, LOCK, 3/4 OZ CONTAINER	0.36
Cost of Removal	Material	201811	DETECTOR,VOLTAGE, W/ HOT STICK EYE, TIC TRACER-BEEPER, TIF300HV, HIGH/LOW RANGE	31.56
Cost of Removal	Material	201811	DRIVER,NUT, WRENCH,INSULATED, 1/4 IN, TOOL	1.44
Cost of Removal	Material	201811	ELBOW,FITTING, LOADBREAK, 15 KV, 200 A, #1 SOLID OR #2 STRANDED, FOR URD-A-22-000	23.52
Cost of Removal	Material	201811	GLASSES,SAFETY, LENS CLEANING TOWELETTE, CLEAR LENS, 100/BOX, 10/CASE, S468	2.50
Cost of Removal	Material	201811	GLOVE,PROTECTIVE, DRIVING, S, KEVLAR/SILICA INFUSED FIBER COMPOSITE LINED, GRAIN GOAT SKIN, BRAND: E	2.50
Cost of Removal	Material	201811	GLOVE,WORK, REFLECTIVE, WINTER, WATERPROOF, L, ORANGE/TAN/YELLOW STRIP	1.73
Cost of Removal	Material	201811	HAMMER, STRIKING, 36 IN LG HANDLE, 12 LB, W/ HICKORY HANDLE, TOOL	8.60
Cost of Removal	Material	201811	HOOK, SHAVE, FOR CLEANING/PREPARE LEAD CABLES	8.27
Cost of Removal	Material	201811	JOINT,ELECTRICAL, CRAB, 500 KCMIL, 4 WAY- 4 WAY, NEUTRAL, TINNED BARE CU, USE UP CATID 9600 INVENTOR	35.55
Cost of Removal	Material	201811	JOINT,KIT, HEAT SHRINK, 4/0-500 KCMIL, EPR	294.57
Cost of Removal	Material	201811	KIT, HEAT SHRINK BONDING, FOR UG 600A ELBOWS	82.09
Cost of Removal	Material	201811	KNIFE, HACKING, 1-1/4 IN BLADE, HANDLE: LEATHER, TOOL	6.29
Cost of Removal	Material	201811	LAMP, HANDLAMP, 115 V, 75-100 W, W/ 25 FT LG CORD	35.11
Cost of Removal	Material	201811	LIVE END, CAP, INSULATING, 15 KV, 4-4/0 AWG, 1/C PILC, RUBBER	116.06
Cost of Removal	Material	201811	LOADBREAK KIT, 15 KV, W/ TAP, T-OP II, LOAD REDUCING TAP PLUG (LRTP), FOR ADAPTS 600 TBODY TO 200 AM	359.96
Cost of Removal	Material	201811	MIRROR, SPLICERS, W/ FRAME	4.55
Cost of Removal	Material	201811	NOZZLE, HEAT SHRINK TORCH, W/ SELF-IGNITING, FOR FITS SMALL PROPANE BOTTLES, NOT AVAILABLE FROM GRAY	12.66
Cost of Removal	Material	201811	PLIER, 9-1/2 IN, W/ GRIP, FOR WATER PUMP, TOOL, MFR: CHANNELLOCK	3.06
Cost of Removal	Material	201811	PLIER,DIAGONAL CUTTING, 6 IN, TOOL	3.46
Cost of Removal	Material	201811	PLIER,SIDE CUTTING, 5/8 IN DIA, 11 THREADED OPENING AT HINGE W HIGH-DIELECTRIC, FOR OVERHEAD LINE WO	10.32
Cost of Removal	Material	201811	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	105.98
Cost of Removal	Material	201811	SPLICE,ELECTRICAL, JOINT, 4/0 TO 1/0 AWG STR, COMPRESSION	3.64
Cost of Removal	Material	201811	SPLICE,ELECTRICAL, JOINT, 500-350 KCMIL STR, COMPRESSION	3.87
Cost of Removal	Material	201811	SPLICE,KIT, COLD SHRINK, 15 KV, #2-350, W/ 3X1/C JOINTS	438.37
Cost of Removal	Material	201811	SPLICE,KIT, COLD SHRINK, 15-25 KV, #1-4/0, 350-750 KCMIL, W/ 3X1/C JOINTS	98.80
Cost of Removal	Material	201811	SPLICE,KIT, HEAT SHRINK, LIVE END CAP, 4 KV, #4/0 AWG, 500 KCMIL, 350	51.94
Cost of Removal	Material	201811	SWITCH, GALV STEEL, G&W TRIDENT H BRACKET	103.05
Cost of Removal	Material	201811	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	14,929.45
Cost of Removal	Material	201811	TUBE,KIT, HEAT SHRINK, #2 AWG, REJACKETED, FOR LOAD BREAK ELBOW	13.41
Cost of Removal	Material	201811	WIPES,HAND, SAFETY, PRE-MEASURED AND PRE-MOISTENED ANTI-MICROBIAL, 135/PAC, 12/CS	1.31
Cost of Removal	Material	201811	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	13.14
Cost of Removal	Material	201811	WIRE,ELECTRICAL, BONDING, #6 AWG, STRANDED, CU, 100 FT COIL	10.03
Cost of Removal	Material	201811	WIRE,ELECTRICAL, BONDING, 1/0 AWG, 19 STR, TINNED, SOFT-DRAWN CU, 1500 FT WOOD REEL	35.95
Cost of Removal	Material	201811	WRENCHE,BOX END, RATCHET, INSULATED MID- SECTION, 1/2 X 9/16 IN	3.00
Cost of Removal	Material	201812	BATTERY,ALKALINE, 1.5 V, AA	0.45
Cost of Removal	Material	201812	BATTERY,ALKALINE, 9 V	1.74
Cost of Removal	Material	201812	CABLE, #4 AWG, 600 V, EPR INSULATED, HYPALON JACKET, CU, 3000 FT Wood Reel	3.95
Cost of Removal	Material	201812	CABLE,ELECTRICAL, 1/0 AWG, 600 V, EPR INSULATED, CU, 2000 FT Wood Reel, CPE JACKETED	8.03
Cost of Removal	Material	201812	CABLE,ELECTRICAL, 1/C, 4/0 AWG, 600 V, EP INSULATED, CU, 1000 FT Wood Reel	15.42
Cost of Removal	Material	201812	CUTTER,CABLE, RATCHET, CU/AL, CABLE: 750 KCMIL	84.37
Cost of Removal	Material	201812	CYLINDER, DISPOSABLE, FOR BERNZ-O-MATIC FUEL	3.29
Cost of Removal	Material	201812	FIRST AID, BURN DRESSING, 4 IN, FOR TRAUMA KITS, WATER GEL PACKET, 2 PACS REQUIRED FOR SMALL KIT, 4	0.65
Cost of Removal	Material	201812	FIRST AID, BURN WRAP DRESSING, 3 X 2-1/2 FT, WATER GEL	9.53
Cost of Removal	Material	201812	GLOVE,WORK, REFLECTIVE, WINTER, WATERPROOF, L, ORANGE/TAN/YELLOW STRIP	20.76
Cost of Removal	Material	201812	KNIFE,CABLE, HAWKBILL, HANDLE: HARDWOOD, W/ ROUNDED TIP, TOOL	29.68
Cost of Removal	Material	201812	PADLOCK, COMBINATION, CORBIN K-436.	4.00
Cost of Removal	Material	201812	PADLOCK, KEYED DIFFERENT	1.31
Cost of Removal	Material	201812	PADLOCK, W/O KEYS, MODEL: 3C, MFR: PASEK	1.61
Cost of Removal	Material	201812	SPLICE,ELECTRICAL, 500 KCMIL, STANDARD, COMPRESSION, TINNED, W/ TAPERED ENDS, CENTER OIL STOP, CONDU	5.58
Cost of Removal	Material	201812	SPLICE,KIT, COLD SHRINK, 15 KV, #2-350, W/ 3X1/C JOINTS	87.88
Cost of Removal	Material	201812	SPLICE,KIT, HEAT SHRINK, 15 KV, 250-500 CR, PILC OR EPR, W/ 3 SINGLE CONDUCTOR SPLICES/KIT, 3 IN ONE	90.16
Cost of Removal	Material	201812	STONE, SHARPENING, 8 X 2 X 1 IN	8.08
Cost of Removal	Material	201812	SWITCH, VACUUM FAULT INTERRUPTER (VFI), 600 A, 15 KV, 16 KA MAX INTERRUTING, 3 PH, G&W TRIDENT, UNDE	2,985.89
Cost of Removal	Material	201812	TESTER, VOLTAGE, AC/DC, 110-600 V, 25-60 HZ	17.82
Cost of Removal	Material Total			24,954.16
Cost of Removal	Other	201808		2.70
Cost of Removal	Other	201809		1.78
Cost of Removal	Other	201810		99.90
Cost of Removal	Other	201811		(11.11)
Cost of Removal	Other	201812		43.20
Cost of Removal	Other	201812	201812 QTR 4 REMD0021 (blank) to FWOs	(0.18)
Cost of Removal	Other	201812	201812 QTR 4 REMD0021 661990 to FWOs	0.18
Cost of Removal	Other Total			136.47
Cost of Removal Total				99,954.84
Grand Total				1,147,784.22

NSTAR ELECTRIC COMPANY D/B/A EVERSOURCE ENERGY
CAPITAL AUTHORIZATION ANALYSIS

Line of Business	12165	Electric Vehicle Infrastructure
Parent Project	EVL2FC01	EV Level 2 and Fast Chargers
Child Project	EV41L2EJ	WMECO EV Level 2 Chargers - EJC
Work Orders	Please refer to the following page for a list of Work Orders	

	PAF Estimate (A)	Additions Total (B)	Cost of Removal Total (C)	CWIP Total (D)	Total Capital Spend (B+C+D) (E)	Variance (E-A)
Direct Costs	39,481,950	142,709	-	133,777	276,486	(39,205,464)
					-	-
Indirect Costs	8,668,221	1,486	2	5,817	7,305	(8,660,916)
					-	-
Total Project Costs	48,150,171	144,195	2	139,594	283,791	(47,866,380)

By Cost Element

Direct Costs						
Labor	4,249,685	2,140	-	10,302	12,443	(4,237,242)
Contractor	21,073,041	140,569	-	266,756	407,325	(20,665,716)
Material	6,454,076	-	-	913	913	(6,453,163)
Other	7,705,148	-	-	(144,195)	(144,195)	(7,849,343)
Total Direct	39,481,950	142,709	-	133,777	276,486	(39,205,464)
Indirect Costs	8,668,221	1,486	2	5,817	7,305	(8,660,916)
Total Project	48,150,171	144,195	2	139,594	283,791	(47,866,380)

Accounting Work Order	Accounting Work Order Description
6A821844	NJC - Greenfield, Olive St - Elec V
6B821194	ETB - PITTSFIELD, KENT AVE; Elec Ve
6S822396	AN:NEW SVC EV CHARGERS AT GAS STATI
6S822416	AN:NEW SVC EV CHARGERS AT GAS STATI
6S822707	***MUNI IN*** Elec Vehicle Make Rea

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Date Prepared: April 2018	Project Title: Massachusetts Make-Ready EV Infrastructure Program
Company/Companies: NSTAR, WMECO	Project ID Number: N/A
Organization: EESBD & EE	Plant Class/(F.P.Type): Energy Efficiency Projects
Project Initiator: Kevin Boughan – EESBD	Project Type: *Specific / Annual / Prelim Project / Parent*
Project Manager: James Cater – EE	Capital Investment Part of Original Operating Plan? Y / N
Project Sponsor: Leon Olivier – Enterprise Energy Strategy & Business Development (EESBD) & Tilak Subrahmanian	Transfer of Budgets Request: Y / N
Estimated in service date(s): 5 year program	Emergency Related Request: No
Total Capital Request: $45M Total Funding Request: $48.2M	Software Projects Only – Estimated Life of Asset: N/A ____ 5 years ____ 10 Years ____15 Years

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:__Email from M. McKenzie dated April 11, 2018_____

FP&A: Email from M. Mueller dated April 24, 2018_____

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:___N/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.)

In the Rate Case Order dated November 30, 2017, the Massachusetts Department of Public Utilities approved as part of the Company (Western and Eastern Massachusetts Electric Companies) proposed five-year $400M grid modernization investments, $45M for the Electric Vehicle (EV) infrastructure program. These EV infrastructure investments will help accelerate electric vehicle charging infrastructure development in Massachusetts, encourage electric vehicle purchases by

reducing range anxiety and contribute to green house gas emissions reductions. The specific method for recovery of the investments along with the requested O&M budget will be addressed in a separate Order forthcoming in Docket D.P.U 15-222.

The program will be divided into two phases: Phase I will start in 2018 and extend through December 31, 2019 and Phase II will extend from Jan. 1, 2020 - December 31, 2022. During the first phase, the Company will begin site host recruitment activities and deployment of Level 2[1] and DC Fast Charging infrastructure. During Phase II the Company expect to accelerate these efforts based on evaluation of progress made during Phase I. Metric reporting will be a requirement of the program. Eversource will track six metrics including:

Metric	Unit of Measurement	Data Source
Total # of sites developed	# of sites	Internal tracking tool
Capital invested in DC Fast Charging	Capital dollars	Internal financial and budgeting systems
Capital invested in Environmental Justice Communities	Capital dollars	Internal financial and budgeting systems
Charging station utilization	kWh	Internal C2 and CIS systems
Percentage of residential customers within range of charging station	% of ES residential customer accounts	GIS data on charging station sites and for customers in service territory
Electric Vehicle adoption and CO2 emissions reductions	# of electric vehicles CO2 emission reduction tons	External data sources for electric vehicle adoption, CO2 reduction calculated from electric vehicle adoption

Over the course of the five years the plan is to support the deployment the following:

	Ports	Sites
Fast Chargers	72	36
Level 2	3,441	393
Total	**3,513**	**429**

**Actual installations may be more or less based on demand, location and cost*

The Company will install the "Eversource-side Infrastructure" (including distribution primary lateral service feed, necessary transformer and transformer pad and new service meter), and contract with third-party electrical contractors to install behind the meter "Participant-side Infrastructure". There is also a commitment to deploy ten percent of the EV charging infrastructure in environmental justice communities[2].

The corporate Electric Vehicle program is being sponsored by the Enterprise Energy Strategy and Business Development Organization, and the implementation of the initiative will be managed by the Energy Efficiency Organization and the funding will be included as part of the overall Grid Modernization program in the Operations Organization.

[1] Level 2 chargers rely on a 240-volt connection and are capable of fully charging most existing EVs in approximately eight hours or less depending on battery capacity; DC fast chargers use direct current and are the fastest method of charging electric vehicles charging 80% of a battery in up to 30 minutes.

[2] 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. Eversource will select opportunities in EJ communities that meet two of the following three criteria (in Eastern MA, or one of three in Western MA) established by the Massachusetts Executive Office of Energy and Environmental Affairs: (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 of 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 (Exh. ES-GMBC-1, at 111).

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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:

	2018	2019	2020	2021	2022	Totals
Capital Additions - Direct	$ 5,104,416	$ 6,299,416	$ 9,373,831	$ 9,538,339	$ 9,165,947	$ 39,481,949
Removals net of salvage	-	-	-	-	-	-
Subtotal - Direct Spending	**$ 5,104,416**	**$ 6,299,416**	**$ 9,373,831**	**$ 9,538,339**	**$ 9,165,947**	**$ 39,481,949**
Capital Additions - Indirect	659,854	875,921	1,306,939	1,339,612	1,325,500	5,507,826
Subtotal Request	**$ 5,764,270**	**$ 7,175,337**	**$ 10,680,770**	**$ 10,877,951**	**$ 10,491,447**	**$ 44,989,775**
O&M	187,102	534,985	618,585	754,401	1,065,322	3,160,395
Total Request	**$ 5,951,372**	**$ 7,710,322**	**$ 11,299,355**	**$ 11,632,353**	**$ 11,556,768**	**$ 48,150,170**

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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	**2018**	**2019**	**2020**	**2021**	**2022**	**Totals**
Labor	$ 526,486	$ 684,071	$ 997,241	$ 1,022,172	$ 1,019,715	$ 4,249,683
Overtime	-	-	-	-	-	-
Outside Services/Consultants	2,696,038	3,445,741	5,027,764	5,089,969	4,813,529	21,073,042
Software / Hardware	358,750	91,930	94,228	96,584	98,998	740,489
Materials	679,015	978,596	1,582,404	1,621,964	1,592,097	6,454,075
Other, including contingency amounts	844,128	1,099,078	1,672,194	1,707,650	1,641,608	6,964,659
Total Direct Capital Costs	**$ 5,104,416**	**$ 6,299,416**	**$ 9,373,831**	**$ 9,538,339**	**$ 9,165,947**	**$ 39,481,949**

Indirect Capital Costs	**2018**	**2019**	**2020**	**2021**	**2022**	**Totals**
Indirects/Overheads (including benefits)	$ 659,854	$ 875,921	$ 1,306,939	$ 1,339,612	$ 1,325,500	$ 5,507,826
Capitalized interest or AFUDC , if any	-	-	-	-	-	-
Total Indirect Capital Costs	**$ 659,854**	**$ 875,921**	**$ 1,306,939**	**$ 1,339,612**	**$ 1,325,500**	**$ 5,507,826**
Total Capital Costs	**$ 5,764,270**	**$ 7,175,337**	**$ 10,680,770**	**$ 10,877,951**	**$ 10,491,447**	**$ 44,989,775**
Total O&M Costs	187,102	534,985	618,585	754,401	1,065,322	3,160,395
Total Project Costs	**$ 5,951,372**	**$ 7,710,322**	**$ 11,299,355**	**$ 11,632,353**	**$ 11,556,768**	**$ 48,150,170**

*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.

By Company Summary:

Note: Dollar values are in whole dollars:

Company Analysis	**E. MA**	**W. MA**	**Totals**
Capital Additions - Direct	$ 31,585,559	$ 7,896,390	$ 39,481,949
Removals net of salvage	-	-	-
Subtotal - Direct Spending	**$ 31,585,559**	**$ 7,896,390**	**$ 39,481,949**
Capital Additions - Indirect	4,406,260	1,101,565	5,507,826
Removals net of salvage	-	-	-
Subtotal Request	**$ 35,991,820**	**$ 8,997,955**	**$ 44,989,775**
O&M	2,528,316	632,079	3,160,395
Total Request	**$ 38,520,136**	**$ 9,630,034**	**$ 48,150,170**

Capital Project Analysis	**E. MA**		**W. MA**		**Total**	
	EJC	**Non EJC**	**EJC**	**Non EJC**	**EJC**	**Non EJC**
Fast Chargers (10%)	$ 359,918	$ 3,239,264	$ 89,980	$ 809,816	$ 449,898	$ 4,049,080
Level 2 Chargers	3,239,264	29,153,374	809,816	7,288,344	4,049,080	36,441,718
Sub Total	$ 3,599,182	$ 32,392,638	$ 899,795	$ 8,098,159	$ 4,498,977	$ 40,490,797
Company Total		**$ 35,991,820**		**$ 8,997,955**		**$ 44,989,775**

Overall Justification:

Project Need Statement
The Massachusetts Global Warming Solutions Act (GWSA) and Zero Emission Vehicle (ZEV) Action Plan objectives created an opportunity for Eversource to invest in utility-owned Electric Vehicle charging infrastructure as part of the company's Grid Modernization program filing.

Project Scope and Objectives
Deploy $45M capital investment in infrastructure to support the installation of approximately 3,500 EV charging ports across NSTAR and WMECO service territories. Actual number of installations may vary based on demand, location and cost. Program costs will not exceed authorized costs.

Background / Justification
Consistent with our stated objective of being a catalyst for the New England clean energy economy, Eversource supports transportation electrification. We will use our experience deploying infrastructure programs at scale to drive the deployment of charging infrastructure through a make-ready model which supports this infrastructure development while preserving a competitive market for vehicle refueling.

The economics do not currently incentivize customers to deploy EV charging stations at their facilities. Without Utility investment in EV charging infrastructure, the market will not develop to the extent needed to accelerate consumer adoption of Electric Vehicles.

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*

The EV infrastructure and associated Electric Vehicle adoption enabled by Eversource's investment will result in benefits to our Customers, including fuel savings, reduced maintenance expenses, and GHG emissions reductions. Details are quantified in the attached spreadsheet.


EV Make-Ready Customer benefits P

Program metrics:


MA EV Make Ready Metrics.pptx

Future Financial Impacts:

Provide below the estimated future costs that will result from the project:
Note: Dollar values are in whole dollars:

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Budget	2018	2019	2020	2021	2022	Total
Make-Ready Infrastructure						
Capital ($M)	$5.7	$7.1	$10.7	$10.9	$10.6	$45.0
O&M ($M)	$0.2	$0.5	$0.6	$0.8	$1.1	$3.2
Total Program ($M)	$6.0	$7.7	$11.3	$11.6	$11.6	$48.2

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

The capital expenditures above reflect each deployment project and will be reflected as plant in service upon installation of make-ready infrastructure, independent of the customer installation of customer owned charging station. As such, any CWIP balances are expected to be immaterial, so there is no AFUDC included in the capital cost.

The estimated O&M includes charging station rebates for Level 2 chargers for site hosts in Environmental Justice Communities and expenses for program evaluation after each phase of deployment.

What functional area(s) will these future costs be funded in? _Operations – Grid Mod__
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:
The capital costs will be recovered in a separate regulatory tracking mechanism (described further below). It is anticipated that operating expenses will also be approved for recovery in this tracker.

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

- All capital and O&M will be spent within the 5-year program timeline ending December 2022.

What functional area(s) will these benefits be reflected in? ____N/A_____
A representative from the respective functional area is required to be included as a project approver.

What is the project's IRR? _____N/A_____

What is the project's NPV? _____N/A_____

What is the project's payback period? _____N/A_____

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).

The above items are not applicable. The $45M of capital spending requested has been approved for recovery by the DPU in the Massachusetts rate case order. The proposed tracker in the company's grid mod filing reflected a return on rate base, depreciation, property taxes and O&M expense (concurrent recovery). The specifics of the tracker recovery will ultimately reflect the DPU grid mod order expected shortly. Although O&M expense was not part of the rate case order, it is anticipated that operating expenses will be approved for recovery as part of the grid mod order.

Future distribution revenues received from these charging station customers will be credited back to customers through the NSTAR/WMECO Electric approved decoupling mechanism.

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:

- There is no known ARO associated with this project

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

- There are no known environmental cleanup costs associated with constructing this project.

Alternatives Considered with Cost Estimates

Due to the DPU's approval of $45 million in funding deployment of charging infrastructure, and finding that the proposed distribution infrastructure, beyond the meter infrastructure, and other capitalized costs associated with the EV infrastructure program are reasonable in relation to the likely benefits to be achieved, further analysis here is inapplicable.

Project Schedule

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

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Corporate Shared Service Project Authorization Form

Task #	Task Description	Year	Start Month	End Month
1	Receive DPU approval of $5.8MM O&M budget	2018	-	Pending
2	Develop DC Fast Charger deployment plan	2018	-	March
3	Qualify charging station vendors for participation in program	2018	-	April
4	Select third party electrical contractors to perform behind-the-meter work	2018	-	April
5	Complete internal approvals process (PAF, subsidiary board approval)	2018	-	May
6	Determine FTE hiring plan	2018	-	June
7	Engage third party contractor to build customer-facing web portal	2018	-	December
8	Recruit site hosts for charging station deployment	2018-2022	January	December
9	Electrify 47 Level 2 and DC Fast Charger sites in Year 1	2018	January	December
10	Electrify 67 Level 2 and DC Fast Charger sites in Year 2	2019	January	December
11	Electrify 106 Level 2 and DC Fast Charger sites in Year 3	2020	January	December
12	Electrify 106 Level 2 and DC Fast Charger sites in Year 4	2021	January	December
13	Electrify 102 Level 2 and DC Fast Charger sites in Year 5	2022	January	December
14	Maintain compliance with commitment to deploy 10% of capital in Environmental Justice Communities	2018-2022	January	December
15	Submit evaluation report to DPU / DOER upon completion of Phase 1	2019	-	December
16	Support MA Grid Mod stakeholder outreach plan	2018-2022	January	December

Regulatory Approvals

Massachusetts DPU approval for the $45M capital component of the investment was received on November 30, 2017 as part of docket 17-05. Approval for cost recovery mechanism and O&M expense was deferred to docket 15-122, with a decision expected in Q2 2018.

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.

In addition to the pending cost recovery approval noted above, please see the attached Risk mitigation plan document.

EV Make Ready
Board Presentation

References (*additional supporting documentation*)

Diagrams, Attachments, and Images

MA EV Make-Ready
Program Illustration

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). **N/A**

Assess the fit of this IT project with the overall IT strategy. **N/A**

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. **N/A**

Attached SaaS/Cloud form where applicable. **N/A**

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:

_____

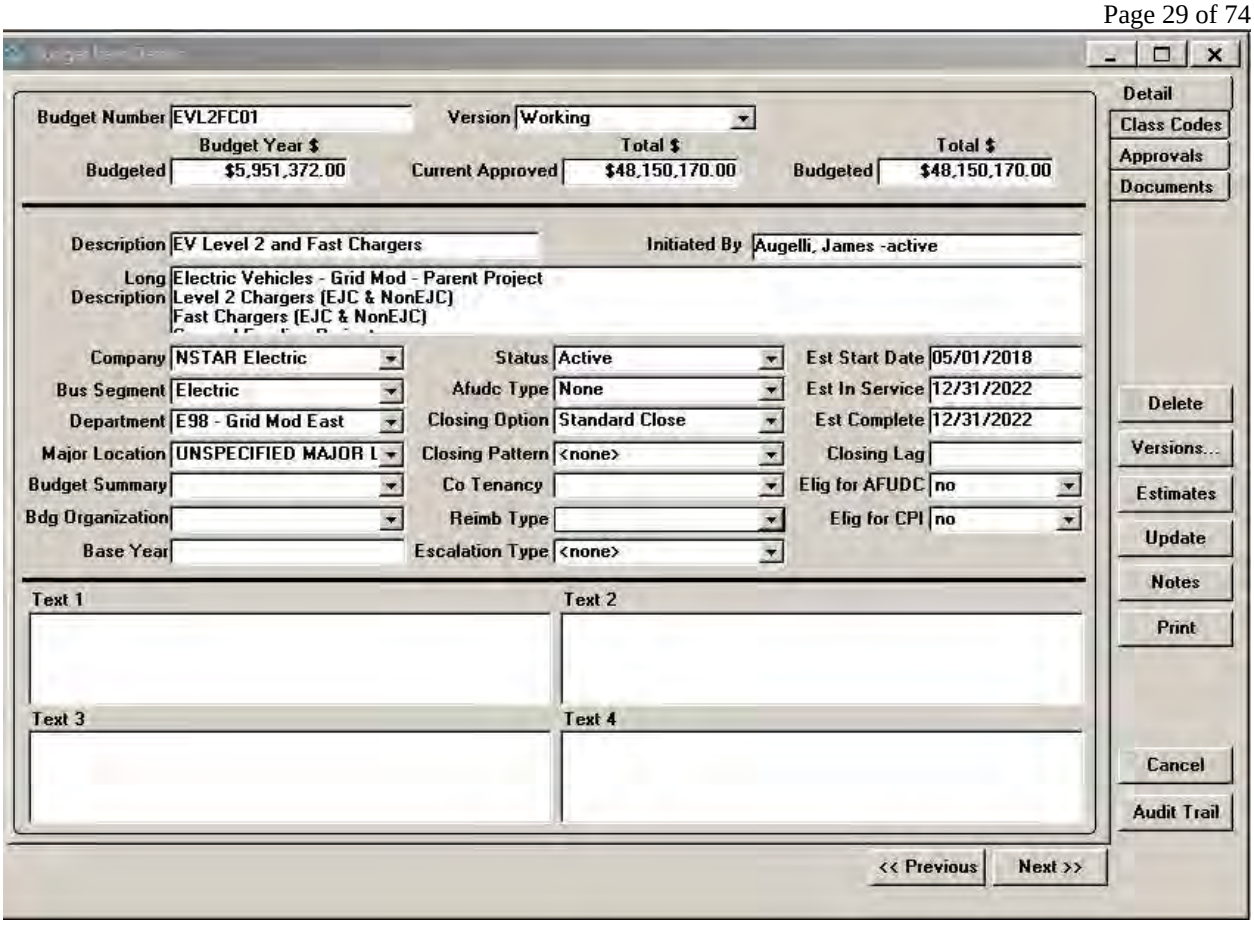
Development phase: # months (provide support) (A) _____

÷ 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.


Budget Number EVL2FC01
Version Working
Budget Year $
Budgeted $5,951,372.00
Total $
Current Approved $48,150,170.00
Total $
Budgeted $48,150,170.00
Description EV Level 2 and Fast Chargers
Initiated By Augelli, James -active
Long Description Electric Vehicles - Grid Mod - Parent Project
Level 2 Chargers (EJC & NonEJC)
Fast Chargers (EJC & NonEJC)
Company NSTAR Electric
Bus Segment Electric
Department E98 - Grid Mod East
Major Location UNSPECIFIED MAJOR L
Budget Summary
Bdg Organization
Base Year
Status Active
Afudc Type None
Closing Option Standard Close
Closing Pattern <none>
Co Tenancy
Reimb Type
Escalation Type <none>
Est Start Date 05/01/2018
Est In Service 12/31/2022
Est Complete 12/31/2022
Closing Lag
Elig for AFUDC no
Elig for CPI no
Text 1
Text 2
Text 3
Text 4
Detail
Class Codes
Approvals
Documents
Delete
Versions...
Estimates
Update
Notes
Print
Cancel
Audit Trail
<< Previous
Next >>

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Additions	**Contractor**	201812	Gen EV Quarterly Proj Allocation	1,479.88
Additions	**Contractor**	201812	MAVERICK CONSTRUCTION CORP	125,488.77
Additions	**Contractor**	201812	MERRIMAC INDUSTRIAL SALES, INC	13,600.00
Additions	**Contractor Total**			**140,568.65**
Additions	**Indirect/Overheads**	201809		38.40
Additions	**Indirect/Overheads**	201811		73.73
Additions	**Indirect/Overheads**	201812		1,373.93
Additions	**Indirect/Overheads Total**			**1,486.06**
Additions	**Labor**	201809		81.72
Additions	**Labor**	201811		168.85
Additions	**Labor**	201812		38.32
Additions	**Labor**	201812	Gen EV Quarterly Proj Allocation	1,851.35
Additions	**Labor Total**			**2,140.24**
Additions Total				**144,194.95**
CWIP	**Contractor**	201811	Accrual	10,000.00
CWIP	**Contractor**	201812	Accrual	(507.00)
CWIP	**Contractor**	201812	Gen EV Quarterly Proj Allocation	5,359.70
CWIP	**Contractor**	201812	MAVERICK CONSTRUCTION CORP	191,312.50
CWIP	**Contractor**	201812	MERRIMAC INDUSTRIAL SALES, INC	51,097.58
CWIP	**Contractor**	201812	WITCH ENTERPRISES	9,493.15
CWIP	**Contractor Total**			**266,755.93**
CWIP	**Indirect/Overheads**	201809		38.40
CWIP	**Indirect/Overheads**	201811		1,403.56
CWIP	**Indirect/Overheads**	201812		4,374.97
CWIP	**Indirect/Overheads Total**			**5,816.93**
CWIP	**Labor**	201809		81.72
CWIP	**Labor**	201811		2,735.68
CWIP	**Labor**	201812		779.95
CWIP	**Labor**	201812	Gen EV Quarterly Proj Allocation	6,705.05
CWIP	**Labor Total**			**10,302.40**
CWIP	**Material**	201812	CABLE, INSULATED, UG, 4CT, 4/0 AWG, 600 V, EPR INSULATED, JACKETED, CU	913.38
CWIP	**Material Total**			**913.38**
CWIP	**Other**	201812		(144,194.95)
CWIP	**Other Total**			**(144,194.95)**
CWIP Total				**139,593.69**
Cost of Removal	**Indirect/Overheads**	201811		2.26
Cost of Removal	**Indirect/Overheads Total**			**2.26**
Cost of Removal Total				**2.26**
Grand Total				**283,790.90**

NSTAR ELECTRIC COMPANY D/B/A EVERSOURCE ENERGY
CAPITAL AUTHORIZATION ANALYSIS

Line of Business	12190	Advanced Sensing Technology
Parent Project	WD00300	MA Grid Mod - Recloser SCADA
Child Project	WD00300	MA Grid Mod - Recloser SCADA
Work Orders	Please refer to the following page for a list of Work Orders	

	PAF Estimate (A)	Additions Total (B)	Cost of Removal Total (C)	CWIP Total (D)	Total Capital Spend (B+C+D) (E)	Variance (E-A)
Direct Costs	1,634,500	442,484	6,440	155,864	604,788	(1,029,712)
Indirect Costs	279,400	258,176	8,768	90,943	357,887	78,487
Total Project Costs	1,913,900	700,660	15,208	246,807	962,675	(951,225)

By Cost Element

Direct Costs						
Labor	297,700	57,774	4,091	66,348	128,212	(169,488)
Contractor	-	30,039	2,311	30,590	62,940	62,940
Material	1,336,800	352,235	-	518,980	871,216	(465,584)
Other		2,436	39	(460,054)	(457,579)	(457,579)
Total Direct	1,634,500	442,484	6,440	155,864	604,788	(1,029,712)
Indirect Costs	279,400	258,176	8,768	90,943	357,887	78,487
Total Project	1,913,900	700,660	15,208	246,807	962,675	(951,225)

Accounting Work Order	Accounting Work Order Description
6A821472	GRID MOD; RPL OIL RECLOSER 21C7-70S
6A821474	REPL OIL RECLOSER 21C7-90T WITH VAC
6A821475	RPL 3 SGL HYDROLIC RECLOSERS ON PO
6A821562	S. Maple St @ Russell St; Add radio
6A821563	French King HWY @ Wunsch Rd; INST 2
6A821564	W Gill Rd @ Main Rd; INST 200 Cal A
6A821565	Greenfield Rd @ Childs Cross Rd; IN
6A821659	CANCEL TRANSFER TO 3157048 GRID MOD
6A822180	GRD MOD: REPLACE SR RECLOSER 21C4-7
6A822183	GRID MOD: REPLACE SR RECLOSER 19J1-
6A822184	GRID MOD: REPLACE SR RECLOSER 19J1-
6A822185	GRID MOD: INSTALL TR RECLOSER 19J1-
6A822186	GRID MOD: INSTALL TR RECLOSER 19J1-
6A822188	GRID MOD: REMOVE 19J1-71S P21/2 INS
6A822362	S. Maple St @ Russell St; Add radio
6B820766	GRID MOD; RPL OIL RECLOSER 18C2-70S
6B820767	GRID MOD; RPL OIL RECLOSER 18C2-90T
6B820768	GRID MOD; RPL OIL RECLOSER 19A505 W
6B820769	GRID MOD; RPL OIL RECLOSER 19A525 W
6B820830	Berkshire Trl @ Back Dalton Rd; Add
6B820831	Maple Rd @ Creamery Rd; Add radio t
6B820832	Main St @ Jericho Rd; Add Radio to
6B820833	S. Mountain Rd @Tamarak Rd; INST 17
6B820834	S Mountain Rd @ Tamarak Rd; INST 17
6B821238	Grid Mod: Rep SR 30B-72S on P514/44
6B821239	Grid Mod: Rep MR30B-81M and Install
6S821675	Kings HWY @ Pine St; Add radio to 2
6S821677	South St @ Mark Dr; Add radio to 30
6S821967	REPLACE RECLOSER; NEW NOMENCLATURE
6S822290	REPLACE TIE RECLOSER; NEW NOMENCLAT

EVERSOURCE
Project Authorization Form

Operations Project Authorization Form

Date Prepared: 07/12/2018	**Project Title: MA Grid Mod – Recloser SCADA**
Company/ies: Eversource	**Project ID Number: WD00300**
Organization: Western Mass Engineering	**Class(es) of Plant: Distribution**
Project Initiator: Mathew Biron	**Project Category: Reliability**
Project Manager: Mathew Biron	**Project Type: Specific**
Project Sponsor: Umair Zia	**Project Purpose: Grid Modernization**
Estimated in service date: 12/31/2018	**If Transmission Project: PTF? N/A**
Eng. /Constr. Resources Budgeted? Y	**Capital Investment Part of Original Operating Plan? Y**
Authorization Type: Initial Funding	**O&M Expenses Part of the Original Operating Plan? Y**
Total Request: $1,000,000	

Financial Requirements:

Project Authorization

ERM: _____

FP&A: _____

Executive Summary

The purpose of the MA GM Recloser DSCADA Project is to capture the costs associated with the engineering and procurement of Recloser DSCADA components as part of the Grid Modernization Program in Massachusetts.

Project Costs Summary

Project cost summary will be supplied after design engineering is complete.

Technical Justification:

Project Need Statement

This project represents Eversource's Grid Modernization plan in accordance with the Department of Public Utilities decision on Order D.P.U. 15-122 dated 5/10/18 as it relates to Overhead Automated Feeder Reconfiguration, and more specifically, Recloser DSCADA.

Project Objectives

The project objective is to capture the engineering and procurement costs associated with the Recloser DSCADA component of Grid Modernization.

EVERSOURCE
Project Authorization Form

Project Scope

This project will include the engineering and procurement of Recloser DSCADA components for the overhead distribution system. Approximately 55 units are targeted to be enabled with DSCADA in Eversource in WMA with the following breadkdown:

- 11 units – Engineer and procure radios and modems to enable DSCADA with existing control
  - 2018 – 11 units
- 43 units – Engineer and procure replacement recloser and control to accept DSCADA radio and modem
  - 2018 – 7 units
  - 2019 – 18 units
  - 2020 – 18 units

Background / Justification

One of the most fundamental and valuable capabilities of a modern grid is the ability for dynamic reconfiguration to minimize the impact to customers in the event of a fault condition. With advanced technology, the grid will 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. This capability makes the grid flexible and dynamic with the goal of maximizing system safety and reliability. As a part of its short term investment plan, Eversource will target to deploy advanced technology on the overhead system across the state.

Business Process and / or Technical Improvements:

For years, Eversource has been committed to using advanced technology to reduce outages and speed the restoration on both the underground and overhead systems. As a result, today the Company estimates that the number of customers affected by outage events is reduced by 25-30 percent due to distribution automation. Technology, however, continues to advance and create the potential for a step change in system reliability and resiliency.

As part of the STIP, Eversource proposes to enhance its existing distribution automation with a next generation topology that delivers sophisticated grid reconfiguration capabilities.

Alternatives Considered with Cost Estimates

Cost estimates do not include auxillary system components that may be required for the successful installation of automated switches. Each location is assumed to have adequate clearance to support the device without the need to install taller poles, shift primary/secondary conductors, or relocate existing transformation.

In the event the Grid Modernization project changes, the equipment can be utilized on other projects.

Project Schedule

EVERSOURCE
Project Authorization Form

Milestone/Phase Name	Estimated Completion Date

Regulatory Approvals: N/A

Risks and Risk Mitigation Plans: N/A

References: N/A

Attachments (One-Line Diagrams, Images, etc.)

Supplement Request Form

Date Prepared: 10/15/2018	**Project Title: MA GM OH Recloser DSCADA**
Company/Companies: Eversource	**Project ID Number: WD00300**
Organization: Distribution Engineering	**Plant Class/(F.P.Type): Distribution**
Project Initiator: Mathew Biron	**Project Type: Reliability**
Project Manager: Mathew Biron	**Capital Investment Part of Original Operating Plan? Y**
Project Sponsor: Umair Zia	**O&M Expenses Part of the Original Operating Plan? Y**
Current Authorized Amount: $1M	**Estimated in service date(s): 12/31/19**
Supplement Request: $910K	**Other:**
Total Request: $1.91M	

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:

Executive Summary

This a supplemental request of $910K is requested for the completion of WMA Grid Modernization Recloser DSCADA Project. The original authorization of $1M was to capture the initial costs associated with the engineering and procurement of overhead DSCADA components as part of the Grid Modernization Program in Western Massachusetts. This request will cover the entire cost of the enabling 35 existing recloser locations with DSCADA.

Technical Justification:

Project Need Statement

This project represents Eversource's Grid Modernization plan in accordance with the Department of Public Utilities decision on Order D.P.U. 15-122 dated 5/10/18 as it relates to Advanced Sensing Technology, and more specifically, Recloser DSCADA.

Project Objectives

The project objective is to capture the engineering, procurement, construction, and commissioning costs associated with the Recloser DSCADA component of Grid Modernization.

EVERSOURCE

APS 1 - Project Authorization Policy

Supplement Request Form

Project Scope

This project will include all costs related to the installation of Recloser DSCADA components for the overhead distribution system. Approximately 35 units are targeted to be enabled with DSCADA in Eversource in WMA with the following breakdown:

- 9 units – Install radios and modems to enable DSCADA with existing control
  - 2018 – 9 units
- 26 units – Replace existing recloser and control to accept DSCADA radio and modem
  - 2018 – 7 units
  - 2019 – 19 units

***Assumes all installations complete in 2019.*

Supplement Cost Summary

Note: Dollar values are in thousands:

	Prior Authorized	2018	2019	2020	Totals
Capital Additions - Direct	$1000	$462.3	$1,172	$	$1,634.3
Less Customer Contribution	$	$	$	$	$
Removals net of Salvage ____%	$	$	$	$	$
Total - Direct Spending	$1000	$462.3	$1,172	$	$1,634.3
Capital Additions - Indirect	$	$89.2	$187.4	$	$276.6
Subtotal Request	$	$551	$1,359	$	$1,910.9
AFUDC	$	$.86	$2	$	$2.9
Total Capital Request	$1000	$552	$1,361	$	$1,913.8
O&M	$	$	$	$	$
Total Request	$1000	$552	$1,361	$	$1,913.8

EVERSOURCE

APS 1 - Project Authorization Policy

Supplement Request Form

Cost breakdown:

Financial Evaluation

Note: Dollar values are in thousands

Direct Capital Costs	Year 1	Year 2	Year 3+	Total
Straight Time Labor	$96.5	$201.3	$	$297.7
Overtime Labor	$0	$	$	$
Outside Services	$0	$	$	$
Materials	$365.9	$970.9	$	$1,336.8
Other, including contingency amounts (describe)	$	$	$	$
Total Direct Costs	**$462.4**	**$1,172**	**$**	**$1,634.4**

Indirect Capital Costs	Year 1	Year 2	Year 3+	Total
Indirects/Overheads (including benefits)	$89.2	$187.4	$	$276.6
Capitalized interest or AFUDC, if any	$.8	$2	$	$2.8
Total Indirect Costs	**$90**	**$189.4**	**$**	**$279.4**

Total Capital Costs	**$552.4**	**$1,361.4**	**$**	**$1,913.8**
Less Total Customer Contribution	$	$	$	$
Total Capital Project Costs	**$552.4**	**$1,361.4**	**$**	**$1,913.8**
Total O&M Project Costs	$	$	$	$

Note: Explain unique payment provisions, if applicable

Background / Justification

For automated devices located on distribution feeders, it is critical that they all have DSCADA capability. In Eversource West, there are many automated devices that work solely based on local system conditions with on-board logic and no remote monitoring and control. Without DSCADA on automated overhead line devices, the Company is limited in its ability to perform load flow analysis in support of DER integration due to the lack of accurate minimum load data for circuit segments. It also precludes the possibility of a future of automated feeder reconfiguration with a centralized logic system based on real-time system conditions.

As a part of the STIP, Eversource proposes to add DSCADA to automated devices in Eversource West that do not currently have the capability.

Alternatives Considered with Cost Estimates

Cost estimates do not include auxiliary system components that may be required for the successful installation of automated switches. Each location is assumed to have adequate clearance to support the device without the need to install taller poles, shift primary/secondary conductors, or relocate existing transformation.

EVERSOURCE

APS 1 - Project Authorization Policy

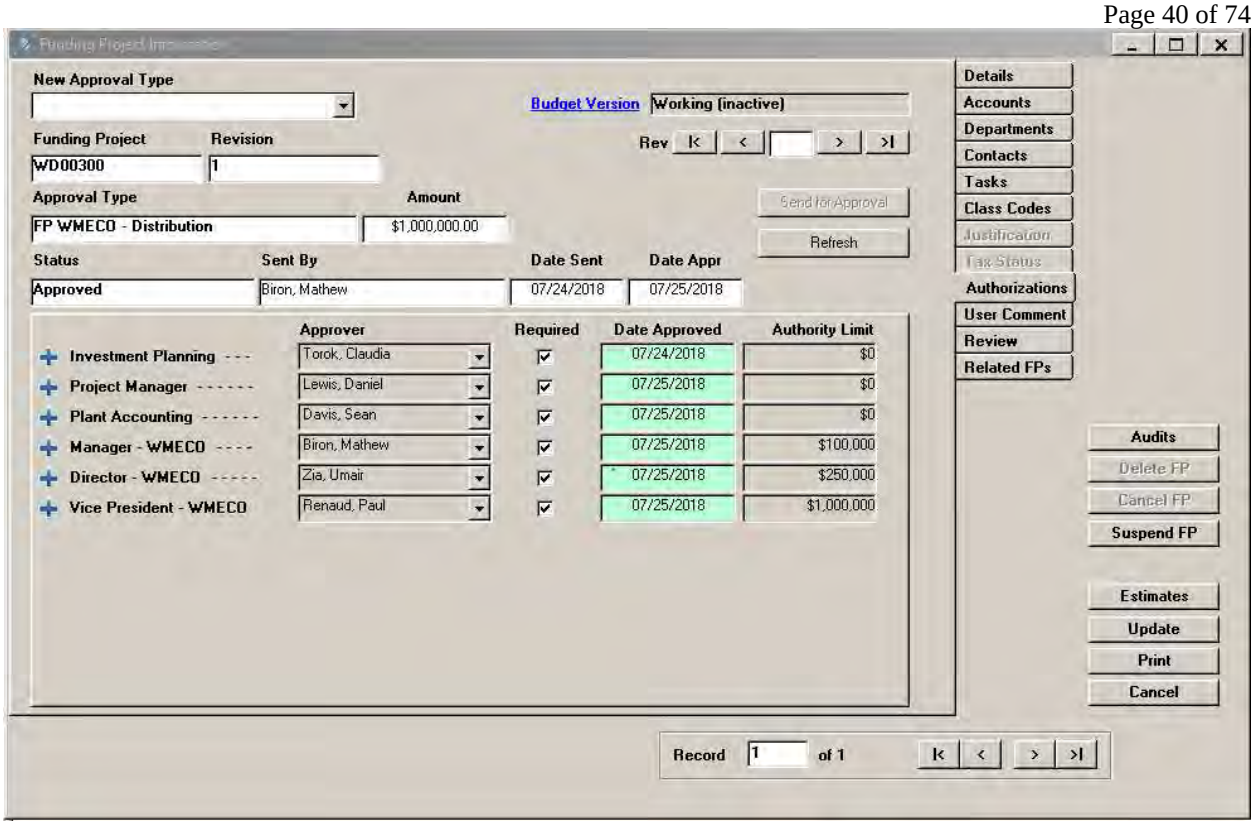
Supplement Request Form

In the event the Grid Modernization project changes, the equipment can be utilized on other projects.

Justification for Additional Resources

See attached PAF:

WD00300%20MA%2
0GM%20RECLOSER9


Funding Project Information
New Approval Type
Budget Version
Working (inactive)
Rev
Funding Project
Revision
WD00300
1
Approval Type
Amount
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$1,000,000.00
Send for Approval
Refresh
Status
Sent By
Date Sent
Date Appr
Approved
Biron, Mathew
07/24/2018
07/25/2018
Approver
Required
Date Approved
Authority Limit
Investment Planning
Torok, Claudia
07/24/2018
$0
Project Manager
Lewis, Daniel
07/25/2018
$0
Plant Accounting
Davis, Sean
07/25/2018
$0
Manager - WMECO
Biron, Mathew
07/25/2018
$100,000
Director - WMECO
Zia, Umair
07/25/2018
$250,000
Vice President - WMECO
Renaud, Paul
07/25/2018
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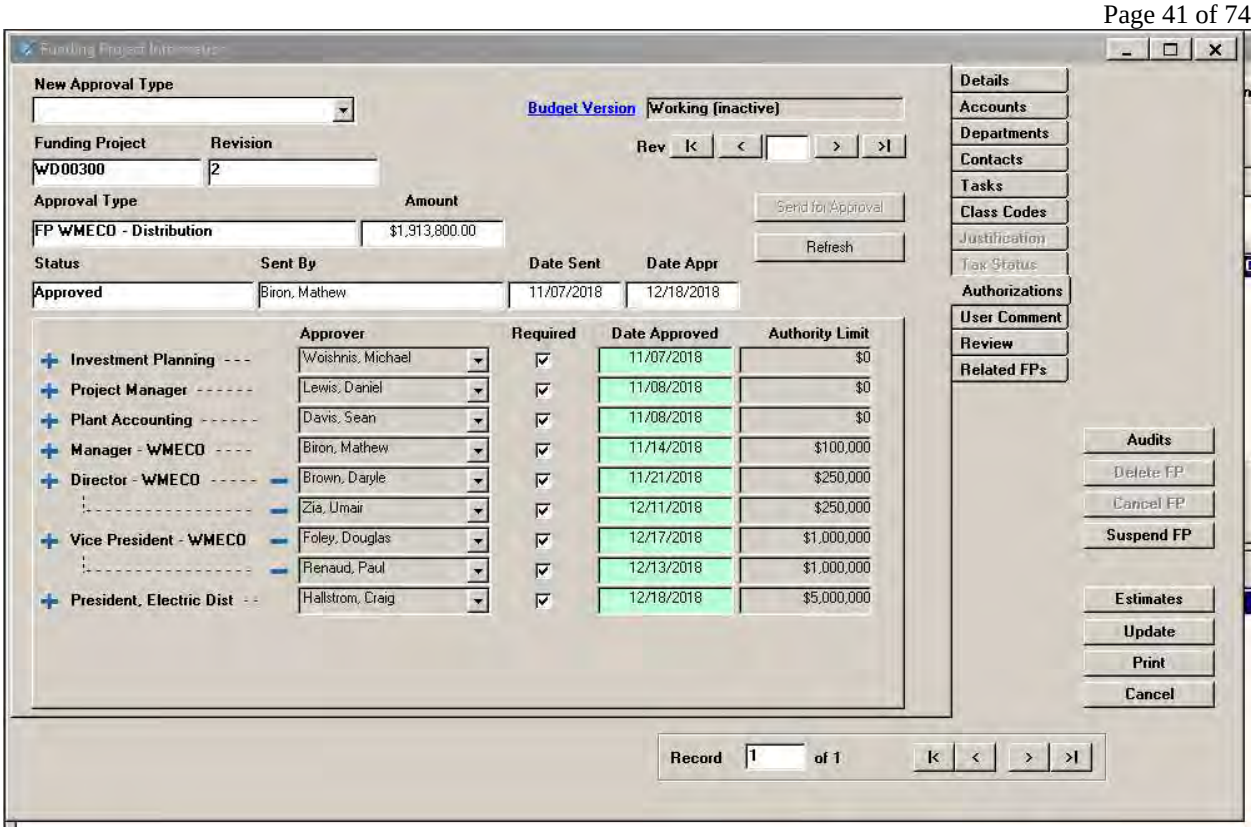
Details
Accounts
Departments
Contacts
Tasks
Class Codes
Justification
Tax Status
Authorizations
User Comment
Review
Related FPs
Audits
Delete FP
Cancel FP
Suspend FP
Estimates
Update
Print
Cancel
Record
1
of 1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Budget Version
Working (inactive)
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Funding Project
Revision
WD00300
2
Approval Type
Amount
FP WMECO - Distribution
$1,913,800.00
Send for Approval
Refresh
Status
Sent By
Date Sent
Date Appr
Approved
Biron, Mathew
11/07/2018
12/18/2018
Approver
Required
Date Approved
Authority Limit
Investment Planning
Woishnis, Michael
11/07/2018
$0
Project Manager
Lewis, Daniel
11/08/2018
$0
Plant Accounting
Davis, Sean
11/08/2018
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Manager - WMECO
Biron, Mathew
11/14/2018
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Director - WMECO
Brown, Daryle
11/21/2018
$250,000
Zia, Umair
12/11/2018
$250,000
Vice President - WMECO
Foley, Douglas
12/17/2018
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Renaud, Paul
12/13/2018
$1,000,000
President, Electric Dist
Hallstrom, Craig
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Details
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Departments
Contacts
Tasks
Class Codes
Justification
Tax Status
Authorizations
User Comment
Review
Related FPs
Audits
Delete FP
Cancel FP
Suspend FP
Estimates
Update
Print
Cancel
Record
1
of 1

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Additions	Contractor	201810	ASPLUNDH TREE EXPERT CO	1,124.29
Additions	Contractor	201811	TRC ENGINEERS LLC	7,646.88
Additions	Contractor	201812		0.06
Additions	Contractor	201812	Accrual	20,751.54
Additions	Contractor	201812	ASPLUNDH TREE EXPERT CO	382.90
Additions	Contractor	201812	TRC ENGINEERS LLC	133.00
Additions	**Contractor Total**			**30,038.67**
Additions	Indirect/Overheads	201808		96,830.48
Additions	Indirect/Overheads	201809		(36,710.40)
Additions	Indirect/Overheads	201810		204,212.30
Additions	Indirect/Overheads	201811		92,299.74
Additions	Indirect/Overheads	201812		(98,455.72)
Additions	**Indirect/Overheads Total**			**258,176.40**
Additions	Labor	201808		1,368.70
Additions	Labor	201809		8,812.52
Additions	Labor	201810		16,346.95
Additions	Labor	201811		18,289.55
Additions	Labor	201812		12,955.79
Additions	**Labor Total**			**57,773.51**
Additions	Material	201808		(61.54)
Additions	Material	201808	ANTENNA, 210-230 MHZ, 3 DB GAIN, NMO MOUNT	152.52
Additions	Material	201808	ANTENNA,MOBILE, 144-174 MHZ, NMO/PL-259	39.73
Additions	Material	201808	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	62.76
Additions	Material	201808	BASE,MOUNTING, ANTENNA, Laird Technologies - 4G/3G Multiband Phantom Antenna Black NMO	61.14
Additions	Material	201808	CONNECTOR,COMPRESSION, NICKEL/GOLD/TEFLON, TNC MALE	49.50
Additions	Material	201808	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	53,436.36
Additions	Material	201808	CONTROL,RECLOSER, TYPE: FORM 6, TRIPLE SINGLE, ELECTRONIC, 26 PIN, POLE MOUNTED, 3-T/S, W/ VOLTAGE S	8,733.69
Additions	Material	201808	RECLOSER, TRIPLE SINGLE, VACUUM, TYPE: KNTS, 22.9 KV, 800 A, 12.5 KA, 3 PH, 13200:120 V, ELECTRONIC,	18,659.55
Additions	Material	201808	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	41,791.36
Additions	Material	201808	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	85,131.48
Additions	Material	201808	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 34.5 KV, 336 KCMIL AAC, 336 ACSR (18/1), 0.570-0.684 I	2,115.88
Additions	Material	201808	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	2,891.38
Additions	Material	201808	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	2,131.15
Additions	Material	201809		(39.66)
Additions	Material	201809	ANCHOR, SINGLE HELIX, SOCKET DRIVE, 10 IN, 8000 LB	25.97
Additions	Material	201809	CABLE ASSEMBLY, COMMUNICATION, Serial DB9 Serial Ext Cable, (DB9 M/F), 6-ft	2.65
Additions	Material	201809	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	49.20
Additions	Material	201809	CONDUIT,ELECTRICAL, FLEXIBLE, LIQUIDTIGHT, 1/2 IN DIA, CS/PVC, GRAY, PACKAGE: 100 FT PER BOX	5.78
Additions	Material	201809	CONNECTOR,COMPRESSION, DOUBLE CRIMP, SMA, Male Crimp, RG58, 58A, 58C, 141, 141A	19.80
Additions	Material	201809	CONNECTOR,CONDUIT, LIQUIDTIGHT, 1/2 IN, 0 DEG, COMPRESSION/THREADED, STEEL	3.21
Additions	Material	201809	CONNECTOR,WEDGE TAP, SHELL DRIVEN, IN-LINE SWITCH, 4/0 AWG ACSR (6/1), YELLOW	241.75
Additions	Material	201809	CROSSARM, DISTRIBUTION, DEADEND, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET AND HARDWARE,	381.08
Additions	Material	201809	GRAYBAR ELECTRIC COMPANY INC	(23.15)
Additions	Material	201809	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	31.73
Additions	Material	201809	HOLDER,SIGN, MOLDED, 10 POSITIONS, VERTICAL, #2, 1-5/8 X 26-1/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	19.58
Additions	Material	201809	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	472.89
Additions	Material	201809	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	80.84
Additions	Material	201809	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	544.80
Additions	Material	201809	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL, 4/0 ACSR, 0.492-.613 IN DIA, AIR, W	2,075.74
Additions	Material	201809	TESSCO INC	18.52
Additions	Material	201810	ANCHOR, SINGLE HELIX, SOCKET DRIVE, 10 IN, 8000 LB	25.81
Additions	Material	201810	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	26.62
Additions	Material	201810	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	95.55
Additions	Material	201810	CONDUIT,ELECTRICAL, FLEXIBLE, LIQUIDTIGHT, 1/2 IN DIA, CS/PVC, GRAY, PACKAGE: 100 FT PER BOX	38.23
Additions	Material	201810	CONNECTOR,CONDUIT, LIQUIDTIGHT, 1/2 IN, 0 DEG, COMPRESSION/THREADED, STEEL	3.22
Additions	Material	201810	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	66.86
Additions	Material	201810	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	(73.39)
Additions	Material	201810	CROSSARM, DISTRIBUTION, DEADEND, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET AND HARDWARE,	383.20
Additions	Material	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	109.40
Additions	Material	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	376.96
Additions	Material	201810	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	11.17
Additions	Material	201810	JP MORGAN CHASE BANK	78.90
Additions	Material	201810	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	468.48
Additions	Material	201810	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	(27.81)
Additions	Material	201810	SHIELD, POLE RISER, 2 IN, 10 FT LG, HMP, FOR CAPACITY AND RECLOSERS	21.33
Additions	Material	201810	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	161.81
Additions	Material	201810	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	1,130.27
Additions	Material	201810	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	(0.01)
Additions	Material	201810	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	2,552.20
Additions	Material	201810	TERMINAL, 35 W X 7.5 H, DIN RAIL PERFORATED	7.29
Additions	Material	201810	TESSCO INC	6.97
Additions	Material	201811		(46.43)
Additions	Material	201811	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	98.78
Additions	Material	201811	BASE,MOUNTING, ANTENNA, Laird Technologies - 4G/3G Multiband Phantom Antenna Black NMO	174.92
Additions	Material	201811	CABLE ASSEMBLY, COMMUNICATION, Serial DB9 Serial Ext Cable, (DB9 M/F), 6-ft	84.95
Additions	Material	201811	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	92.71
Additions	Material	201811	CONNECTOR,COMPRESSION, DOUBLE CRIMP, SMA, Male Crimp, RG58, 58A, 58C, 141, 141A	14.79
Additions	Material	201811	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	35,412.71
Additions	Material	201811	FUSEHOLDER, DELUXE BLADE, 10 GA HEAVY DUTY WIRE LEADS	26.89
Additions	Material	201811	GRAYBAR ELECTRIC COMPANY INC	(2.31)
Additions	Material	201811	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	11.01
Additions	Material	201811	POLE, 40 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	365.14
Additions	Material	201811	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	41,833.52
Additions	Material	201811	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	42,590.29
Additions	Material	201811	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	575.66
Additions	Material	201811	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	2,328.04
Additions	Material	201811	TERMINAL, 35 W X 7.5 H, DIN RAIL PERFORATED	1.19
Additions	Material	201811	TESSCO INC	2.28
Additions	Material	201812		12.60
Additions	Material	201812	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	12.54
Additions	Material	201812	BASE,MOUNTING, ANTENNA, Laird Technologies - 4G/3G Multiband Phantom Antenna Black NMO	30.61
Additions	Material	201812	CABLE ASSEMBLY, COMMUNICATION, Serial DB9 Serial Ext Cable, (DB9 M/F), 6-ft	0.53
Additions	Material	201812	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	94.78
Additions	Material	201812	CONNECTOR,COMPRESSION, DOUBLE CRIMP, SMA, Male Crimp, RG58, 58A, 58C, 141, 141A	9.92
Additions	Material	201812	POLE, 40 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	359.42
Additions	Material	201812	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	472.47
Additions	Material	201812	RADIO, MOBILE, SIERRA WIRELESS, AIRLINK RV50 MODEM	3,093.85
Additions	Material	201812	TESSCO INC	15.69

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Additions	**Material Total**			**352,235.30**
Additions	**Other**	201808		216.71
Additions	**Other**	201809		415.00
Additions	**Other**	201810		564.82
Additions	**Other**	201811		1,014.50
Additions	**Other**	201812		225.26
Additions	**Other Total**			**2,436.29**
Additions Total				**700,660.17**
CWIP	**Contractor**	201810	ASPLUNDH TREE EXPERT CO	1,124.29
CWIP	**Contractor**	201811	TRC ENGINEERS LLC	8,331.25
CWIP	**Contractor**	201812		0.06
CWIP	**Contractor**	201812	Accrual	20,751.54
CWIP	**Contractor**	201812	ASPLUNDH TREE EXPERT CO	382.90
CWIP	**Contractor Total**			**30,590.04**
CWIP	**Indirect/Overheads**	201808		97,033.69
CWIP	**Indirect/Overheads**	201809		863.14
CWIP	**Indirect/Overheads**	201810		(5,732.06)
CWIP	**Indirect/Overheads**	201811		(3,606.97)
CWIP	**Indirect/Overheads**	201812		2,384.99
CWIP	**Indirect/Overheads Total**			**90,942.80**
CWIP	**Labor**	201808		1,435.71
CWIP	**Labor**	201809		10,858.85
CWIP	**Labor**	201810		16,778.48
CWIP	**Labor**	201811		18,676.25
CWIP	**Labor**	201812		18,598.47
CWIP	**Labor Total**			**66,347.76**
CWIP	**Material**	201808		(61.54)
CWIP	**Material**	201808	ANTENNA, 210-230 MHZ, 3 DB GAIN, NMO MOUNT	152.52
CWIP	**Material**	201808	ANTENNA,MOBILE, 144-174 MHZ, NMO/PL-259	119.20
CWIP	**Material**	201808	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	138.06
CWIP	**Material**	201808	BASE,MOUNTING, ANTENNA, Laird Technologies - 4G/3G Multiband Phantom Antenna Black NMO	183.46
CWIP	**Material**	201808	CONNECTOR,COMPRESSION, NICKEL/GOLD/TEFLON, TNC MALE	82.50
CWIP	**Material**	201808	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	53,436.36
CWIP	**Material**	201808	CONTROL,RECLOSER, TYPE: FORM 6, TRIPLE SINGLE, ELECTRONIC, 26 PIN, POLE MOUNTED, 3-T/S, W/ VOLTAGE S	8,733.69
CWIP	**Material**	201808	RECLOSER, TRIPLE SINGLE, VACUUM, TYPE: KNTS, 22.9 KV, 800 A, 12.5 KA, 3 PH, 13200:120 V, ELECTRONIC,	18,659.55
CWIP	**Material**	201808	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	41,791.36
CWIP	**Material**	201808	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	85,131.48
CWIP	**Material**	201808	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 34.5 KV, 336 KCMIL AAC, 336 ACSR (18/1), 0.570-0.684 I	2,115.88
CWIP	**Material**	201808	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	2,891.38
CWIP	**Material**	201808	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	2,131.15
CWIP	**Material**	201809		(39.66)
CWIP	**Material**	201809	ANCHOR, SINGLE HELIX, SOCKET DRIVE, 10 IN, 8000 LB	25.97
CWIP	**Material**	201809	CABLE ASSEMBLY, COMMUNICATION, Serial DB9 Serial Ext Cable, (DB9 M/F), 6-ft	5.83
CWIP	**Material**	201809	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	49.20
CWIP	**Material**	201809	CONDUIT,ELECTRICAL, FLEXIBLE, LIQUIDTIGHT, 1/2 IN DIA, CS/PVC, GRAY, PACKAGE: 100 FT PER BOX	5.78
CWIP	**Material**	201809	CONNECTOR,COMPRESSION, DOUBLE CRIMP, SMA, Male Crimp, RG58, 58A, 58C, 141, 141A	59.42
CWIP	**Material**	201809	CONNECTOR,CONDUIT, LIQUIDTIGHT, 1/2 IN, 0 DEG, COMPRESSION/THREADED, STEEL	3.21
CWIP	**Material**	201809	CONNECTOR,WEDGE TAP, SHELL DRIVEN, IN-LINE SWITCH, 4/0 AWG ACSR (6/1), YELLOW	241.75
CWIP	**Material**	201809	CROSSARM, DISTRIBUTION, DEADEND, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET AND HARDWARE,	381.08
CWIP	**Material**	201809	GRAYBAR ELECTRIC COMPANY INC	(25.73)
CWIP	**Material**	201809	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	31.73
CWIP	**Material**	201809	HOLDER,SIGN, MOLDED, 10 POSITIONS, VERTICAL, #2, 1-5/8 X 26-1/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	19.58
CWIP	**Material**	201809	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	472.89
CWIP	**Material**	201809	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	80.84
CWIP	**Material**	201809	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	544.80
CWIP	**Material**	201809	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL, 4/0 ACSR, 0.492-.613 IN DIA, AIR, W	2,075.74
CWIP	**Material**	201809	TESSCO INC	45.72
CWIP	**Material**	201810	ANCHOR, SINGLE HELIX, SOCKET DRIVE, 10 IN, 8000 LB	25.81
CWIP	**Material**	201810	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	26.62
CWIP	**Material**	201810	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	95.55
CWIP	**Material**	201810	CONDUIT,ELECTRICAL, FLEXIBLE, LIQUIDTIGHT, 1/2 IN DIA, CS/PVC, GRAY, PACKAGE: 100 FT PER BOX	38.23
CWIP	**Material**	201810	CONNECTOR,CONDUIT, LIQUIDTIGHT, 1/2 IN, 0 DEG, COMPRESSION/THREADED, STEEL	3.22
CWIP	**Material**	201810	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	66.86
CWIP	**Material**	201810	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	8,545.05
CWIP	**Material**	201810	CROSSARM, DISTRIBUTION, DEADEND, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET AND HARDWARE,	383.20
CWIP	**Material**	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	109.40
CWIP	**Material**	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	376.96
CWIP	**Material**	201810	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	11.17
CWIP	**Material**	201810	JP MORGAN CHASE BANK	78.90
CWIP	**Material**	201810	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	468.48
CWIP	**Material**	201810	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	20,864.21
CWIP	**Material**	201810	SHIELD, POLE RISER, 2 IN, 10 FT LG, HMP, FOR CAPACITY AND RECLOSERS	21.33
CWIP	**Material**	201810	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	161.81
CWIP	**Material**	201810	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	1,130.27
CWIP	**Material**	201810	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	(0.01)
CWIP	**Material**	201810	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	2,552.20
CWIP	**Material**	201810	TERMINAL, 35 W X 7.5 H, DIN RAIL PERFORATED	7.29
CWIP	**Material**	201810	TESSCO INC	25.96
CWIP	**Material**	201811		(46.43)
CWIP	**Material**	201811	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	98.78
CWIP	**Material**	201811	BASE,MOUNTING, ANTENNA, Laird Technologies - 4G/3G Multiband Phantom Antenna Black NMO	174.92
CWIP	**Material**	201811	CABLE ASSEMBLY, COMMUNICATION, Serial DB9 Serial Ext Cable, (DB9 M/F), 6-ft	84.95
CWIP	**Material**	201811	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	92.71
CWIP	**Material**	201811	CONNECTOR,COMPRESSION, DOUBLE CRIMP, SMA, Male Crimp, RG58, 58A, 58C, 141, 141A	14.79
CWIP	**Material**	201811	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	53,288.22
CWIP	**Material**	201811	FUSEHOLDER, DELUXE BLADE, 10 GA HEAVY DUTY WIRE LEADS	26.89
CWIP	**Material**	201811	GRAYBAR ELECTRIC COMPANY INC	(2.31)
CWIP	**Material**	201811	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	11.01
CWIP	**Material**	201811	POLE, 40 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	365.14
CWIP	**Material**	201811	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	41,833.52
CWIP	**Material**	201811	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	106,543.96
CWIP	**Material**	201811	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	2,302.64
CWIP	**Material**	201811	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	9,329.38
CWIP	**Material**	201811	TERMINAL, 35 W X 7.5 H, DIN RAIL PERFORATED	1.19
CWIP	**Material**	201811	TESSCO INC	2.28
CWIP	**Material**	201812		(68.98)
CWIP	**Material**	201812	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	94.78
CWIP	**Material**	201812	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	32.94

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
CWIP	Material	201812	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	26,773.07
CWIP	Material	201812	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	94.09
CWIP	Material	201812	POLE, 40 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	359.42
CWIP	Material	201812	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	472.47
CWIP	Material	201812	RADIO, MOBILE, SIERRA WIRELESS, AIRLINK RV50 MODEM	3,093.85
CWIP	Material	201812	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	21,270.19
CWIP	Material	201812	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	582.80
CWIP	Material	201812	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	(2,333.78)
CWIP	Material	201812	TESSCO INC	12.23
CWIP	**Material Total**			**518,980.43**
CWIP	Other	201808		217.12
CWIP	Other	201809		(3,165.62)
CWIP	Other	201810		(50,047.97)
CWIP	Other	201811		(249,709.03)
CWIP	Other	201812		(157,348.50)
CWIP	**Other Total**			**(460,054.00)**
CWIP Total				**246,807.03**
Cost of Removal	Contractor	201810	ASPLUNDH TREE EXPERT CO	82.54
Cost of Removal	Contractor	201811	TRC ENGINEERS LLC	503.16
Cost of Removal	Contractor	201812		(0.06)
Cost of Removal	Contractor	201812	Accrual	1,697.47
Cost of Removal	Contractor	201812	ASPLUNDH TREE EXPERT CO	28.10
Cost of Removal	**Contractor Total**			**2,311.21**
Cost of Removal	Indirect/Overheads	201808		125.29
Cost of Removal	Indirect/Overheads	201809		814.14
Cost of Removal	Indirect/Overheads	201810		2,307.99
Cost of Removal	Indirect/Overheads	201811		2,432.94
Cost of Removal	Indirect/Overheads	201812		3,087.30
Cost of Removal	**Indirect/Overheads Total**			**8,767.66**
Cost of Removal	Labor	201808		70.95
Cost of Removal	Labor	201809		558.22
Cost of Removal	Labor	201810		1,363.17
Cost of Removal	Labor	201811		1,157.73
Cost of Removal	Labor	201812		940.62
Cost of Removal	**Labor Total**			**4,090.69**
Cost of Removal	Other	201810		3.34
Cost of Removal	Other	201811		34.75
Cost of Removal	Other	201812		0.44
Cost of Removal	**Other Total**			**38.53**
Cost of Removal Total				**15,208.09**
Grand Total				**962,676.50**

NSTAR ELECTRIC COMPANY D/B/A EVERSOURCE ENERGY
CAPITAL AUTHORIZATION ANALYSIS

Line of Business	12165	Electric Vehicle Infrastucture
Parent Project	EVL2FC01	EV Level 2 and Fast Chargers
Child Project	18296	NSTAR EV Level 2 Chargers - NonEJC
Work Orders	Please refer to the following page for a list of Work Orders	

	PAF Estimate (A)	Additions Total (B)	Cost of Removal Total (C)	CWIP Total (D)	Total Capital Spend (B+C+D) (E)	Variance (E-A)
Direct Costs	39,481,950	1,110,815	0	1,157,534	2,268,349	(37,213,601)
Indirect Costs	8,668,221	41,176	0	61,748	102,924	(8,565,297)
Total Project Costs	48,150,171	1,151,991	0	1,219,282	2,371,273	(45,778,898)

By Cost Element

Direct Costs						
Labor	4,249,685	51,130	0	92,603	143,732	(4,105,953)
Contractor	21,073,041	1,023,796	0	2,181,032	3,204,828	(17,868,213)
Material	6,454,076	35,746	0	35,746	71,491	(6,382,585)
Other	7,705,148	144	0	(1,151,847)	(1,151,703)	(8,856,851)
Total Direct	39,481,950	1,110,815	0	1,157,534	2,268,349	(37,213,601)
Indirect Costs	8,668,221	41,176	0	61,748	102,924	(8,565,297)
Total Project	48,150,171	1,151,991	0	1,219,282	2,371,273	(45,778,898)

Accounting Work Order	Accounting Work Order Description
02288353	EVL2NEJC BED 125 EV MIDDLESEX TPK
02288360	EVL2NEJC WIN EV LARAWAY RD WINCHES
02288387	EVL2NEJC CAM 1 EV BENNETT ST PROP
02288454	EVL2NEJC WLF 300 EV MAIN ST (96100
02288493	EVL2NEJC WTD 247 EV-1 STATION DR
02288673	EVL2NEJC LIN 208 S GREAT RD MASS
02293085	EVL2NEJC LEX 300 EV CHARGER SHIR
02294023	EVL2NEJC NEW EV MELROSE AVE CITY O
02294136	EVL2NEJC NEW 1000 COMM AVE. C OF NE
02295014	EVL2NEJC WHO 49A EV SCHOOL ST W
02295021	EVL2NEJC WHO 360 WH ROAD EV CHARGER
02296316	EVL2NEJC PLY 5 EV RUSSELL ST PLYM
02296613	EVL2NEJC NEW 26 RICHARDSON ST . C.
02297722	EVL2NEJC CAM 620 EV MEMORIAL DR 6
02298508	EVL2NEJC MAT 500 WALK-HILL ST MAS
02300157	EVL2NEJC MIL 525 EV CHARGER CANT
02300187	EVL2NEJC MDW 155 EV CHARGE VILLAG
02300215	EVL2NEJC MDW 26 EV CHARGE HIGH ST
02300340	EVL2NEJC CAM 9- 29 CAMP ST TRUST
02301279	EVL2NEJC WLF 291 EV RTE-6 MASSACHUS
02305344	EVL2NEJC CAM 420 EV CHARGE GREEN
02305358	EVL2NEJC CAM 375 EV CHARGER GREEN
02307504	EVL2NEJC CAM EV CHARGE GARDEN ST C
02307610	EVL2NEJC CAM 99 EV CHARGER SHERMAN
02307622	EVL2NEJC CAM 73 EV CHARGER SHERMA
02307872	EVL2NEJC WHO 7 PARKING LOT NORTH ST
02311288	EVL2NEJC BED 99 MCMAHON RD BEDFORD
02311296	EVL2NEJC BED 9 MUDGE WAY EV-HS
02311346	EVL2NEJC BED 66 SWEETWATER AVE E
02311474	EVL2NEJC BED 10 MUDGE WAY EV-TH
02311478	EVL2NEJC BED 314 GREAT RD EV-DPW
02311845	EVL2NEJC BED 410 DAVIS RD EV B

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Appendix 3
Corporate Shared Service Project Authorization Form

Date Prepared: April 2018	Project Title: Massachusetts Make-Ready EV Infrastructure Program
Company/Companies: NSTAR, WMECO	Project ID Number: N/A
Organization: EESBD & EE	Plant Class/(F.P.Type): Energy Efficiency Projects
Project Initiator: Kevin Boughan – EESBD	Project Type: *Specific / Annual / Prelim Project / Parent*
Project Manager: James Cater – EE	Capital Investment Part of Original Operating Plan? Y / N
Project Sponsor: Leon Olivier – Enterprise Energy Strategy & Business Development (EESBD) & Tilak Subrahmanian	Transfer of Budgets Request: Y / N
Estimated in service date(s): 5 year program	Emergency Related Request: No
Total Capital Request: $45M Total Funding Request: $48.2M	Software Projects Only – Estimated Life of Asset: N/A ____ 5 years ____ 10 Years ____15 Years

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:__Email from M. McKenzie dated April 11, 2018_____

FP&A: Email from M. Mueller dated April 24, 2018_____

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:___N/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.)

In the Rate Case Order dated November 30, 2017, the Massachusetts Department of Public Utilities approved as part of the Company (Western and Eastern Massachusetts Electric Companies) proposed five-year $400M grid modernization investments, $45M for the Electric Vehicle (EV) infrastructure program. These EV infrastructure investments will help accelerate electric vehicle charging infrastructure development in Massachusetts, encourage electric vehicle purchases by

reducing range anxiety and contribute to green house gas emissions reductions. The specific method for recovery of the investments along with the requested O&M budget will be addressed in a separate Order forthcoming in Docket D.P.U 15-222.

The program will be divided into two phases: Phase I will start in 2018 and extend through December 31, 2019 and Phase II will extend from Jan. 1, 2020 - December 31, 2022. During the first phase, the Company will begin site host recruitment activities and deployment of Level 2[1] and DC Fast Charging infrastructure. During Phase II the Company expect to accelerate these efforts based on evaluation of progress made during Phase I. Metric reporting will be a requirement of the program. Eversource will track six metrics including:

Metric	Unit of Measurement	Data Source
Total # of sites developed	# of sites	Internal tracking tool
Capital invested in DC Fast Charging	Capital dollars	Internal financial and budgeting systems
Capital invested in Environmental Justice Communities	Capital dollars	Internal financial and budgeting systems
Charging station utilization	kWh	Internal C2 and CIS systems
Percentage of residential customers within range of charging station	% of ES residential customer accounts	GIS data on charging station sites and for customers in service territory
Electric Vehicle adoption and CO2 emissions reductions	# of electric vehicles CO2 emission reduction tons	External data sources for electric vehicle adoption, CO2 reduction calculated from electric vehicle adoption

Over the course of the five years the plan is to support the deployment the following:

	Ports	Sites
Fast Chargers	72	36
Level 2	3,441	393
Total	**3,513**	**429**

**Actual installations may be more or less based on demand, location and cost*

The Company will install the "Eversource-side Infrastructure" (including distribution primary lateral service feed, necessary transformer and transformer pad and new service meter), and contract with third-party electrical contractors to install behind the meter "Participant-side Infrastructure". There is also a commitment to deploy ten percent of the EV charging infrastructure in environmental justice communities[2].

The corporate Electric Vehicle program is being sponsored by the Enterprise Energy Strategy and Business Development Organization, and the implementation of the initiative will be managed by the Energy Efficiency Organization and the funding will be included as part of the overall Grid Modernization program in the Operations Organization.

[1] Level 2 chargers rely on a 240-volt connection and are capable of fully charging most existing EVs in approximately eight hours or less depending on battery capacity; DC fast chargers use direct current and are the fastest method of charging electric vehicles charging 80% of a battery in up to 30 minutes.
[2] 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. Eversource will select opportunities in EJ communities that meet two of the following three criteria (in Eastern MA, or one of three in Western MA) established by the Massachusetts Executive Office of Energy and Environmental Affairs: (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 of 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 (Exh. ES-GMBC-1, at 111).

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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:

	2018	2019	2020	2021	2022	Totals
Capital Additions - Direct	$ 5,104,416	$ 6,299,416	$ 9,373,831	$ 9,538,339	$ 9,165,947	$ 39,481,949
Removals net of salvage	-	-	-	-	-	-
Subtotal - Direct Spending	**$ 5,104,416**	**$ 6,299,416**	**$ 9,373,831**	**$ 9,538,339**	**$ 9,165,947**	**$ 39,481,949**
Capital Additions - Indirect	659,854	875,921	1,306,939	1,339,612	1,325,500	5,507,826
Subtotal Request	**$ 5,764,270**	**$ 7,175,337**	**$ 10,680,770**	**$ 10,877,951**	**$ 10,491,447**	**$ 44,989,775**
O&M	187,102	534,985	618,585	754,401	1,065,322	3,160,395
Total Request	**$ 5,951,372**	**$ 7,710,322**	**$ 11,299,355**	**$ 11,632,353**	**$ 11,556,768**	**$ 48,150,170**

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Corporate Shared Service Project Authorization Form

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	**2018**	**2019**	**2020**	**2021**	**2022**	**Totals**
Labor	$ 526,486	$ 684,071	$ 997,241	$ 1,022,172	$ 1,019,715	$ 4,249,683
Overtime	-	-	-	-	-	-
Outside Services/Consultants	2,696,038	3,445,741	5,027,764	5,089,969	4,813,529	21,073,042
Software / Hardware	358,750	91,930	94,228	96,584	98,998	740,489
Materials	679,015	978,596	1,582,404	1,621,964	1,592,097	6,454,075
Other, including contingency amounts	844,128	1,099,078	1,672,194	1,707,650	1,641,608	6,964,659
Total Direct Capital Costs	**$ 5,104,416**	**$ 6,299,416**	**$ 9,373,831**	**$ 9,538,339**	**$ 9,165,947**	**$ 39,481,949**

Indirect Capital Costs	**2018**	**2019**	**2020**	**2021**	**2022**	**Totals**
Indirects/Overheads (including benefits)	$ 659,854	$ 875,921	$ 1,306,939	$ 1,339,612	$ 1,325,500	$ 5,507,826
Capitalized interest or AFUDC , if any	-	-	-	-	-	-
Total Indirect Capital Costs	**$ 659,854**	**$ 875,921**	**$ 1,306,939**	**$ 1,339,612**	**$ 1,325,500**	**$ 5,507,826**
Total Capital Costs	**$ 5,764,270**	**$ 7,175,337**	**$ 10,680,770**	**$ 10,877,951**	**$ 10,491,447**	**$ 44,989,775**
Total O&M Costs	187,102	534,985	618,585	754,401	1,065,322	3,160,395
Total Project Costs	**$ 5,951,372**	**$ 7,710,322**	**$ 11,299,355**	**$ 11,632,353**	**$ 11,556,768**	**$ 48,150,170**

*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.

By Company Summary:

Note: Dollar values are in whole dollars:

Company Analysis	**E. MA**	**W. MA**	**Totals**
Capital Additions - Direct	$ 31,585,559	$ 7,896,390	$ 39,481,949
Removals net of salvage	-	-	-
Subtotal - Direct Spending	**$ 31,585,559**	**$ 7,896,390**	**$ 39,481,949**
Capital Additions - Indirect	4,406,260	1,101,565	5,507,826
Removals net of salvage	-	-	-
Subtotal Request	**$ 35,991,820**	**$ 8,997,955**	**$ 44,989,775**
O&M	2,528,316	632,079	3,160,395
Total Request	**$ 38,520,136**	**$ 9,630,034**	**$ 48,150,170**

Capital Project Analysis	**E. MA**		**W. MA**		**Total**	
	EJC	**Non EJC**	**EJC**	**Non EJC**	**EJC**	**Non EJC**
Fast Chargers (10%)	$ 359,918	$ 3,239,264	$ 89,980	$ 809,816	$ 449,898	$ 4,049,080
Level 2 Chargers	3,239,264	29,153,374	809,816	7,288,344	4,049,080	36,441,718
Sub Total	$ 3,599,182	$ 32,392,638	$ 899,795	$ 8,098,159	$ 4,498,977	$ 40,490,797
Company Total		**$ 35,991,820**		**$ 8,997,955**		**$ 44,989,775**

Overall Justification:

Project Need Statement
The Massachusetts Global Warming Solutions Act (GWSA) and Zero Emission Vehicle (ZEV) Action Plan objectives created an opportunity for Eversource to invest in utility-owned Electric Vehicle charging infrastructure as part of the company's Grid Modernization program filing.

Project Scope and Objectives
Deploy $45M capital investment in infrastructure to support the installation of approximately 3,500 EV charging ports across NSTAR and WMECO service territories. Actual number of installations may vary based on demand, location and cost. Program costs will not exceed authorized costs.

Background / Justification
Consistent with our stated objective of being a catalyst for the New England clean energy economy, Eversource supports transportation electrification. We will use our experience deploying infrastructure programs at scale to drive the deployment of charging infrastructure through a make-ready model which supports this infrastructure development while preserving a competitive market for vehicle refueling.

The economics do not currently incentivize customers to deploy EV charging stations at their facilities. Without Utility investment in EV charging infrastructure, the market will not develop to the extent needed to accelerate consumer adoption of Electric Vehicles.

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*

The EV infrastructure and associated Electric Vehicle adoption enabled by Eversource's investment will result in benefits to our Customers, including fuel savings, reduced maintenance expenses, and GHG emissions reductions. Details are quantified in the attached spreadsheet.


EV Make-Ready Customer benefits P

Program metrics:


MA EV Make Ready Metrics.pptx

Future Financial Impacts:

Provide below the estimated future costs that will result from the project:
Note: Dollar values are in whole dollars:

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Budget	2018	2019	2020	2021	2022	Total
Make-Ready Infrastructure						
Capital ($M)	$5.7	$7.1	$10.7	$10.9	$10.6	$45.0
O&M ($M)	$0.2	$0.5	$0.6	$0.8	$1.1	$3.2
Total Program ($M)	$6.0	$7.7	$11.3	$11.6	$11.6	$48.2

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

The capital expenditures above reflect each deployment project and will be reflected as plant in service upon installation of make-ready infrastructure, independent of the customer installation of customer owned charging station. As such, any CWIP balances are expected to be immaterial, so there is no AFUDC included in the capital cost.

The estimated O&M includes charging station rebates for Level 2 chargers for site hosts in Environmental Justice Communities and expenses for program evaluation after each phase of deployment.

What functional area(s) will these future costs be funded in? _Operations – Grid Mod__
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:
The capital costs will be recovered in a separate regulatory tracking mechanism (described further below). It is anticipated that operating expenses will also be approved for recovery in this tracker.

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

- All capital and O&M will be spent within the 5-year program timeline ending December 2022.

What functional area(s) will these benefits be reflected in? ____N/A_____
A representative from the respective functional area is required to be included as a project approver.

What is the project's IRR? _____N/A_____

What is the project's NPV? _____N/A_____

What is the project's payback period? _____N/A_____

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).

The above items are not applicable. The $45M of capital spending requested has been approved for recovery by the DPU in the Massachusetts rate case order. The proposed tracker in the company's grid mod filing reflected a return on rate base, depreciation, property taxes and O&M expense (concurrent recovery). The specifics of the tracker recovery will ultimately reflect the DPU grid mod order expected shortly. Although O&M expense was not part of the rate case order, it is anticipated that operating expenses will be approved for recovery as part of the grid mod order.

Future distribution revenues received from these charging station customers will be credited back to customers through the NSTAR/WMECO Electric approved decoupling mechanism.

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:

- There is no known ARO associated with this project

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

- There are no known environmental cleanup costs associated with constructing this project.

Alternatives Considered with Cost Estimates

Due to the DPU's approval of $45 million in funding deployment of charging infrastructure, and finding that the proposed distribution infrastructure, beyond the meter infrastructure, and other capitalized costs associated with the EV infrastructure program are reasonable in relation to the likely benefits to be achieved, further analysis here is inapplicable.

Project Schedule

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

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Task #	Task Description	Year	Start Month	End Month
1	Receive DPU approval of $5.8MM O&M budget	2018	-	Pending
2	Develop DC Fast Charger deployment plan	2018	-	March
3	Qualify charging station vendors for participation in program	2018	-	April
4	Select third party electrical contractors to perform behind-the-meter work	2018	-	April
5	Complete internal approvals process (PAF, subsidiary board approval)	2018	-	May
6	Determine FTE hiring plan	2018	-	June
7	Engage third party contractor to build customer-facing web portal	2018	-	December
8	Recruit site hosts for charging station deployment	2018-2022	January	December
9	Electrify 47 Level 2 and DC Fast Charger sites in Year 1	2018	January	December
10	Electrify 67 Level 2 and DC Fast Charger sites in Year 2	2019	January	December
11	Electrify 106 Level 2 and DC Fast Charger sites in Year 3	2020	January	December
12	Electrify 106 Level 2 and DC Fast Charger sites in Year 4	2021	January	December
13	Electrify 102 Level 2 and DC Fast Charger sites in Year 5	2022	January	December
14	Maintain compliance with commitment to deploy 10% of capital in Environmental Justice Communities	2018-2022	January	December
15	Submit evaluation report to DPU / DOER upon completion of Phase 1	2019	-	December
16	Support MA Grid Mod stakeholder outreach plan	2018-2022	January	December

Regulatory Approvals

Massachusetts DPU approval for the $45M capital component of the investment was received on November 30, 2017 as part of docket 17-05. Approval for cost recovery mechanism and O&M expense was deferred to docket 15-122, with a decision expected in Q2 2018.

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.

In addition to the pending cost recovery approval noted above, please see the attached Risk mitigation plan document.

EV Make Ready
Board Presentation

References (*additional supporting documentation*)

Diagrams, Attachments, and Images

MA EV Make-Ready
Program Illustration

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). **N/A**

Assess the fit of this IT project with the overall IT strategy. **N/A**

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. **N/A**

Attached SaaS/Cloud form where applicable. **N/A**

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:

_____

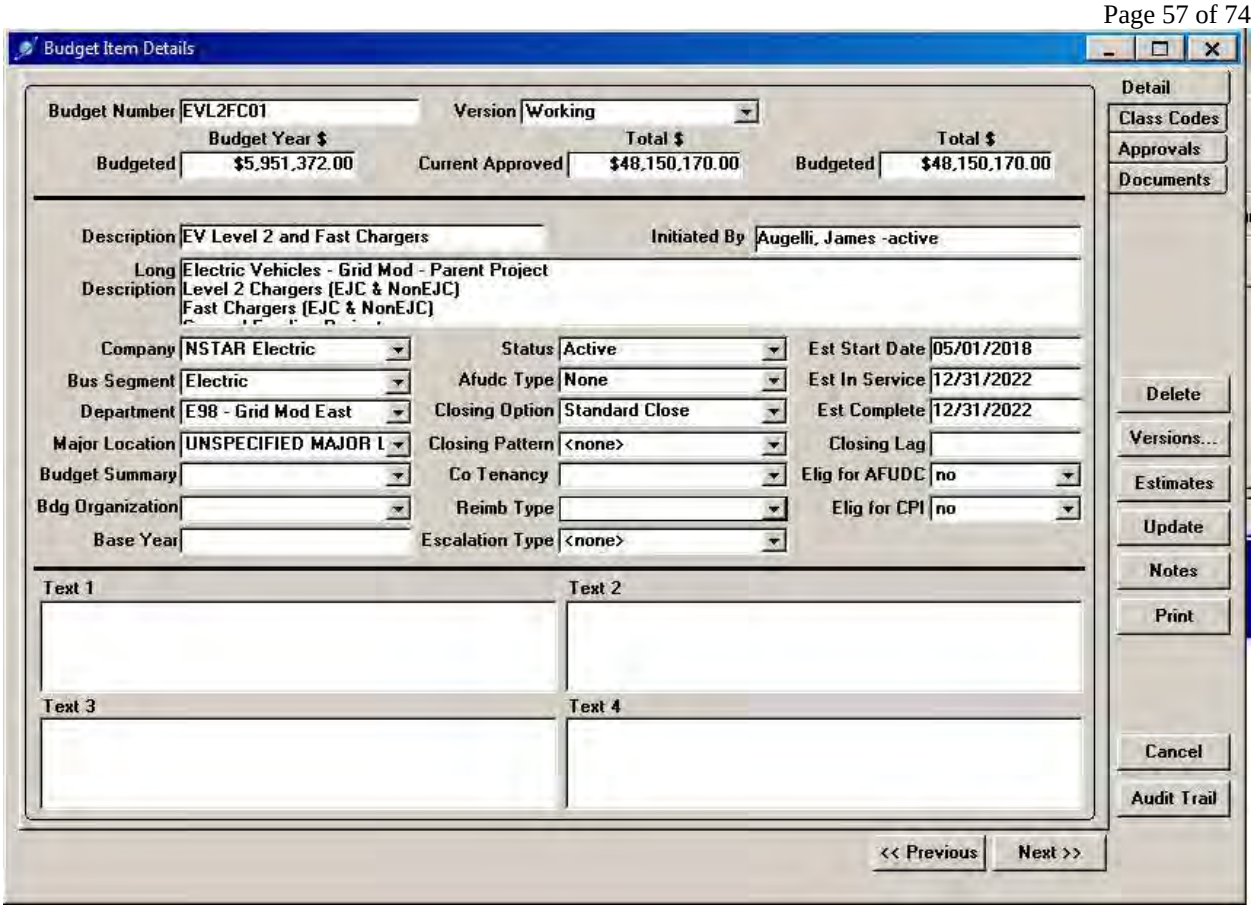
Development phase: # months (provide support) (A) _____

÷ 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.


Budget Item Details
Budget Number EVL2FC01
Version Working
Budget Year $
Budgeted $5,951,372.00
Total $
Current Approved $48,150,170.00
Total $
Budgeted $48,150,170.00
Description EV Level 2 and Fast Chargers
Initiated By Augelli, James -active
Long Description Electric Vehicles - Grid Mod - Parent Project
Level 2 Chargers (EJC & NonEJC)
Fast Chargers (EJC & NonEJC)
Company NSTAR Electric
Status Active
Est Start Date 05/01/2018
Bus Segment Electric
Afudc Type None
Est In Service 12/31/2022
Department E98 - Grid Mod East
Closing Option Standard Close
Est Complete 12/31/2022
Major Location UNSPECIFIED MAJOR L
Closing Pattern <none>
Closing Lag
Budget Summary
Co Tenancy
Elig for AFUDC no
Bdg Organization
Reimb Type
Elig for CPI no
Base Year
Escalation Type <none>
Text 1
Text 2
Text 3
Text 4
Detail
Class Codes
Approvals
Documents
Delete
Versions...
Estimates
Update
Notes
Print
Cancel
Audit Trail
<< Previous
Next >>

FERC Account	Cost Element Category	Month Number	Description	Sum of Amount
Additions	Contractor	201811	MERRIMAC INDUSTRIAL SALES, INC	22,600.00
Additions	Contractor	201812	Accrual	3,024.00
Additions	Contractor	201812	Gen EV Quarterly Proj Allocation	14,798.81
Additions	Contractor	201812	HORIZON SOLUTIONS LLC	54,420.00
Additions	Contractor	201812	J & M BROWN COMPANY INC	704,645.00
Additions	Contractor	201812	MANUAL UVL MASS AUDOBON LINCOLN INV 119497-00	11,600.00
Additions	Contractor	201812	MAVERICK CONSTRUCTION CORP	105,649.60
Additions	Contractor	201812	MERRIMAC INDUSTRIAL SALES, INC	107,058.34
Additions	**Contractor Total**			**1,023,795.75**
Additions	Indirect/Overheads	201809		69.61
Additions	Indirect/Overheads	201810		5,393.96
Additions	Indirect/Overheads	201811		113.00
Additions	Indirect/Overheads	201812		35,599.37
Additions	**Indirect/Overheads Total**			**41,175.94**
Additions	Labor	201809		148.65
Additions	Labor	201810		5,501.46
Additions	Labor	201812		26,966.06
Additions	Labor	201812	Gen EV Quarterly Proj Allocation	18,513.52
Additions	**Labor Total**			**51,129.69**
Additions	Material	201810	BUSHING,ELECTRICAL, LOADBREAK CONNECTOR, 15 KV, 200 A	61.33
Additions	Material	201810	BUSHING,ELECTRICAL, PARKING / STAND-OFF, 15 KV, 200 A , 1-POSITION, INSULATED , BASE: SS, INTERFACE,	359.25
Additions	Material	201810	CAP,ELECTRICAL, INSULATING, DEADEND, LOADBREAK, 15 KV, 200 A	279.42
Additions	Material	201810	CONNECTOR,ELECTRICAL, 2 POSITION, BACK TO BACK	159.69
Additions	Material	201810	ELBOW,FITTING, LOADBREAK, 15 KV, 200 A, #1 SOLID OR #2 STRANDED, FOR URD-A-22-000	146.74
Additions	Material	201810	FUSE, ELECTRONIC CONTROL MODULE, W/ RADSEC & NON-RADSEC, TIME DELAYED COMPOUND CURVE, USE W/FAULT FI	3,850.50
Additions	Material	201810	FUSE, INTERRUPTER MODULE, RADSEC AND NON-RADSEC, USE W/FAULT FITER CONTROL MODULE, FAULT FITER, REST	2,365.32
Additions	Material	201810	FUSEHOLDER, RADSEC AND NON-RADSEC, USED IN PME-9 PADMOUNT SWITCHES, HOLDS FAULT FITER FUSES	950.06
Additions	Material	201810	SPLICE,KIT, COLD SHRINK, ELBOW SEALING, CABLE OD RANGE: 0.8 - 1.5 IN	25.79
Additions	Material	201810	SPLICE,KIT, GROUNDING/BOND, FOR JACKETED CABLE BONDING, UGK1	172.70
Additions	Material	201810	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	18.45
Additions	Material	201810	WIRE,ELECTRICAL, BONDING, 1/0 AWG, 19 STR, TINNED, SOFT-DRAWN CU, 1500 FT WOOD REEL	49.33
Additions	Material	201812	CABLE, 350 KCMIL, 37 STR, 5 KV, 40 FT LG COIL, 115 MILS EPR INSULATED, CSPE JACKET	280.91
Additions	Material	201812	CABLE, BARE, COMPRESSED STRANDED, QUADRUPLEX, 3-500 KCMIL CU, 1-500 KCMIL BARE TINNED CU, 600 V, 100	12,705.48
Additions	Material	201812	CABLE, BARE, TRIPLEX, 2-4/0 AWG CU, 1-1/0 BARE TINNED CU, 600 V, EP HYPALON JACKET, MAX. 72 STEEL RE	11,092.68
Additions	Material	201812	CABLE,ELECTRICAL, 1/0 AWG, 600 V, EPR INSULATED, CU, 2000 FT Wood Reel, CPE JACKETED	224.14
Additions	Material	201812	CONNECTOR,ELECTRICAL, 6 POSITION, H CONFIGURATION	368.01
Additions	Material	201812	CONNECTOR,ELECTRICAL, INSULATED, URD SECONDARY 3- POSITION, GEL FILLED, BUS: AL	103.28
Additions	Material	201812	CORD,EXTENSION, 3/C, 14 AWG, 25 FT LG, ORANGE	9.41
Additions	Material	201812	CUTOUT, FUSE, OPEN, 100 A, 12 KA INTERRUPTING CURRENT ASYMMETRICAL, 25 KV, 150 KV BIL, W/ LOADBUSTER	628.88
Additions	Material	201812	FOAM, LIQUID, LARGE, BACKFILL FOR POLE SETTING 6 CU FT WHEN EXPANDED, ORDER FULL PALLETS 18, 2 PART	497.57
Additions	Material	201812	LUG,COMPRESSION, HYLUG, 4/0 AWG, 1 HOLE, CU	16.13
Additions	Material	201812	LUG,COMPRESSION, HYLUG, 500 KCMIL, 2 HOLE, CU	55.42
Additions	Material	201812	PAD, 43.5 X 37.5 IN TOP, 32 IN DP, OPENING: 26 X 32 IN, FIBERGLASS, FOR SINGLE PH XFMR, XFMR BOX- NO	283.99
Additions	Material	201812	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	439.00
Additions	Material	201812	TERMINAL, LUG, 1/0 AWG, COMPRESSION, 1 HOLE, CU	9.69
Additions	Material	201812	WIRE, 600 V, CU, # 2, 7 STR, MEDIUM HARD DRAWN, 50 FT COIL	132.81
Additions	Material	201812	WIRE, COMPRESSED, 1/C, 4/0, 37 STR, 5 KV, 115 MIL EPR INSULATED, 40 FT Coil, CSPE INSULATED, NO JACK	385.70
Additions	Material	201812	WIRE,ELECTRICAL, #4, 7 STR, 600 V, 60 MIL INSULATED, MEDIUM-HARD DRAWN CU, 200 FT COIL	44.41
Additions	Material	201812	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	29.53
Additions	**Material Total**			**35,745.62**
Additions	Other	201810		72.00
Additions	Other	201812		72.00
Additions	**Other Total**			**144.00**
Additions Total				**1,151,991.00**
CWIP	Contractor	201810	MERRIMAC INDUSTRIAL SALES, INC	15,500.00
CWIP	Contractor	201811	MERRIMAC INDUSTRIAL SALES, INC	18,900.00
CWIP	Contractor	201812	0125062 - 360 WOODS HOLE RD	4,357.90
CWIP	Contractor	201812	Accrual	3,024.00
CWIP	Contractor	201812	Gen EV Quarterly Proj Allocation	47,356.21
CWIP	Contractor	201812	HORIZON SOLUTIONS LLC	54,420.00
CWIP	Contractor	201812	J & M BROWN COMPANY INC	1,495,556.12
CWIP	Contractor	201812	MANUAL UVL 73 SHERMAN ST CAMBRIDGE INV 119438-00	11,600.00
CWIP	Contractor	201812	MANUAL UVL BEDFORD DPW INV 119418-00	15,300.00
CWIP	Contractor	201812	MANUAL UVL BEDFORD HS INV 119343-00	11,600.00
CWIP	Contractor	201812	MANUAL UVL BEDFORD LN INV 119414-00	11,600.00
CWIP	Contractor	201812	MANUAL UVL BEDFORD MIDDLE SCH INV 119409-00	11,600.00
CWIP	Contractor	201812	MANUAL UVL BEDFORD TOWN HALL INV 119306-00	11,600.00
CWIP	Contractor	201812	MANUAL UVL CAMBRIDGE 177 GARDEN ST INV 119464-00	11,600.00
CWIP	Contractor	201812	MANUAL UVL CAMP ST CAMBRIDGE INV 119336-00	11,800.00
CWIP	Contractor	201812	MANUAL UVL CHARLES HOTEL INV 36159	73,220.00
CWIP	Contractor	201812	MANUAL UVL DAVIS SCH INV 119335-00	11,600.00
CWIP	Contractor	201812	MANUAL UVL MASS AUDOBON LINCOLN INV 119497-00	11,600.00
CWIP	Contractor	201812	MANUAL UVL MEMORIAL DR CAMBRIDGE INV 119337-00	12,290.00
CWIP	Contractor	201812	MANUAL UVL NEWTON LEXINGTON LOT INV 118957-00	11,600.00
CWIP	Contractor	201812	MAVERICK CONSTRUCTION CORP	105,649.60
CWIP	Contractor	201812	MERRIMAC INDUSTRIAL SALES, INC	219,258.34
CWIP	**Contractor Total**			**2,181,032.17**
CWIP	Indirect/Overheads	201809		69.61
CWIP	Indirect/Overheads	201810		5,646.14
CWIP	Indirect/Overheads	201811		257.13
CWIP	Indirect/Overheads	201812		55,775.15
CWIP	**Indirect/Overheads Total**			**61,748.03**
CWIP	Labor	201809		148.65
CWIP	Labor	201810		5,798.76
CWIP	Labor	201811		346.85
CWIP	Labor	201812		27,065.16
CWIP	Labor	201812	Gen EV Quarterly Proj Allocation	59,243.31
CWIP	**Labor Total**			**92,602.73**
CWIP	Material	201810	BUSHING,ELECTRICAL, LOADBREAK CONNECTOR, 15 KV, 200 A	61.33
CWIP	Material	201810	BUSHING,ELECTRICAL, PARKING / STAND-OFF, 15 KV, 200 A , 1-POSITION, INSULATED , BASE: SS, INTERFACE,	359.25
CWIP	Material	201810	CAP,ELECTRICAL, INSULATING, DEADEND, LOADBREAK, 15 KV, 200 A	279.42
CWIP	Material	201810	CONNECTOR,ELECTRICAL, 2 POSITION, BACK TO BACK	159.69
CWIP	Material	201810	ELBOW,FITTING, LOADBREAK, 15 KV, 200 A, #1 SOLID OR #2 STRANDED, FOR URD-A-22-000	146.74
CWIP	Material	201810	FUSE, ELECTRONIC CONTROL MODULE, W/ RADSEC & NON-RADSEC, TIME DELAYED COMPOUND CURVE, USE W/FAULT FI	3,850.50
CWIP	Material	201810	FUSE, INTERRUPTER MODULE, RADSEC AND NON-RADSEC, USE W/FAULT FITER CONTROL MODULE, FAULT FITER, REST	2,365.32

FERC Account	Cost Element Category	Month Number	Description	Sum of Amount
CWIP	Material	201810	FUSEHOLDER, RADSEC AND NON-RADSEC, USED IN PME-9 PADMOUNT SWITCHES, HOLDS FAULT FITER FUSES	950.06
CWIP	Material	201810	SPLICE,KIT, COLD SHRINK, ELBOW SEALING, CABLE OD RANGE: 0.8 - 1.5 IN	25.79
CWIP	Material	201810	SPLICE,KIT, GROUNDING/BOND, FOR JACKETED CABLE BONDING, UGK1	172.70
CWIP	Material	201810	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	18.45
CWIP	Material	201810	WIRE,ELECTRICAL, BONDING, 1/0 AWG, 19 STR, TINNED, SOFT-DRAWN CU, 1500 FT WOOD REEL	49.33
CWIP	Material	201812	CABLE, 350 KCMIL, 37 STR, 5 KV, 40 FT LG COIL, 115 MILS EPR INSULATED, CSPE JACKET	280.91
CWIP	Material	201812	CABLE, BARE, COMPRESSED STRANDED, QUADRUPLEX, 3-500 KCMIL CU, 1-500 KCMIL BARE TINNED CU, 600 V, 100	12,705.48
CWIP	Material	201812	CABLE, BARE, TRIPLEX, 2-4/0 AWG CU, 1-1/0 BARE TINNED CU, 600 V, EP HYPALON JACKET, MAX. 72 STEEL RE	11,092.68
CWIP	Material	201812	CABLE,ELECTRICAL, 1/0 AWG, 600 V, EPR INSULATED, CU, 2000 FT Wood Reel, CPE JACKETED	224.14
CWIP	Material	201812	CONNECTOR,ELECTRICAL, 6 POSITION, H CONFIGURATION	368.01
CWIP	Material	201812	CONNECTOR,ELECTRICAL, INSULATED, URD SECONDARY 3- POSITION, GEL FILLED, BUS: AL	103.28
CWIP	Material	201812	CORD,EXTENSION, 3/C, 14 AWG, 25 FT LG, ORANGE	9.41
CWIP	Material	201812	CUTOUT, FUSE, OPEN, 100 A, 12 KA INTERRUPTING CURRENT ASYMMETRICAL, 25 KV, 150 KV BIL, W/ LOADBUSTER	628.88
CWIP	Material	201812	FOAM, LIQUID, LARGE, BACKFILL FOR POLE SETTING 6 CU FT WHEN EXPANDED, ORDER FULL PALLETS 18, 2 PART	497.57
CWIP	Material	201812	LUG,COMPRESSION, HYLUG, 4/0 AWG, 1 HOLE, CU	16.13
CWIP	Material	201812	LUG,COMPRESSION, HYLUG, 500 KCMIL, 2 HOLE, CU	55.42
CWIP	Material	201812	PAD, 43.5 X 37.5 IN TOP, 32 IN DP, OPENING: 26 X 32 IN, FIBERGLASS, FOR SINGLE PH XFMR, XFMR BOX- NO	283.99
CWIP	Material	201812	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	439.00
CWIP	Material	201812	TERMINAL, LUG, 1/0 AWG, COMPRESSION, 1 HOLE, CU	9.69
CWIP	Material	201812	WIRE, 600 V, CU, # 2, 7 STR, MEDIUM HARD DRAWN, 50 FT COIL	132.81
CWIP	Material	201812	WIRE, COMPRESSED, 1/C, 4/0, 37 STR, 5 KV, 115 MIL EPR INSULATED, 40 FT Coil, CSPE INSULATED, NO JACK	385.70
CWIP	Material	201812	WIRE,ELECTRICAL, #4, 7 STR, 600 V, 60 MIL INSULATED, MEDIUM-HARD DRAWN CU, 200 FT COIL	44.41
CWIP	Material	201812	WIRE,ELECTRICAL, BARE, #4 AWG, SOLID, TINNED, CU, 3000 FT Reel	29.53
CWIP	**Material Total**			**35,745.62**
CWIP	Other	201810		(19,552.26)
CWIP	Other	201812		(1,132,294.74)
CWIP	**Other Total**			**(1,151,847.00)**
CWIP Total				**1,219,281.55**
Grand Total				**2,371,272.55**

NSTAR ELECTRIC COMPANY D/B/A EVERSOURCE ENERGY
CAPITAL AUTHORIZATION ANALYSIS

Line of Business 12170 Automated Feeder Reconfiguration
Parent Project WD00298 MA Grid Mod - OH Dist. Automation
Child Project WD00298 MA Grid Mod - OH Dist. Automation
Work Orders Please refer to the following page for a list of Work Orders

	PAF Estimate (A)	Additions Total (B)	Cost of Removal Total (C)	CWIP Total (D)	Total Capital Spend (B+C+D) (E)	Variance (E-A)
Direct Costs	4,071,600	613,477	15,810	319,769	949,056	(3,122,544)
					-	-
Indirect Costs	659,800	319,357	11,283	166,462	497,102	(162,698)
					-	-
Total Project Costs	4,731,400	932,834	27,093	486,230	1,446,158	(3,285,242)

By Cost Element

Direct Costs						
Labor	699,200	66,653	3,006	86,350	156,009	(543,191)
Contractor	-	113,217	12,800	229,436	355,454	355,454
Material	3,372,400	431,752	-	603,085	1,034,837	(2,337,563)
Other	-	1,855	4	(599,103)	(597,244)	(597,244)
Total Direct	4,071,600	613,477	15,810	319,769	949,056	(3,122,544)
Indirect Costs	659,800	319,357	11,283	166,462	497,102	(162,698)
Total Project	4,731,400	932,834	27,093	486,230	1,446,158	(3,285,242)

Accounting Work Order	Accounting Work Order Description
6A821670	GRID MOD; INSTALL RECLOSER 21C7-62R
6A821672	GRID MOD: INSTALL VS RECLOSER 21C7-
6A821673	GRID MOD; INSTALL TRIPLE SINGLE REC
6A821674	GRID MOD; INSTALL RECLOSER VS 22B7-
6A821675	GRID MOD; INSTALL RECLOSER AND FORM
6A821676	GRID MOD - NJC - Montague, N. Lever
6A822123	GRID MOD: INSTALL MR RECLOSER 22B1-
6A822124	GRID MOD: INSTALL SR RECLOSER 18G5-
6A822128	GRID MOD: INSTALL VS RECLOSER 18K2-
6A822130	GRID MOD: INSTALL MR RECLOSER 18G6-
6A822131	GRID MOD: INSTALL VS RECLOSER 17K5-
6A822132	GRID MOD: INSTALL MR RECLOSER 18G7-
6A822133	GRID MOD: INSTALL VS RECLOSER 15A5-
6A822178	GRID MOD: INSTALL VS RECLOSER 21C4-
6A822179	GRID MOD: INSTALL VS RECL 21C4-XXXX
6A822181	GRID MOD: REM GOAB & INST RECLOSER
6A822182	GRID MOD: INSTALL VS RECLOSER 19J1-
6A822238	GRID MOD: INSTALL VS 15A3-4102 & IN
6A822239	GRID MOD: INSTALL MR RECLOSER 15A3-
6A822240	GRID MOD: INSTALL MR RECLOSER 15A3-
6A822241	GRID MOD: INSTALL MR RECLOSER 21C8-
6A822257	GRID MOD: INSTALL SR RECLOSER 22B7-
6A822258	GRID MOD: INSTALL VS RECLOSER 22B7-
6A822267	Grid Mod: Inst MR 17K5-74S and Form
6A822273	GRID MOD: INSTALL TSR RECLOSER 21C1
6B820910	GRID MOD; RM RECL 19A1-60R;RM SLD B
6B820911	GRID MOD: RPL SOLID BLADES WITH RE
6B820912	GRID MOD; INSTALL RECLOSER 19A1-81
6B820913	GRID MOD; INSTALL TIE RECLOSER 19A
6B820914	GRID MOD; NEW RECLOSER LOCATION SR
6B821179	Grid Mod: Install MR on Form 6 Cntl
6B821180	Grid Mod: Install VS 30B1-xxxx and
6B821181	GRID MOD: REPLACE RR RECLOSER 16B5-
6B821182	Grid Mod: rep GOAB with MR 30B5-xxx
6B821183	GRID MOD: INSTALL XX RECLOSER 19J4-
6B821185	GRID MOD: INSTALL MR RECLOSER 17G3-
6B821243	GRID MOD: INST MR RECL 19J4-85M AND
6B821245	GRID MOD: INSTALL RR RECLOSER 30B7-
6B821247	Grid Mod: Rem 40T fuses P228/74, in
6B821260	GRID MOD: INSTALL MR RECLOSER 30B7-

Accounting Work Order	Accounting Work Order Description
6S821808	GRID MOD; INSTALL RECLOSER 16C17-92
6S821809	GRID MOD; INSTALL SR RECLOSER 30A1-
6S821810	GRID MOD; INSTALL SR RECLOSER 16C17
6S822178	AGAWAM 16C17 30A1 GRID MOD FUSING
6S822352	GRID MOD: INSTALL SR RECLOSER 16C17
6S822353	GRID MOD: INSTALL MR RECLOSER 16C17
6S822354	GRID MOD: INSTALL SR RECLOSER 16C17
6S822356	GRID MOD: INSTALL MR RECL 20A33-XXM
6S822357	GRID MOD: INSTALL MR RECLOSER 21N4-
6S822358	GRID MOD: INSTALL MR RECLOSER 22H16
6S822359	GRID MOD: INSTALL VS RECLOSER 22H16
6S822361	GRID MOD: INSTALL VS RECLOSER 19S1-
6S822362	GRID MOD: INSTALL MR RECLOSER 21N4-
6S822364	GRID MOD: INSTALL MR RECLOSER 5J17-
6S822365	GRID MOD: INSTALL VS RECLOSER 5J17-
6S822366	GRID MOD: INSTALL MR RECLOSER 20A34
6S822367	GRID MOD: INSTALL MR RECLOSER 22H16
6S822368	GRID MOD: INSTALL SR RECLOSER 29A1-
6S822369	GRID MOD: INSTALL VS RECL 20A32-XXX
6S822370	GRID MOD: INSTALL MR RECLOSER 30A1-
6S822502	GRID MOD: INSTALL SR RECLOSER 30A5-
6S822503	GRID MOD: INSTALL MR RECLOSER 30A5-
6S822513	GRID MOD: INSTALL VS RECLOSER 19S3-
6S822531	GRID MOD: INSTALL MR RECLOSER 20A35

EVERSOURCE
Project Authorization Form

Operations Project Authorization Form

Date Prepared: 07/12/2018	**Project Title: MA GM OVERHEAD DA**
Company/ies: Eversource - MA	**Project ID Number: WD00298**
Organization: Distribution Engineering	**Class(es) of Plant: Distribution**
Project Initiator: Mathew Biron	**Project Category: Reliability**
Project Manager: Mathew Biron	**Project Type: Specific**
Project Sponsor: Umair Zia	**Project Purpose: Grid Modernization**
Estimated in service date: 12/31/2020	**If Transmission Project: PTF? N/A**
Eng. /Constr. Resources Budgeted? Y	**Capital Investment Part of Original Operating Plan? Y**
Authorization Type: Engineering	**O&M Expenses Part of the Original Operating Plan? Y**
Total Request: $500,000	

Financial Requirements:

Project Authorization

ERM: _____

FP&A: _____

Executive Summary

The purpose of the MA Grid Modernization Overhead Distribution Automation Project is to capture the costs associated with the engineering and procurement of overhead distribution automation components as part of the the Grid Modernization Program in Massachusett.

Project Costs Summary

Project cost summary will be supplied after design engineering is complete.

Technical Justification:

Project Need Statement

This project represents Eversource's Grid Modernization plan in accordance with the Department of Public Utilities decision on Order D.P.U. 15-122 dated 5/10/18 as it relates to Overhead Automated Feeder Reconfiguration, and more specifically, Overhead Distribution Automation.

Project Objectives

The project objective is to capture the engineering and procurement costs associated with Overhead Distribution Automation component of Grid Modernization.

EVERSOURCE
Project Authorization Form

Project Scope

This project will include the engineering and procurement of automated switches on the overhead distribution system. A total of approximately 77 units

Company	2018	2019	2020
Eversource WMA	14	32	31

Note – This was already approved at a whole-state combined level under WD00298, but is being broken out under 18326 for EMA and WD00298 for WMA only.

Background / Justification

One of the most fundamental and valuable capabilities of a modern grid is the ability for dynamic reconfiguration to minimize the impact to customers in the event of a fault condition. With advanced technology, the grid will 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. This capability makes the grid flexible and dynamic with the goal of maximizing system safety and reliability. As a part of its short term investment plan, Eversource will target deployment of advanced technology on the overhead system across the state.

For years, Eversource has been committed to using advanced technology to reduce outages and speed the restoration on both the underground and overhead systems. As a result, today the Company estimates that the number of customers affected by outage events is reduced by 25-30 percent due to distribution automation. Technology, however, continues to advance and create the potential for a step change in system reliability and resiliency.

As part of the STIP, Eversource proposes to enhance its existing distribution automation with a next generation topology that delivers sophisticated grid reconfiguration capabilities.

Business Process and / or Technical Improvements:

Currently, in Eversource East, which is a more customer dense service area, when a fault occurs on an overhead line the design goal is to automatically isolate the fault to a section with no more than 750 customers. In Eversource West, Eversource designs its system with a goal of having isolation segments of no more than 500 customers. Segment size is generally determined by historical reliability such that areas with poor reliability are sectionalized down to smaller segments to minimize the number of customers impacted by an event. This methodology maximizes reliability benefit for the associated cost.

A truly dynamic and reconfigurable grid requires an even greater degree of segmentation. Ideally, the grid needs the ability to find solutions to resupply as many customers as possible following an outage event. To implement these solutions, however, the system must have the flexibility associated with small customer segments between automated devices. The short term investment plan calls for further reducing the number of customers affected by circuit outages and restoring power more rapidly by installing a significant number of automatic sectionalizing devices. These additional devices will allow Eversource East to achieve its goal of 750

EVERSOURCE
Project Authorization Form

customers per segment and Eversource West will be able to achieve its goal of 500 customers per segment where circuit ties are available.

Alternatives Considered with Cost Estimates

Cost estimates do not include auxillary system components that may be required for the successful installation of automated switches. Each location is assumed to have adequate clearance to support the device without the need to install taller poles, shift primary/secondary conductors, or relocate existing transformation.

In the event the Grid Modernization project changes, the equipment can be utilized on other projects.

Project Schedule

Milestone/Phase Name	Estimated Completion Date

Regulatory Approvals: N/A

Risks and Risk Mitigation Plans: N/A

References: N/A

Attachments (One-Line Diagrams, Images, etc.)

EVERSOURCE

APS 1 - Project Authorization Policy

Supplement Request Form

Supplement Request Form

Date Prepared: 10/15/2018	**Project Title: MA GM OVERHEAD DA**
Company/Companies: Eversource	**Project ID Number: WD00298**
Organization: Distribution Engineering	**Plant Class/(F.P.Type): Distribution**
Project Initiator: Mathew Biron	**Project Type: Reliability**
Project Manager: Mathew Biron	**Capital Investment Part of Original Operating Plan? Y**
Project Sponsor: Umair Zia	**O&M Expenses Part of the Original Operating Plan? Y**
Current Authorized Amount: $500K	**Estimated in service date(s): 12/31/19**
Supplement Request: $4.231M	**Other:**
Total Request: $4.731M	

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:

Executive Summary

This a supplemental request of $3,228K is requested for the completion of WMA Grid Modernization Overhead Distribution Automation Project. The original authorization of $500K was to capture the initial costs associated with the engineering and procurement of overhead distribution automation components as part of the Grid Modernization Program in Western Massachusetts. This request will cover the entire cost of the installing all 66 overhead devices in WMA as required by the Grid Mod Filing.

Technical Justification:

Project Need Statement

This project represents Eversource's Grid Modernization plan in accordance with the Department of Public Utilities decision on Order D.P.U. 15-122 dated 5/10/18 as it relates to Overhead Automated Feeder Reconfiguration, and more specifically, Overhead Distribution Automation.

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APS 1 - Project Authorization Policy

Supplement Request Form

Project Objectives

The project objective in all of Eversource Massachusetts is to automatically isolate the fault to a section with no more than 500 customers. Segment size is generally determined by historical reliability such that areas with poor reliability are sectionalized down to smaller segments to minimize the number of customers impacted by an event. This methodology maximizes reliability benefit for the associated cost.

A truly dynamic and reconfigurable grid requires an even greater degree of segmentation. Ideally, the grid needs the ability to find solutions to resupply as many customers as possible following an outage event. To implement these solutions, however, the system must have the flexibility associated with small customer segments between automated devices. The short term investment plan calls for further reducing the number of customers affected by circuit outages and restoring power more rapidly by installing a significant number of automatic sectionalizing devices. These additional devices will allow Eversource to achieve its goal of 500 customers per segment where circuit ties are available.

Project Scope

This project will include the engineering, procurement and installation of automated switches on the overhead distribution system in WMA. A total of approximately 66 units will be installed in Eversource - WMA through 2020 with the following breakdown:

AWC	2018	2019	2020
Springfield	3	20	
Hadley	6	12	
Pittsfield	5	20	
Total	14	52	

***Assumes all installations complete in 2019.*

EVERSOURCE

APS 1 - Project Authorization Policy

Supplement Request Form

Supplement Cost Summary

Note: Dollar values are in thousands:

	Prior Authorized	2018	2019	2020	Totals
Capital Additions - Direct	$500	$363.6	$3,208	$0	$4,071.6
Less Customer Contribution	$0	$0	$0	$0	$0
Removals net of Salvage ____%	$0	$0	$0	$0	$0
Total - Direct Spending	$500	$363.6	$3,208	$0	$4,071.6
Capital Additions - Indirect	$0	$138.1	$468.7	$0	$606.8
Subtotal Request	$500	$501.7	$3,676.7	$0	$4,678.4
AFUDC	$0	$1.5	$51.5	$0	$53
Total Capital Request	$500	$503	$3,728.2	$0	$4,731.4
O&M	$0	$0	$0	$0	$0
Total Request	$500	$503	$3,728.2	$	$4,731.4

Cost breakdown:

Financial Evaluation

Note: Dollar values are in thousands

Direct Capital Costs	Year 1	Year 2	Year 3+	Total
Straight Time Labor	$148.3	$550.9	$0	$699.2
Overtime Labor	$0	$0	$0	$0
Outside Services	$0	$0	$0	$0
Materials	$715.4	$2,657	$0	$3,372.4
Other, including contingency amounts (describe)	$0	$0	$0	$0
Total Direct Costs	**$863.7**	**$3,207.9**	**$0**	**$4,071.6**

Indirect Capital Costs	Year 1	Year 2	Year 3+	Total
Indirects/Overheads (including benefits)	$138.1	$468.7	$0	$606.8
Capitalized interest or AFUDC, if any	$1.5	$51.5	$0	$53
Total Indirect Costs	**$139.6**	**$520.2**	**$0**	**$659.8**

Total Capital Costs	**$1,003.3**	**$3,728.1**	**$0**	**$4,731.4**
Less Total Customer Contribution	$0	$0	$0	$0
Total Capital Project Costs	**$1,003.3**	**$3,728.1**	**$0**	**$4,731.4**
Total O&M Project Costs	$0	$0	$0	$0

Note: Explain unique payment provisions, if applicable

EVERSOURCE

APS 1 - Project Authorization Policy

Supplement Request Form

Background / Justification

One of the most fundamental and valuable capabilities of a modern grid is the ability for dynamic reconfiguration to minimize the impact to customers in the event of a fault condition. With advanced technology, the grid will 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. This capability makes the grid flexible and dynamic with the goal of maximizing system safety and reliability. As a part of its short term investment plan, Eversource will target deployment of advanced technology on the overhead system in Eastern Massachusetts.

For years, Eversource has been committed to using advanced technology to reduce outages and speed the restoration on both the underground and overhead systems. As a result, today the Company estimates that the number of customers affected by outage events is reduced by 25-30 percent due to distribution automation. Technology, however, continues to advance and create the potential for a step change in system reliability and resiliency.

As part of the STIP, Eversource proposes to enhance its existing distribution automation with a next generation topology that delivers sophisticated grid reconfiguration capabilities.

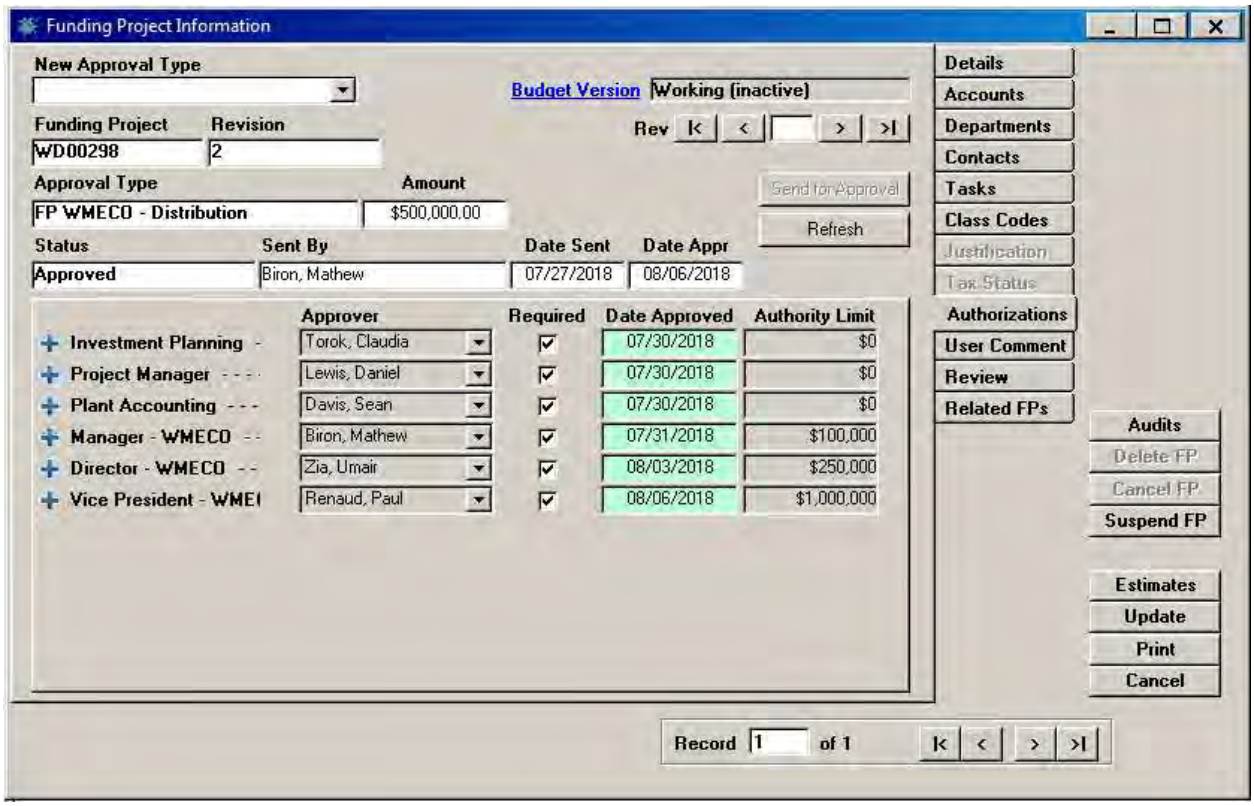
Alternatives Considered with Cost Estimates

Cost estimates do not include auxiliary system components that may be required for the successful installation of automated switches. Each location is assumed to have adequate clearance to support the device without the need to install taller poles, shift primary/secondary conductors, or relocate existing transformation.

In the event the Grid Modernization project changes, the equipment can be utilized on other projects.

Justification for Additional Resources

See attach a copy of the prior authorized PAF as reference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Budget Version
Working (inactive)
Funding Project
Revision
WD00298
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Approval Type
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Date Sent
Date Appr
Approved
Biron, Mathew
07/27/2018
08/06/2018
Approver
Required
Date Approved
Authority Limit
Investment Planning
Torok, Claudia
07/30/2018
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Project Manager
Lewis, Daniel
07/30/2018
$0
Plant Accounting
Davis, Sean
07/30/2018
$0
Manager - WMECO
Biron, Mathew
07/31/2018
$100,000
Director - WMECO
Zia, Umair
08/03/2018
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Vice President - WMEI
Renaud, Paul
08/06/2018
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Class Codes
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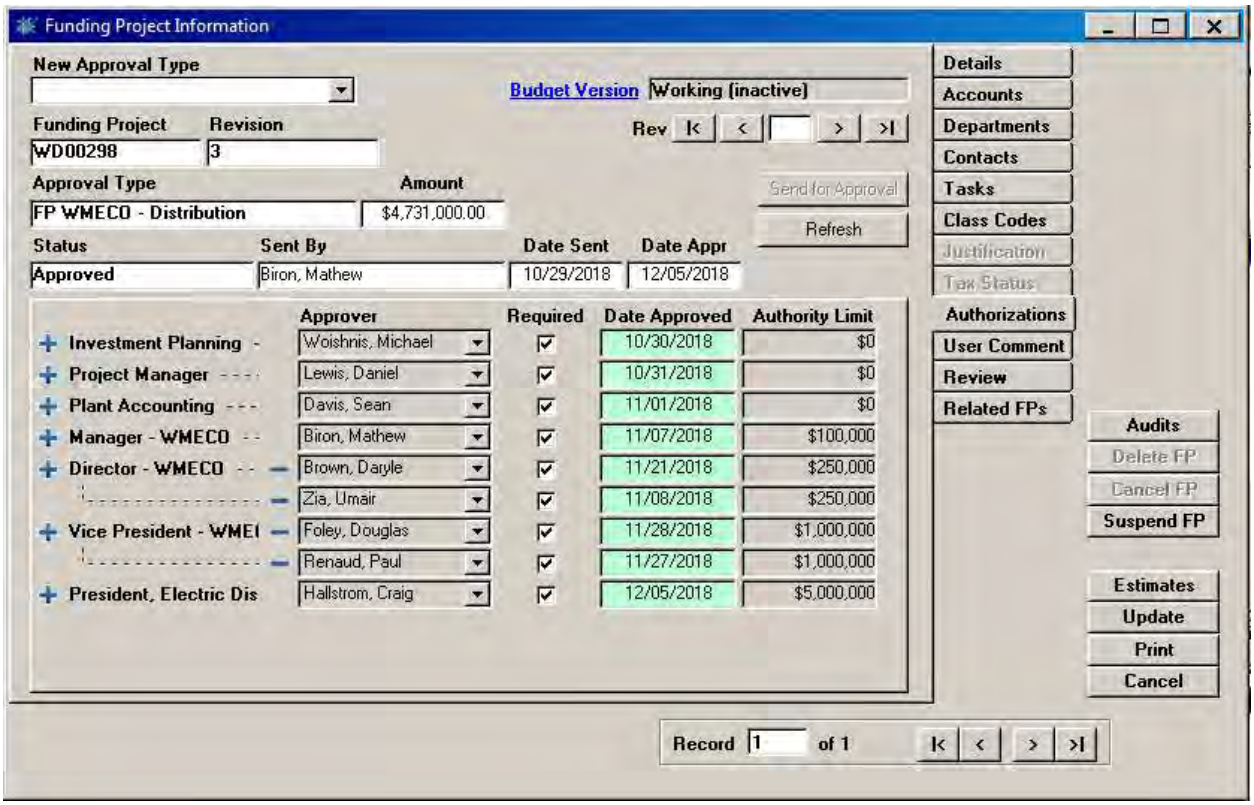
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Funding Project
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Amount
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10/29/2018
12/05/2018
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Date Approved
Authority Limit
Investment Planning
Woishnis, Michael
10/30/2018
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Lewis, Daniel
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Manager - WMECO
Biron, Mathew
11/07/2018
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Director - WMECO
Brown, Daryle
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Zia, Umair
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Vice President - WMEI
Foley, Douglas
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Renaud, Paul
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President, Electric Dis
Hallstrom, Craig
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Audits
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Cancel FP
Suspend FP
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FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Additions	Contractor	201810	0124017 - BURKE UVL NORTH WEST ST	5,676.62
Additions	Contractor	201810	0124017 - BURKE UVL NORTH WESTFIELD ST	20,354.64
Additions	Contractor	201811		(77.93)
Additions	Contractor	201811	0124017 - BURKE UVL NORTH WEST ST	(5,676.62)
Additions	Contractor	201811	0124017 - BURKE UVL NORTH WESTFIELD ST	(20,354.64)
Additions	Contractor	201811	DANIEL BURKE ELECTRICAL	43,996.92
Additions	Contractor	201811	TRC ENGINEERS LLC	15,246.56
Additions	Contractor	201812		(1,853.35)
Additions	Contractor	201812	Accrual	15,323.12
Additions	Contractor	201812	ASPLUNDH TREE EXPERT CO	220.71
Additions	Contractor	201812	DANIEL BURKE ELECTRICAL	40,361.39
Additions	**Contractor Total**			**113,217.42**
Additions	Indirect/Overheads	201808		18,562.15
Additions	Indirect/Overheads	201809		70,721.64
Additions	Indirect/Overheads	201810		81,408.78
Additions	Indirect/Overheads	201811		69,994.48
Additions	Indirect/Overheads	201812		78,669.94
Additions	**Indirect/Overheads Total**			**319,356.99**
Additions	Labor	201808		75.67
Additions	Labor	201809		12,357.43
Additions	Labor	201810		22,165.55
Additions	Labor	201811		7,251.91
Additions	Labor	201812		24,802.63
Additions	**Labor Total**			**66,653.19**
Additions	Material	201808	RECLOSER, VACUUM, TRIPLE SINGLE, TYPE: KNTS, 27 KV, 800 A, 12.5 KA, 3 PH, ELECTRONIC, W/ 7970:120V P	39,243.34
Additions	Material	201808	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	2,895.23
Additions	Material	201809		0.01
Additions	Material	201809	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	98.41
Additions	Material	201809	CONDUIT,ELECTRICAL, FLEXIBLE, LIQUIDTIGHT, 1/2 IN DIA, CS/PVC, GRAY, PACKAGE: 100 FT PER BOX	36.00
Additions	Material	201809	CONNECTOR,CONDUIT, LIQUIDTIGHT, 1/2 IN, 0 DEG, COMPRESSION/THREADED, STEEL	9.60
Additions	Material	201809	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	32.82
Additions	Material	201809	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	68,882.01
Additions	Material	201809	CONTROL,RECLOSER, TYPE: FORM 6, TRIPLE SINGLE, ELECTRONIC, 26 PIN, POLE MOUNTED, 3-T/S, W/ VOLTAGE S	17,120.98
Additions	Material	201809	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	218.52
Additions	Material	201809	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	376.77
Additions	Material	201809	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	1,892.48
Additions	Material	201809	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	125,345.98
Additions	Material	201809	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	42,590.26
Additions	Material	201809	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	80.85
Additions	Material	201809	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	5,756.43
Additions	Material	201809	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	14,157.87
Additions	Material	201809	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	6,404.95
Additions	Material	201809	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, LOADBUSTER HOOKS, 200 KV BIL , 477 ACSR (18/1),	2,181.22
Additions	Material	201810		(0.32)
Additions	Material	201810	ANCHOR, SINGLE HELIX, SOCKET DRIVE, 10 IN, 8000 LB	26.92
Additions	Material	201810	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	39.95
Additions	Material	201810	CABLE, BARE, ANNEALED, #2 AWG, 7 STR, SOFT DRAWN CU	22.82
Additions	Material	201810	CABLE, INSULATED, AERIAL, AAC, TRIPLEX, 1/0 AWG, 7 STR, 600 V, W/ 1/0 AWG 7 STR ALLOY NEUTRAL, GAMMA	336.06
Additions	Material	201810	CONDUIT,ELECTRICAL, 3 IN DIA, PVC, SCH 80, 2.9 IN ID, STRAIGHT	17.74
Additions	Material	201810	CONDUIT,ELECTRICAL, 3 IN, 10 FT LG, PVC, SCH 40, ONE BELLED END	24.72
Additions	Material	201810	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	197.28
Additions	Material	201810	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	165.57
Additions	Material	201810	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	8,618.87
Additions	Material	201810	CROSSARM, DISTRIBUTION, DEADEND, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET AND HARDWARE,	383.72
Additions	Material	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	428.98
Additions	Material	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 5 FT-7 IN LG, W/ CENTER MOUNT BRACKET AND HARDWAR	313.36
Additions	Material	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	1,129.67
Additions	Material	201810	CUTOUT, FUSE, OPEN, 100 A, 12 KA INTERRUPTING CURRENT ASYMMETRICAL, 25 KV, 150 KV BIL, W/ LOADBUSTER	271.12
Additions	Material	201810	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	32.29
Additions	Material	201810	HOLDER,SIGN, MOLDED, 10 POSITIONS, VERTICAL, #2, 1-5/8 X 26-1/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	9.79
Additions	Material	201810	JP MORGAN CHASE BANK	32.03
Additions	Material	201810	POLE, 40 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	1,429.50
Additions	Material	201810	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	1,853.15
Additions	Material	201810	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	21,280.46
Additions	Material	201810	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	80.86
Additions	Material	201810	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	(462.07)
Additions	Material	201810	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	(5,704.24)
Additions	Material	201810	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	2,023.85
Additions	Material	201811		(66.10)
Additions	Material	201811	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	78.41
Additions	Material	201811	BASE,MOUNTING, ANTENNA, Laird Technologies - 4G/3G Multiband Phantom Antenna Black NMO	147.06
Additions	Material	201811	BRACKET, CUTOUT AND ARRESTER, 12 IN, FIBERGLASS, FERR / ALUM FITTINGS W/ MOUNTING BOLTS	35.39
Additions	Material	201811	CABLE ASSEMBLY, COMMUNICATION, Serial DB9 Serial Ext Cable, (DB9 M/F), 6-ft	65.97
Additions	Material	201811	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	47.47
Additions	Material	201811	CONDUIT,ELECTRICAL, FLEXIBLE, LIQUIDTIGHT, 1/2 IN DIA, CS/PVC, GRAY, PACKAGE: 100 FT PER BOX	19.10
Additions	Material	201811	CONNECTOR,COMPRESSION, DOUBLE CRIMP, SMA, Male Crimp, RG58, 58A, 58C, 141, 141A	23.79
Additions	Material	201811	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	176.91
Additions	Material	201811	CONNECTOR,WEDGE TAP, IN-LINE DISCONNECT SWITCH, 1/0, 4/0 AWG, 477, REPLACEMENT C-MEMBER	102.68
Additions	Material	201811	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	17,863.36
Additions	Material	201811	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	215.99
Additions	Material	201811	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	374.61
Additions	Material	201811	CUTOUT, FUSE, OPEN, 100 A, 12 KA INTERRUPTING CURRENT ASYMMETRICAL, 25 KV, 150 KV BIL, W/ LOADBUSTER	690.57
Additions	Material	201811	FUSEHOLDER, DELUXE BLADE, 10 GA HEAVY DUTY WIRE LEADS	14.57
Additions	Material	201811	GRAYBAR ELECTRIC COMPANY INC	(2.05)
Additions	Material	201811	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	11.02
Additions	Material	201811	JP MORGAN CHASE BANK	54.37
Additions	Material	201811	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	41,882.20
Additions	Material	201811	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	1,151.32
Additions	Material	201811	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	4,658.88
Additions	Material	201811	TERMINAL, 35 W X 7.5 H, DIN RAIL PERFORATED	1.19
Additions	Material	201811	TESSCO INC	3.42
Additions	Material	201812		1.02
Additions	Material	201812	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	96.08
Additions	Material	201812	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	33.42
Additions	Material	201812	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	217.92
Additions	Material	201812	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	284.15
Additions	Material	201812	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	10.53
Additions	Material	201812	JP MORGAN CHASE BANK	34.90

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
Additions	**Material**	201812	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	979.60
Additions	**Material**	201812	RADIO, MOBILE, SIERRA WIRELESS, AIRLINK RV50 MODEM	2,572.63
Additions	**Material**	201812	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	85.67
Additions	**Material**	201812	TESSCO INC	9.78
Additions	**Material Total**			**431,751.64**
Additions	**Other**	201808		42.03
Additions	**Other**	201809		349.93
Additions	**Other**	201810		555.03
Additions	**Other**	201811		547.37
Additions	**Other**	201811	0124822 - 1157 NORTH WESTFIELD ST AGAWAM	28,228.41
Additions	**Other**	201811	0124822 - N WESTFIELD ST AGAWAM	4,900.14
Additions	**Other**	201812		360.82
Additions	**Other**	201812	0124822 - 1157 NORTH WESTFIELD ST AGAWAM	(28,228.41)
Additions	**Other**	201812	0124822 - N WESTFIELD ST AGAWAM	(4,900.14)
Additions	**Other Total**			**1,855.18**
Additions Total				**932,834.42**
CWIP	**Contractor**	201810	0124017 - BURKE UVL NORTH WEST ST	5,676.62
CWIP	**Contractor**	201810	0124017 - BURKE UVL NORTH WESTFIELD ST	20,354.64
CWIP	**Contractor**	201811		(77.93)
CWIP	**Contractor**	201811	0124017 - BURKE UVL NORTH WEST ST	(5,676.62)
CWIP	**Contractor**	201811	0124017 - BURKE UVL NORTH WESTFIELD ST	(20,354.64)
CWIP	**Contractor**	201811	Accrual	1,467.41
CWIP	**Contractor**	201811	DANIEL BURKE ELECTRICAL	43,996.92
CWIP	**Contractor**	201811	TRC ENGINEERS LLC	20,580.07
CWIP	**Contractor**	201812		(1,853.35)
CWIP	**Contractor**	201812	Accrual	124,741.18
CWIP	**Contractor**	201812	ASPLUNDH TREE EXPERT CO	220.71
CWIP	**Contractor**	201812	DANIEL BURKE ELECTRICAL	40,361.39
CWIP	**Contractor Total**			**229,436.40**
CWIP	**Indirect/Overheads**	201808		18,562.15
CWIP	**Indirect/Overheads**	201809		93,486.66
CWIP	**Indirect/Overheads**	201810		13,369.33
CWIP	**Indirect/Overheads**	201811		15,611.51
CWIP	**Indirect/Overheads**	201812		25,432.00
CWIP	**Indirect/Overheads Total**			**166,461.65**
CWIP	**Labor**	201808		75.67
CWIP	**Labor**	201809		14,376.23
CWIP	**Labor**	201810		28,685.55
CWIP	**Labor**	201811		11,327.20
CWIP	**Labor**	201812		31,885.50
CWIP	**Labor Total**			**86,350.15**
CWIP	**Material**	201808	RECLOSER, VACUUM, TRIPLE SINGLE, TYPE: KNTS, 27 KV, 800 A, 12.5 KA, 3 PH, ELECTRONIC, W/ 7970:120V P	39,243.34
CWIP	**Material**	201808	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	2,895.23
CWIP	**Material**	201809		0.01
CWIP	**Material**	201809	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	98.41
CWIP	**Material**	201809	CONDUIT,ELECTRICAL, FLEXIBLE, LIQUIDTIGHT, 1/2 IN DIA, CS/PVC, GRAY, PACKAGE: 100 FT PER BOX	36.00
CWIP	**Material**	201809	CONNECTOR,CONDUIT, LIQUIDTIGHT, 1/2 IN, 0 DEG, COMPRESSION/THREADED, STEEL	9.60
CWIP	**Material**	201809	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	32.82
CWIP	**Material**	201809	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	94,700.54
CWIP	**Material**	201809	CONTROL,RECLOSER, TYPE: FORM 6, TRIPLE SINGLE, ELECTRONIC, 26 PIN, POLE MOUNTED, 3-T/S, W/ VOLTAGE S	17,120.98
CWIP	**Material**	201809	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	218.52
CWIP	**Material**	201809	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	376.77
CWIP	**Material**	201809	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	1,892.48
CWIP	**Material**	201809	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	125,345.98
CWIP	**Material**	201809	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	106,433.11
CWIP	**Material**	201809	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	80.85
CWIP	**Material**	201809	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	6,845.05
CWIP	**Material**	201809	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	14,157.87
CWIP	**Material**	201809	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	8,511.08
CWIP	**Material**	201809	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, LOADBUSTER HOOKS, 200 KV BIL , 477 ACSR (18/1),	2,181.22
CWIP	**Material**	201810		(0.32)
CWIP	**Material**	201810	ANCHOR, SINGLE HELIX, SOCKET DRIVE, 10 IN, 8000 LB	53.83
CWIP	**Material**	201810	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	39.95
CWIP	**Material**	201810	CABLE, BARE, ANNEALED, #2 AWG, 7 STR, SOFT DRAWN CU	22.82
CWIP	**Material**	201810	CABLE, INSULATED, AERIAL, AAC, TRIPLEX, 1/0 AWG, 7 STR, 600 V, W/ 1/0 AWG 7 STR ALLOY NEUTRAL, GAMMA	502.96
CWIP	**Material**	201810	CONDUIT,ELECTRICAL, 3 IN DIA, PVC, SCH 80, 2.9 IN ID, STRAIGHT	17.74
CWIP	**Material**	201810	CONDUIT,ELECTRICAL, 3 IN, 10 FT LG, PVC, SCH 40, ONE BELLED END	24.72
CWIP	**Material**	201810	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	244.37
CWIP	**Material**	201810	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	199.05
CWIP	**Material**	201810	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	8,618.87
CWIP	**Material**	201810	CROSSARM, DISTRIBUTION, DEADEND, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET AND HARDWARE,	575.58
CWIP	**Material**	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	536.05
CWIP	**Material**	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 5 FT-7 IN LG, W/ CENTER MOUNT BRACKET AND HARDWAR	392.14
CWIP	**Material**	201810	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	1,129.67
CWIP	**Material**	201810	CUTOUT, FUSE, OPEN, 100 A, 12 KA INTERRUPTING CURRENT ASYMMETRICAL, 25 KV, 150 KV BIL, W/ LOADBUSTER	271.12
CWIP	**Material**	201810	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	32.29
CWIP	**Material**	201810	HOLDER,SIGN, MOLDED, 10 POSITIONS, VERTICAL, #2, 1-5/8 X 26-1/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	9.79
CWIP	**Material**	201810	JP MORGAN CHASE BANK	63.95
CWIP	**Material**	201810	POLE, 40 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	1,429.50
CWIP	**Material**	201810	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	2,303.60
CWIP	**Material**	201810	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	21,280.46
CWIP	**Material**	201810	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	80.86
CWIP	**Material**	201810	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	(462.07)
CWIP	**Material**	201810	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 1/0 ACSR, 0.368-0.460 IN DIA, AIR, W/ LOADBUSTE	(5,704.24)
CWIP	**Material**	201810	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	4,591.46
CWIP	**Material**	201811		(66.10)
CWIP	**Material**	201811	BASE,MOUNTING, ANTENNA, 3/4 IN, METAL, ROOF TOP, ASP LOW PROFILE, W/ CABLE	125.78
CWIP	**Material**	201811	BASE,MOUNTING, ANTENNA, Laird Technologies - 4G/3G Multiband Phantom Antenna Black NMO	234.34
CWIP	**Material**	201811	BRACKET, CUTOUT AND ARRESTER, 12 IN, FIBERGLASS, FERR / ALUM FITTINGS W/ MOUNTING BOLTS	35.39
CWIP	**Material**	201811	CABLE ASSEMBLY, COMMUNICATION, Serial DB9 Serial Ext Cable, (DB9 M/F), 6-ft	105.82
CWIP	**Material**	201811	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	47.47
CWIP	**Material**	201811	CONDUIT,ELECTRICAL, FLEXIBLE, LIQUIDTIGHT, 1/2 IN DIA, CS/PVC, GRAY, PACKAGE: 100 FT PER BOX	19.10
CWIP	**Material**	201811	CONNECTOR,COMPRESSION, DOUBLE CRIMP, SMA, Male Crimp, RG58, 58A, 58C, 141, 141A	37.29
CWIP	**Material**	201811	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	176.91
CWIP	**Material**	201811	CONNECTOR,WEDGE TAP, IN-LINE DISCONNECT SWITCH, 1/0, 4/0 AWG, 477, REPLACEMENT C-MEMBER	102.68
CWIP	**Material**	201811	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	35,726.72
CWIP	**Material**	201811	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	215.99
CWIP	**Material**	201811	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	374.61

FERC Account	Cost Element Category	Month Number	Description	Sum of amount
CWIP	Material	201811	CUTOUT, FUSE, OPEN, 100 A, 12 KA INTERRUPTING CURRENT ASYMMETRICAL, 25 KV, 150 KV BIL, W/ LOADBUSTER	690.57
CWIP	Material	201811	FUSEHOLDER, DELUXE BLADE, 10 GA HEAVY DUTY WIRE LEADS	21.94
CWIP	Material	201811	GRAYBAR ELECTRIC COMPANY INC	(3.46)
CWIP	Material	201811	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	22.03
CWIP	Material	201811	JP MORGAN CHASE BANK	54.37
CWIP	Material	201811	RECLOSER, VACUUM, SOLID DIELECTRIC, 13.8/13.2 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/SS JUNC BOX, LO	41,882.20
CWIP	Material	201811	RECLOSER, VACUUM, SOLID DIELECTRIC, 22.9 KV, 800 A CONTINUOUS, 12.5 KA, 3 PH, W/ SS JUNCTION BOX, RA	42,616.74
CWIP	Material	201811	SWITCH,DISCONNECT, 600 A, 40 KA MOM , 25 KV, 125 KV BIL , 1 PH, AIR, VERTICAL MOUNT, W/ LOADBUSTER H	2,302.64
CWIP	Material	201811	SWITCH,DISCONNECT, IN LINE, 900 A CONTINUOUS, 35 KV, 200 KV BIL , 336.4 AAC STD, ACSR (18/1) (26/7),	6,992.66
CWIP	Material	201811	TERMINAL, 35 W X 7.5 H, DIN RAIL PERFORATED	1.19
CWIP	Material	201811	TESSCO INC	3.42
CWIP	Material	201812		1.02
CWIP	Material	201812	CONDUIT,ELECTRICAL, 4 IN, 10 FT LG, PVC, SCH 40, BELLED END	142.13
CWIP	Material	201812	CONNECTOR,STUD, 2 HOLE NEMA PAD, 600 A, CU BRONZE, FOR SWITCHES AND DISCONNECTS, FINISH: TIN PLATED	33.42
CWIP	Material	201812	CONTROL,RECLOSER, CLOSING COIL, LOW VOLTAGE, ELECTRONICALLY, LOOP SCHEME, W/ SCADA READY, TYPE: FORM	8,931.68
CWIP	Material	201812	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 10 FT LG , W/ CENTER MOUNT BRACKET, FIBERGLASS, 4	217.92
CWIP	Material	201812	CROSSARM, DISTRIBUTION, TANGENT, 3-5/8 X 4-5/8 IN, 8 FT LG, W/ CENTER MOUNT BRACKET AND HARDWARE, FI	284.15
CWIP	Material	201812	CUTOUT, FUSE, OPEN, 100 A, 12 KA INTERRUPTING CURRENT ASYMMETRICAL, 25 KV, 150 KV BIL, W/ LOADBUSTER	76.95
CWIP	Material	201812	HOLDER,SIGN, 15 POSITIONS, VERTICAL, #2, 1-1/2 X 38-3/4 IN, AL, W/ 2-1/4 X 1/2 IN NUTS/BOLTS	10.53
CWIP	Material	201812	JP MORGAN CHASE BANK	69.84
CWIP	Material	201812	POLE, 45 FT LG, CLASS 2, SOUTHREN YELLOW PINE, CCA TREATED	979.60
CWIP	Material	201812	RADIO, MOBILE, SIERRA WIRELESS, AIRLINK RV50 MODEM	4,084.87
CWIP	Material	201812	SHIELD, POLE RISER, 4 IN, 10 FT LG, PVC, FOR RECLOSER AND RISER	85.67
CWIP	Material	201812	TESSCO INC	13.08
CWIP	**Material Total**			**603,085.17**
CWIP	Other	201808		42.03
CWIP	Other	201809		431.28
CWIP	Other	201810		(164,402.92)
CWIP	Other	201811		(115,140.94)
CWIP	Other	201811	0124822 - 1157 NORTH WESTFIELD ST AGAWAM	28,228.41
CWIP	Other	201811	0124822 - N WESTFIELD ST AGAWAM	4,900.14
CWIP	Other	201812		(320,310.24)
CWIP	Other	201812	0124822 - 1157 NORTH WESTFIELD ST AGAWAM	(28,228.41)
CWIP	Other	201812	0124822 - N WESTFIELD ST AGAWAM	(4,900.14)
CWIP	Other	201812	JP MORGAN CHASE BANK	277.79
CWIP	**Other Total**			**(599,103.00)**
CWIP Total				**486,230.37**
Cost of Removal	Contractor	201810	0124017 - BURKE UVL NORTH WEST ST	899.04
Cost of Removal	Contractor	201810	0124017 - BURKE UVL NORTH WESTFIELD ST	2,573.27
Cost of Removal	Contractor	201811		19.47
Cost of Removal	Contractor	201811	0124017 - BURKE UVL NORTH WEST ST	(899.04)
Cost of Removal	Contractor	201811	0124017 - BURKE UVL NORTH WESTFIELD ST	(2,573.27)
Cost of Removal	Contractor	201811	DANIEL BURKE ELECTRICAL	6,277.73
Cost of Removal	Contractor	201811	TRC ENGINEERS LLC	874.31
Cost of Removal	Contractor	201812		1,835.36
Cost of Removal	Contractor	201812	Accrual	340.27
Cost of Removal	Contractor	201812	ASPLUNDH TREE EXPERT CO	8.89
Cost of Removal	Contractor	201812	DANIEL BURKE ELECTRICAL	3,443.77
Cost of Removal	**Contractor Total**			**12,799.80**
Cost of Removal	Indirect/Overheads	201808		11.29
Cost of Removal	Indirect/Overheads	201809		1,937.08
Cost of Removal	Indirect/Overheads	201810		5,321.02
Cost of Removal	Indirect/Overheads	201811		3,671.29
Cost of Removal	Indirect/Overheads	201812		342.71
Cost of Removal	**Indirect/Overheads Total**			**11,283.39**
Cost of Removal	Labor	201808		6.05
Cost of Removal	Labor	201809		1,106.90
Cost of Removal	Labor	201810		1,400.02
Cost of Removal	Labor	201811		327.60
Cost of Removal	Labor	201812		165.27
Cost of Removal	**Labor Total**			**3,005.84**
Cost of Removal	Other	201809		1.14
Cost of Removal	Other	201811		0.77
Cost of Removal	Other	201811	0124822 - 1157 NORTH WESTFIELD ST AGAWAM	3,443.77
Cost of Removal	Other	201812		2.03
Cost of Removal	Other	201812	0124822 - 1157 NORTH WESTFIELD ST AGAWAM	(3,443.77)
Cost of Removal	**Other Total**			**3.94**
Cost of Removal Total				**27,092.97**
Grand Total				**1,446,158.03**

INVOICE

September 2, 2018

Invoice Number: NU1796

NORTHEAST UTILITIES
PO Box 5017
Hartford, CT 06102-5017

Alan Spaulding
143 Chestnut Hill Road
Colchester, CT 06415
(860) 796-8216

CONTACT: Jon Higgins
PO: 02245232

CLIENT: Haley Dunn/Strategic Communications

CCC	CE	Field Work Order			%
255	S28	21GEEVMA	21		80
245	S28	41GEEVMA	41		20

Quantity	Description	Date	Tax	Rate	Total
[redacted]	EV Press Conference - Prep and Event Audio setup/Photos/Video	8/29/18	N/A	[redacted]	
				SUBTOTAL	$600.00
				TOTAL DUE	**$600.00**

TERMS: NET 10 DAYS FOR 1% DISCOUNT Make checks payable to: Alan Spaulding

THANK YOU!

Boathouse Group, Inc
260 Charles Street
4th Floor
Waltham, MA 02453
p 781 663 6600
f 781 207 8155

Invoice

Invoice #	3501469
Invoice Date	4/27/2018
Due Date	5/27/2018

Bill To
Accounts Payable
Eversource
PO Box 5017
Hartford CT 06141-5017
United States

Project No.	322311
Project Manager	Bob Parks
Payment Terms	Net 30
Purchase Order #	

Project Name 322311 EVS 2018 Electric Vehicles Program Naming (AWC)

Description
PO #: Energy Efficiency Marketing
Client: Jen Gray

This invoice reflects the actual agency fee for the 2018 Electric Vehicles Naming Convention

Item	Amount
Agency Fee	$8,500.00
Total	$8,500.00

Check Payment Remit To:
Boathouse Group, Inc
260 Charles St., 4th Floor
Waltham, MA 02453

Wire Payments Remit To:
Belmont Savings Bank
2 Leonard St., Belmont, MA 02478
Account # [redacted]
Routing #
EIN #

DAVEY
RESOURCE GROUP
An Operating Division of the
The Davey Tree Expert Company

The Davey Resource Group
295 S. Water St. Ste. 300
Kent, Ohio 44240
Phone: 330-673-5685
Fax: 330-673-0860

INVOICE

INVOICE #:
912880795

DATE:
07/27/2018

CLIENT NO
7095883

Contract #: 71625

BILL TO:
Eversource Energy Services Accounts Payable PO Box 2915 Hartford, CT. 06104

July 2018

Invoice Summary

Description	Quantity	Cost	Extended Cost
Project kick off meetings, setup, configuration	[redacted]		
Pole / Equipment Verification (per pole)			
Transformer / Parcel Link (per service location)			
Phase Identification (per circuit)			
Primary / Secondary Distribution Connectivity (per pole)			
Service Point Connectivity (per service location)			
		TOTAL	**$30,297.16**

REMIT PAYMENT TO:

Davey Resource Group
P.O. Box 74142
Cleveland, Ohio 44194-4142
(330) 673-5685, Ext. 8051

DUE UPON RECEIPT

DAVEY RESOURCE GROUP
An Operating Division of the The Davey Tree Expert Company

The Davey Resource Group
295 S. Water St. Ste. 300
Kent, Ohio 44240
Phone: 330-673-5685
Fax: 330-673-0860

INVOICE

INVOICE #:
912990547

DATE:
08/24/2018

CLIENT NO
7095883

Contract #: 71625

BILL TO:
Eversource Energy Services Accounts Payable PO Box 2915 Hartford, CT. 06104

August 2018

Invoice Summary

Description	Quantity	Cost	Extended Cost
Additional Calculated Attributes Adder	[redacted]		
Pole / Equipment Verification (per pole)			
Transformer / Parcel Link (per service location)			
Phase Identification (per circuit)			
Primary / Secondary Distribution Connectivity (per pole)			
Service Point Connectivity (per service location)			
Doublewood			
Phase Stencils			
		TOTAL	**$74,766.15**

REMIT PAYMENT TO:

Davey Resource Group
P.O. Box 74142
Cleveland, Ohio 44194-4142
(330) 673-5685, Ext. 8051

DUE UPON RECEIPT

Please include Invoice Number on payment

REDACTED

7850K
OR
RJJ
11/20/18

DAVEY RESOURCE GROUP
An Operating Division of the The Davey Tree Expert Company

The Davey Resource Group
295 S. Water St. Ste. 300
Kent, Ohio 44240
Phone: 330-673-5685
Fax: 330-673-0860

INVOICE

INVOICE #:
913110221

DATE:
09/28/2018

CLIENT NO
7095883

Contract #: 71625

BILL TO:
Eversource Energy Services Accounts Payable PO Box 2915 Hartford, CT. 06104

September 2018

Invoice Summary

Description	Quantity	Cost	Extended Cost
Database Rebuild Hours (approved on 9/18/18)	[redacted]		
Transformer External Fuse Set-Up Fee (approved on 9/25/18)			
Transformer External Fuse Collections on pilot circuits (approved on 9/25/18)			
Pole / Equipment Verification (per pole)			
Transformer / Parcel Link (per service location)			
Phase Identification (per circuit)			
Primary / Secondary Distribution Connectivity (per pole)			
Service Point Connectivity (per service location)			
Doublewood			
Phase Stencils			
Transformer External Fuse			
		TOTAL	**$273,204.02**

REMIT PAYMENT TO:

Davey Resource Group
P.O. Box 74142
Cleveland, Ohio 44194-4142
(330) 673-5685, Ext. 8051

DUE UPON RECEIPT

Please include Invoice Number on payment

REDACTED

$5ck
OR
RJ
11/20/18

DAVEY RESOURCE GROUP
An Operating Division of the The Davey Tree Expert Company

The Davey Resource Group
295 S. Water St. Ste. 300
Kent, Ohio 44240
Phone: 330-673-5685
Fax: 330-673-0860

INVOICE

INVOICE #:
913185441

DATE:
10/26/2018

CLIENT NO
7095883

Contract #: 71625

BILL TO:
Eversource Energy Services Accounts Payable PO Box 2915 Hartford, CT. 06104

October 2018

Invoice Summary

Description	Quantity	Cost	Extended Cost
Pole / Equipment Verification (per pole)	[redacted]		
Transformer / Parcel Link (per service location)			
Phase Identification (per circuit)			
Primary / Secondary Distribution Connectivity (per pole)			
Service Point Connectivity (per service location)			
Doublewood			
Transformer External Fuse			
		TOTAL	**$328,000.23**

REMIT PAYMENT TO:

Davey Resource Group
P.O. Box 74142
Cleveland, Ohio 44194-4142
(330) 673-5685, Ext. 8051

DUE UPON RECEIPT

Please include Invoice Number on payment

Jeff Lin LLC

264 Giants Neck Road
Niantic, CT 06357
Phone: 860-674-8006
Fax: 860-677-1989
jeff@jefflin.com

Invoice

JEFF LIN LLC

Bill To
Eversource Ellen Rosenthal 107 Selden Street Berlin, CT 06037

Date	Invoice #
4/10/2018	2708
P.O. No.	**Terms**
02222863 Release # 00002	Net 30

Quantity	Description	Rate	Amount
[redacted]	Eversource 2018 Electric Vehicle installation Informational Graphic 4/5/0218 Design fee @ [redacted] 4/9/2018 Design fee @ 4/10/2018 Design fee @ 4/17/2018 Design fee @ Stock photo - Illustrations	[redacted]	
	Invoice Total		$1,437.50
	Payments/Credits		$0.00
	Balance Due		$1,437.50

Thank you for your prompt payment.

Jeff Lin LLC

264 Giants Neck Road
Niantic, CT 06357
Phone: 860-674-8006
Fax: 860-677-1989
jeff@jefflin.com

Invoice

JEFF LIN LLC

Bill To
Eversource Ellen Rosenthal 107 Selden Street Berlin, CT 06037

Date	Invoice #
7/9/2018	2713
P.O. No.	**Terms**
222863 Release # 00002	Net 30

Quantity	Description	Rate	Amount
[redacted]	Electric Vehicle Program - sell sheet Reference number 84011 Concept writing/design sell sheet Develop overall theme line for Electric Vehicle launch program FAQ Fact sheet 5/16-17/2018 Design fee - Initial designs 5/17/2018 Copy writing fee - headlines and concepts 5/24/2018 Copy Writing fee - fact sheet copy - rewrite 5/18/2018 Design fee - Update designs version 2 5/24/2018 Design fee - Update designs version 3 5/25/2018 Design fee - Update designs version 4-5 6/21/2018 Design fee Update new copy and design sell sheet 6/18/2018 Design fee FAQ fact sheet	[redacted]	[redacted]

Invoice Total	$4,167.50
Payments/Credits	$0.00
Balance Due	$4,167.50

Thank you for your prompt payment.

Jeff Lin LLC
264 Giants Neck Road
Niantic, CT 06357
Phone: 860-674-8006
Fax: 860-677-1989
jeff@jefflin.com

Invoice

JEFF LIN LLC

Bill To
Eversource Ellen Rosenthal 107 Selden Street Berlin, CT 06037

Date	Invoice #
7/9/2018	2715
P.O. No.	**Terms**
02222863 Release # 00002	Net 30

Quantity	Description	Rate	Amount
	RUSH - EV Support Documents - Roadmap sell sheet Refernce Nunmbe: 84011		
[redacted]	[redacted]/17/2018 Design fee Illustrations and design [redacted]/23/2018 Design fee [redacted]/24-25 Design fee	[redacted]	[redacted]
	Invoice Total		$1,092.50
	Payments/Credits		$0.00
	Balance Due		$1,092.50

Thank you for your prompt payment.

The Hired Pens, Inc.

We choose your words carefully

INVOICE

Eversource Energy Service Co.
P.O. Box 5017
Hartford, CT 06102-5017

Date: July 11, 2018

Invoice No.: EES10

Purchase Order No.: 02279198

Tax ID No.: on file

Description:

- Copywriting services for energy efficiency programs
- Dates: May 1, 2018 to July 6, 2018
- Program manager: Ellen Rosenthal

#25 Demand Response sell sheets [redacted] hrs. at [redacted] hrs. at [redacted]
#27 Collateral for electric vehicle charging stations [redacted] hrs. at [redacted]

Total Due: **$1,763**

Payment due within 15 days of receipt.

Please make check payable to "The Hired Pens, Inc." and send to:

Dan O'Sullivan
The Hired Pens
10 Morrison Place
Somerville, MA 02144

Thank you,
Dan O'Sullivan

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

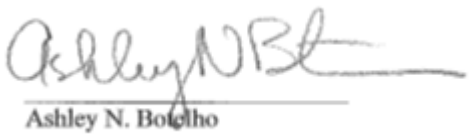
NSTAR Electric Company d/b/a Eversource Energy 2018 Grid Modernization Plan Cost Recovery Filing	)	D.P.U. 19-23

AFFIDAVIT OF ASHLEY N. BOTELHO

Ashley N. Botelho does hereby depose and say as follows:

I, Ashley N. Botelho, 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 2019.



Ashley N. Botelho

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF PUBLIC UTILITIES

NSTAR Electric Company d/b/a Eversource Energy 2018 Grid Modernization Plan Cost Recovery Filing	)	D.P.U. 19-23

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 2019.

John G. Griffin