Massachusetts Electric Company
Nantucket Electric Company
d/b/a
National Grid

Petition to Offer Optional Electric Vehicle Time-of-Use Rates

Testimony and Exhibits of:

Achyut Shrestha
Scott M. McCabe

August 11, 2023

Docket No. D.P.U. 23-85

Submitted to:
Massachusetts Department of Public Utilities

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nationalgrid

Exhibits

Exhibit NG-1	Pre-Filed Joint Testimony of Achyut Shrestha and Scott M. McCabe
Exhibit NG-2	Illustrative Electric Vehicle Time-of-Use Rate Design
Exhibit NG-3	Illustrative Optional Electric Vehicle Time-of-Use EV Retail Delivery Service Tariff
Exhibit NG-4	Illustrative EV-1 Bill Impact

Exhibit NG-1
Testimony of
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Exhibit NG-1

Pre-filed Joint Testimony of

Achyut Shrestha and Scott M. McCabe

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I. INTRODUCTION

Q. Mr. Shrestha, please state your name and business address, by whom are you employed, and in what position.

A. My name is Achyut Shrestha. My business address is 170 Data Drive, Waltham, MA, 02451. I am a Lead Analyst in the U.S. Regulatory Strategy group at National Grid USA Service Company, Inc. ("National Grid"). In this role, I support development and implementation of regulatory strategy related to various topics in clean energy for Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid (the "Company").

Q. Please describe your education and professional background.

A. I joined the Company in August 2022. Prior to working for National Grid, I was employed at Florida Power and Light ("FPL") as a Principal Analyst where I provided regulatory support for approval of several noteworthy projects including approval of FPL's rate case, community solar program, storm cost recovery filings, and investments in storm hardening and resiliency. Prior to FPL, I worked as a Project Manager at NC Clean Energy Technology Center, where I was the Principal Investigator for the U.S. Department of Energy funded *Community Solar for the Southeast* project that provided technical assistance to municipal utilities and electric cooperatives to develop solar plus storage community solar projects.

I have a Bachelor of Arts degree in Physics from Hampshire College, a Master of Energy Regulation and Law from Vermont Law School, and Graduate Certificate in Finance from North Carolina State University.

Q. Have you previously testified before the Department of Public Utilities (the "Department")?

A. No, I have not. This is my first time testifying before the Department.

Q. Mr. McCabe, please state your name and business address, by whom are you employed, and in what position.

A. My name is Scott M. McCabe. My business address is 170 Data Drive, Waltham, MA, 02451. I am the Manager of New England Electric Pricing within the New England Regulatory and Pricing department of National Grid. The New England Pricing group provides rate-related support to the Company.

Q. Please describe your education and professional background.

A. In 1991, I graduated from Bowdoin College in Brunswick, Maine with a Bachelor of Arts degree in Economics and Government and Legal Studies. From 1991 to 1999, I was employed by Bay State Gas Company ("Bay State Gas"), where I held several positions. In 1991, began my employment at Bay State Gas as an intern for the Marketing and Sales Group and was promoted to Associate Planning Analyst for the same group in January 1993. In August 1993, I joined the Demand Side Management ("DSM") department as a program manager responsible for the implementation of Bay State Gas's commercial and multifamily DSM programs.

In August 1996, I joined EnergyUSA, an unregulated affiliate of Bay State Gas, as a Senior Financial Analyst. In December 1997, I was promoted to Manager of Product Support. In January 1999, I rejoined Bay State Gas as Revenue Control and Analysis Supervisor. From May 1999 through April 2001, I worked for the Massachusetts Technology Collaborative as Project Manager for the Massachusetts Renewable Energy Trust. In April 2001, I joined National Grid USA as Senior Analyst in the Energy Efficiency Services Group. I transferred to the Regulation and Pricing Department in October 2002. In July 2008, I was promoted to Principal Analyst and in July 2013 became a Principal Program Manager. In May 2014, I was promoted to my current position.

Q. Have you previously testified before the Department?

A. Yes, I have previously before the Department on numerous occasions in support of various rate-related issues. Most recently, I testified in D.P.U 21-91 in support of the Company's approved Demand Charge Alternative EV Pricing proposal.

II. PURPOSE OF TESTIMONY

Q. Please describe the purpose of your testimony.

A. Our testimony is offered in support of the Company's filing in compliance with Chapter 179 of the Acts of 2022, An Act Driving Clean Energy and Offshore Wind ("Clean Energy Act"). Our testimony describes the Company's proposal for an optional electric vehicle time-of-use ("TOU") rate that will be available to residential and small commercial customers. The rates described in this proposal

should be considered illustrative and developed for the purpose of meeting this compliance requirement. Our testimony also discusses the technical and implementation considerations facing the Company as it transitions to more advanced metering and billing systems that will further enable advanced rate design options with benefits for electric vehicle charging. The implementation timeline should allow the Department sufficient time over the next several years to more thoroughly investigate how the distribution companies can design even more effective rate options for customers to charge electric vehicles and use electricity during optimal periods, as discussed in the next section of our testimony.

Q. Are you providing any exhibits in support of your testimony?

A. Yes. In this proceeding, we are sponsoring the following exhibits in support of the Company's proposal:

Table 1. List of Exhibits

Exhibit	Description
Exhibit NG-1	Testimony of Achyut Shrestha and Scott M. McCabe
Exhibit NG-2	Illustrative EV TOU Rate Design
Exhibit NG-3	Illustrative Optional Electric Vehicle Time-of-Use EV Retail Delivery Service Tariff
Exhibit NG-4	Illustrative EV-1 Bill Impact

Q. Please provide background on the Clean Energy Act as it relates to the proposal herein.

A. On August 11, 2022, Governor Baker signed into law the Clean Energy Act. Section 90 of the Clean Energy Act ("Section 90") requires each electric

distribution company ("EDC") to file a proposal for a TOU rate that is designed to reflect the cost of providing electricity to a consumer charging an electric vehicle at an electric vehicle charging station or Electric Vehicle Supply Equipment ("EVSE") at different times of the day. Section 90 states that the proposal should not include additional demand charges and must be made available on an opt-in basis for residential customers with electric vehicles. In evaluating the proposals, Section 90 provides that the Department must consider the effect of the proposal on- (i) energy conservation; (ii) optimal and efficient use of a distribution company's facilities and resources; (iii) benefits to transmission and distribution systems; (iv) equitable rates for electric consumers; and (v) greenhouse gas emissions reductions.

Pursuant to this statutory provision, the Company proposes a framework for a new optional time-of-use rate for customers to charge electric vehicles. This optional time-of-use rate encourages more efficient use of the electric system by offering supply and distribution rate components that better reflect the cost of providing electricity at different times of the day.

III. POLICY CONSIDERATIONS

Q. How does the Company's proposal relate to other ongoing or anticipated proceedings to advance innovative rate designs?

A. The Company recognizes that the Department has expressed its intention to examine issues related to Basic Service time-varying rates ("TVR') in phase two of

the ongoing Basic Service investigation, D.P.U. 23-50, and has also expressed an intention to open an investigation into TVR for delivery (D.P.U. 21-80-B/21-81-B/21-82-B, at 327 n.136.) In addition, the EDCs are required to submit their first Electric Sector Modernization Plans to the Grid Modernization Advisory Council by September 1, 2023, and file their final Plans with the Department by January 29, 2024. The Company believes that any AMI-enabled rates should be informed by those proceedings, rather than advanced through this specific proceeding. In addition, the EDCs are currently engaged in the AMI stakeholder process (through the D.P.U. 21-80/21-81/21-82 proceeding) to inform the availability of TVR for competitive supply customers.

Q. What other considerations should inform the Department's perspectives on time-varying rates?

A. The investigations referenced above provide an opportunity to consider how innovative rates enabled by AMI can most effectively encourage efficient use of the system to limit growth in network costs and to support the Commonwealth's decarbonization objectives. The current flat volumetric delivery rates are not aligned with either objective because they are not reflective of a customer's contribution to total system costs. For example, customers with high volumetric consumption, such as from EV charging, but lower than average peak demands, will face higher delivery bills than customers with lower consumption and higher than average peak demands though they contribute less to delivery system costs.

By increasing customers' delivery costs with incremental usage regardless of incremental demand on the system, volumetric delivery rates can discourage adoption of end uses such as EV charging and heat electrification. Further, volumetric delivery rates do not provide sufficient price signals for management of customer's total electric load, which will become increasingly important as electrification of both heating and transportation expands. While time-varying delivery rates improve upon existing flat rates in this regard, AMI offers opportunities to go much further in introducing delivery rates that capture contributions to costs while reducing artificial disincentives for electric heat and transportation.

Additionally, end-use-specific rates have the potential for significant inefficiencies. The Company expects that EV owners will likely adopt technologies, such as distributed solar, energy storage, or heat pumps. Offering customers a host of end-use-specific rates would unnecessarily cause significant customer confusion as well as implementation and administrative challenges. Rate designs should instead reflect the drivers of system costs and be offered to all customers in order to drive efficient investment in beneficial technologies and behaviors.

Q. What is the role of load disaggregation in implementing electric vehicle time-of-use rates?

A. In D.P.U. 21-80-B/21-81-B/21-82-B (at 234), the Department suggested that load disaggregation could be the basis for implementing proposed electric vehicle time

of use rates thereby eliminating the need for the Company to install more than one AMI meter at a customer's location. The Company will offer load disaggregation to enhance customer engagement and education, however, at this time, we do not believe that the data provided through load disaggregation would be suitable for billing purposes. The Company recommends that the Department convene a technical session at an appropriate time in the future to consider the potential technology options for the implementation of electric vehicle time-of-use rates.

IV. PROPOSED RATE EV-1

Q. Please summarize the Company's proposal in response to Section 90.

A. Although the Company recommends that the Department develop proposals for AMI-enabled rates more holistically as noted above, the Company is proposing Rate EV-1 as required by Section 90, which would employ a TOU rate design, not include a demand charge, and be available to certain residential and commercial EV charging sites on an opt-in basis. The rate is designed to encourage customers to shift the electric load to off-peak hours when the electric system may be less constrained. In doing so, customers may be able to take advantage of bill savings.

Q. What is the timeframe the Company envisions for the implementation of Rate EV-1?

A. As noted in more detail in Section VIII, the Company will have the capability to offer TOU rates after the Company implements a new Meter Data Management System ("MDMS"), and deploys its AMI communications network, supporting

back-office systems and AMI meters.

Q. How are these proposed rates different than the Company's Demand Charge Alternative rates approved in D.P.U. 21-91?

A. In D.P.U. 21-91, the Company proposed and received approval for Demand Charge Alternative EV Price Schedules that employ a sliding scale of demand charges at public or commercial charging sites. The Department approved these Demand Charge Alternative rates for commercial customers (G-2, and G-3) who operate public or commercial charging and it offers these customers tiered discounts on their demand charges based on the load factor of the charging station.

Q. Please summarize the proposed Rate EV-1.

A. Rate EV-1 would be available to separately metered, via technology options deemed acceptable by the Department, electric vehicle charging sites only, including separately metered charging stations in a residential home garage and small business or public charging stations that are less than or equal to 200 kW. The proposed Rate EV-1 includes a fixed monthly customer charge and volumetric TOU energy rates for distribution and Basic Service. No changes are proposed to reconciling rates and surcharges. The Company is not proposing a time-varying transmission charge at this time.

Q. Please discuss the illustrative pricing for Rate EV-1.

A. Exhibit NG - 2, Page 1, shows illustrative pricing for Rate EV-1. The illustrative distribution and Basic Service prices are also shown below and compared to Rate R-1 and Rate G-1.

Table 2. Illustrative comparison of EV-1, G-1 and R-1 rates

	Rate EV-1	Rate G-1	Rate R-1
Customer Charge	$10.00/month	$10.00/month	$7.00/[1]month
Base Distribution	$0.0797/kWh (1:00 pm – 9:00 pm weekdays) $0.0375/kWh (All other hours plus weekends & holidays)	$0.04890/kWh	$0.05575/ kWh
Basic Service	$0.20030/kWh (1:00 pm – 9:00 pm weekdays) $0.10435/kWh (All other hours plus weekends & holidays)	$0.13393/ kWh	$0.14115/kWh

Reconciling rates and surcharges (not included in the table above) would remain as currently structured and applicable to the proposed Rate EV-1 based on the General Service, Small Commercial and Industrial Retail Delivery Service Rate G-1.

[1] Note that the Customer Charge for R-1 and G-1 customers will already be included on their bill for non-EV charging load

Q. What is the proposed TOU period for Rate EV-1?

A. The Company proposes a peak period of 1:00 pm to 9:00 pm weekdays for Rate EV-1. All other hours are deemed off-peak hours including weekends and holidays. This TOU period is aligned with the Company's current Off-Peak Charging Rebate program offered for customers to charge their EVs.

Q. How did the Company arrive at its proposed TOU definition for proposed Rate EV-1?

A. The peak periods are determined based on two factors: i) the ability to reflect the system peaks observed in the Company's system; and ii) the need to offer an adequate off-peak period duration for EV charging. The peak from 1:00 pm to 9:00 pm on non-holiday weekdays reasonably accommodates recent electric system peaks and offers adequate time to charge an EV. It is important to note that the Company anticipates electric system peaks will continue to evolve with higher penetration of EV, distributed generation resources, and heat pump load. The Company will adjust the TOU peak periods in the future to ensure that the TOU peak periods are adequately reflective of the peak demand period while also considering customer needs.

Q. How often will the TOU rate will be adjusted?

A The Company will adjust the EV-1 supply rate to reflect costs for Basic Service supply received through general Basic Service procurement. The time-of-use rates

will be adjusted each time the Basic Service rate for the Commercial customer group is updated.

The base distribution component of the EV-1 rate will be updated annually based on the current Department approved schedule.

Q. Please describe the general construct for Rate EV-1.

A. The Company is proposing to collect distribution revenue through a customer charge and peak and off-peak energy rates that would be assessed to the metered kWh for each TOU period in the billing month. The EV-1 rate is designed to be revenue neutral to the Company's Rate G-1.

Q. Would the proposed Rate EV-1 base distribution rates be subject to applicable Performance Based Revenue adjustments?

A. Yes. Since the proposed Rate EV-1 is intended to be revenue neutral to the Company, it will serve to contribute to the target distribution revenue requirement as approved by the Department. The base distribution rate for Rate EV-1 would be adjusted annually for both the peak and off-peak rates in order to reflect updates to the approved target distribution revenue requirement for Rate G-1 while maintaining the same marginal cost price differential.

Q. Please describe the methodology the Company is proposing for time-differentiated Basic Service.

A. The time of use supply rate is designed to reflect the marginal cost of electricity generation at that period. The Company is proposing to time differentiate Basic

Service prices by first allocating its forecast of the Commercial customer group Basic Service energy using the shares of peak and off-peak energy use. The Commercial customer group Basic Service price is multiplied by the energy in each period to establish a preliminary revenue target. The historic average ISO-NE energy price for the proposed off-peak and peak hours is then applied to the forecast hours to derive the wholesale cost. The Forward Capacity Market ("FCM") cost is then added to the peak hour wholesale market cost. A rate for each TOU period is then calculated by scaling up the wholesale market cost to the Basic Service revenue requirement and dividing it by the forecast energy. Please see Exhibit NG-2 for the proposed calculations of the illustrative rate.

Q. Why did the Company add all of the FCM cost to the peak period?

A. The FCM is a wholesale electricity market designed to ensure sufficient capacity to meet system demand. Capacity resources are bid into an auction which sets a clearing price. All load is assigned an Installed Capacity ("ICAP") Tag based on their demand during the ISO-NE annual system peak hour. The ISO-NE system peak typically occurs in the late afternoon and falls within the window of the Company's proposed peak period. By loading FCM costs into the peak hours, the Company is able to create a greater price differential between peak and off-peak rates that is reflective of wholesale energy and capacity market costs.

Q. How would you establish the TOU Basic Service price in each supply procurement?

A. The Company would proceed with its Basic Service procurement for the Commercial customer group as approved by the Department. However, the Company would include an additional exhibit or attachment that would detail the calculation of the TOU Basic Service Price as shown in Exhibit NG-2. The Company would update the ISO-NE hourly data used in the calculation once a year in its procurement of Basic Service supply for the first half of the calendar year.

Q. How did you arrive at the peak and off-peak delivery rates for the proposed Rate EV-1?

A. The base distribution energy charge was calculated by first taking the total distribution revenue requirement minus the customer charge revenue requirement to establish a revenue target. A peak and off-peak volumetric rate was then calculated to meet this revenue target while maintaining a peak to off-peak price difference of $0.042/kWh. The Company based this price differential on the marginal distribution cost for Rate G-1 as calculated and approved in D.P.U. 18-150 which was the last time that the Company performed a marginal cost of service study.

Q. Please describe why the Company is not currently proposing a time-of-use rate for transmission charge.

A. The Company currently is not proposing a time-of-use rate for transmission charges and is offering a fixed rate, as is offered to G-1 rate customers. The Company has not yet conducted an analysis to assess an appropriate allocation of transmission costs between peak and off-peak periods. The price signal provided by the supply and distribution portions of the rate provides a sufficiently meaningful signal to encourage charging outside of peak periods. The Company is open to developing time-varying transmission charges in the future.

V. POLICY OBJECTIVES

Q. Does the Company's rate proposal meet the requirements of Section 90?

A. Yes. The Company's proposal for Rate EV-1 complies with Section 90 of the Clean Energy Act and the Department's directives in D.P.U. 21-90. The Clean Energy Act requires the Company to submit to the Department for approval a separate, opt-in residential time-of-use rate for electric vehicle owners or lessees that does not include demand charges. Rate EV-1, as proposed by the Company, fulfills this requirement as it is a non-demand TOU rate restricted to electric vehicle charging stations and available to residential customers, as well as general service customers.

Q. Please summarize what the Department must consider in evaluating the Company's proposal per Section 90.

A. The Department must consider the effect of the proposal on: (i) energy conservation; (ii) optimal and efficient use of a distribution company's facilities

and resources; (iii) benefits to transmission and distribution systems; (iv) equitable rates for electric consumers; and (v) greenhouse gas emissions reductions.

Q. What is the effect of the proposal on energy conservation?

A. The Supply portion of the rate has been constructed to reflect marginal energy and generation capacity costs and is designed to make customers more conscious of those costs and their variation during the day. This will offer a price signal for the EV customers to shift their energy usage to off-peak hours. While it is therefore expected to reduce energy use during the peak periods, there is no reason to believe it will lead to lower energy use in total. However, from the Company's perspective energy conservation in the aggregate is not an objective of this rate design.

Q. What is the effect of the proposal on the optimal and efficient use of the Company's facilities and resources?

A. As discussed earlier, the Company established time-of-use periods in consideration of system load curves. Rate EV-1 is designed with a peak period of 1:00 pm to 9:00 pm on non-holiday weekdays. EV charging load is expected to be primarily new load given that the EV marketplace is in its early stages. Consequently, the proposed peak period covers the likely range of potential system peaks across the Company's territory

Q. What is the effect of the proposal on the transmission and distribution system?

A. Congruent with the discussion of time-of-use periods above, the Company's proposed peak period encourages more optimal use of the both the transmission

and distribution system by encouraging customers to shift usage away from potential peak hours. For distribution rates, the Company utilized its marginal distribution cost to set the difference between peak and off-peak rates which should signal to customers the cost of incremental usage. The Basic Service pricing reflects hourly pricing differentials at ISO-NE including the cost of capacity which better aligns the cost of energy supply with energy markets. This serves as a more cost-reflective price signals to customers. Evidence from the Company's Off-Peak Charging Rebate Program, which uses the same peak window as proposed for Rate EV-1, has resulted in approximately 87% of EV charging to occur off-peak for participating customers.[2] While the Company is currently not offering time varying transmission rate, there is an adequate price difference to incent off-peak hour charging, which will eventually reduce the system transmission costs. By encouraging EV charging outside of the window of potential system peaks, the proposed rate will reduce the potential transmission costs associated with incremental EV charging load. As discussed in Section III, however, volumetric time-of-use delivery rates are not the optimal rate design for encouraging efficient system utilization.

Q. What is the effect of the proposal on equitable rates for customers?

A. Under existing delivery rates, customers with an electric vehicle could pay distribution costs that is in excess of their true contribution to those costs. By

[2] See D.P.U. 23-44, Exhibit NG-MM-9 Off-Peak Charging Rebate Program Evaluation, Table 5-3 and Table 5-5. See https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/17450134.

offering a more cost-reflective rate that provides an opportunity for EV drivers who charge during the off-peak period to reduce their distribution costs, this rate would reduce an inequity inherent in existing rates. It would also generally make operating an EV more affordable for participating customers. However, as the Company discusses in Section III, a broader redesign of both supply and delivery rates to be more fully cost-reflective would better support equity over the longer term, particularly as electrification of both heat and transportation expands in support of the Commonwealth's climate goals.

Q. What is the effect of the proposal on greenhouse gas emissions reduction?

A. The Company's proposal will have a modest direct impact by shifting the incremental EV load to off-peak hours thereby avoiding the use of higher emitting Peaker generation units.[3] The EV specific rate will also, in combination with other existing policy incentives, encourage adoption of more EVs in the Company's service territory and thus reduce the number of internal combustion engine vehicles that emit GHG.

VI. CUSTOMER IMPACTS

Q. Does the Company currently offer an EV specific time-varying rate or a managed charging program for residential customers?

A. Yes, the Company currently offers an Off-Peak Charging Rebate Program for residential EV customers which provides a rebate of three or five cents per kWh for

[3] Id., Section 10.

EV charging occurring during off-peak hours (9:00pm to 1:00pm on non-holiday weekdays). The Company launched the Off-Peak Rebate Charging Program in September 2020. There are approximately 3,000 residential customers currently enrolled in the program. The Company currently does not have an EV specific time-varying rate available to residential customers.

Q. How does the Company's EV-1 proposal change the availability of the Off-peak Charging Rebate Program?

A. When the EV-1 rate is available, the customers will have a choice to select between the proposed Rate EV-1 or the Off-Peak Charging Rebate Program. As directed by the Department in D.P.U. 18-150, the Department ordered that customers may not participate in duplicative off-peak bill saving programs. As the Off-Peak Charging Rebate Program and the EV-1 Rate were designed independently of each other to achieve many of the same objectives, dual participation may result in duplicative bill savings for charging during off-peak hours. Therefore, customers may not enroll in both the Off-Peak Charging Rebate program and the proposed EV-1 rate.

Q. What is the bill impact to a residential customer electing Rate EV-1?

A. While actual customer bill impacts will vary based upon their charging behavior and other factors, a typical battery electric vehicle ("BEV") that uses 400 kWh per month and is charged solely during off-peak hours will on average save up to $23 per month on EV-1 rate compared to charging on a residential R-1 rate.

VII. PROPOSED TARIFF AND TERMS OF ENROLLMENT

Q. Please describe the terms of Rate EV-1.

A. Rate EV-1 would be available to small commercial electric vehicle charging sites (metered demand is less than or equal to 200 kW) that qualify for the G-1 rate and to charging sites at a residential premise. To take service under this rate, the metered load must be attributable solely to electric vehicle charging. The rate is optional which means a customer who prefers to remain on the otherwise applicable general service rate may do so.

Q. What Basic Service prices would apply to Rate EV-1?

A. For Rate EV-1, the Company proposes to apply a TOU variant of the six-month fixed price Commercial customer group Basic Service rate.

Q. Will reconciling rate provisions and Basic Service apply?

A. All reconciling rate provisions will apply. The effective TOU Basic Service rate would apply if the customer has not chosen to receive their electric supply from a competitive supplier. Customers who select Rate EV-1 may not opt out of the TOU Basic Service price for the conventional all hours fixed Basic Service rate.

Q. Would a customer be able to opt out of TOU pricing for energy supply by electing an alternate supplier?

A. Yes. The Company has no authority over the customer's choice of pricing from an alternate supplier. Electing flat rate pricing from an alternate supplier has the effect of diluting the price signals the EV-1 rate design. Customers may limit the risk of

incurring of higher on-peak charges by choosing an alternate supplier, but also will have less opportunity to save by shifting usage to off-peak periods.

Q. What is the effective date of the proposed EV-1 Rate?

A. The Company's proposed tariff is illustrative and does not include an effective date at this time. The effective date and availability of the rate will be dependent on the timing of deployment by the Company of AMI meters and communications network, the ability of the Company's back-office systems to process the interval meter data produced by such meters, and the technology solutions available for developing revenue-quality data from EV charging. The timing of the Company's deployment of AMI as it relates to the the ultimate potential rollout of Rate EV-1 is discussed in Section VIII, below.

While the Company in theory could implement the rate in the near term with a separate meter, the Company does not believe that is a cost-effective method for implementation given that the Company is in the process of deploying AMI meters to all customers which will enable innovative rates.

VIII. COST RECOVERY AND TIMELINE FOR IMPLEMENTATION

Q. Are there administrative costs to implement Rate EV-1?

A. Yes. There will be costs associated with programming the rate into the billing system, maintaining that billing system, as well as customer outreach and education. The Company has not yet estimated the specific costs of implementing the rate, which will depend upon the timing of the rate availability and how that

relates to other potential AMI-enabled rate options. For example, the incremental cost of customer outreach for this rate may be reduced if it is combined with outreach and education for other future rates.

Q. How will the Company address any over or under collection of revenues induced by this rate?

A. Although the Company has designed this rate to be revenue neutral, customer response to new rates is inherently uncertain. Any under or overcollection of revenues would be subject to a true-up the following year. Basic Service reconciliations would also be impacted by changes in the pattern of usage. While there is no fixed revenue target for Basic Service, the Company procures energy on a fixed price basis. Aggregate customer deviation from the underlying Company's hourly profile used to develop TOU Basic Service prices will serve to create an over or under recovery of costs.

Q. How does the Company plan to recover these various costs?

A. Target revenue shortfalls associated with base distribution costs would be recovered through the Revenue Decoupling Adjustment Factor ("RDAF"). Base distribution revenue collection is reconciled annually to the base distribution revenue target and collected in the following year through the RDAF. Basic service costs are reconciled through the Basic Service Adjustment Factor and would apply to TOU-related variances as well.

Q. Please summarize the Company's timeline for implementation of proposed TOU rates.

A. The Company will have the capability to offer TOU rates after the Company's new Meter Data Management System ("MDMS") and AMI communications network, supporting back office systems and meters are deployed. Back-office work for AMI deployment is set to commence in September of 2023. The deployment of AMI meters is expected to be completed by the end of the year 2027.

Implementation of a new MDMS is expected to be completed in the first half of 2025. At that point, the Company will begin an approximately three-year roll-out of AMI meter installations. The AMI network deployment would commence approximately six months ahead of planned installations. The Company anticipates waiting one year after the first AMI meters are installed before offering any approved TOU rates to customers to ensure a suitable penetration of AMI meter installations.

VIII. CONCLUSION

Q. Does this conclude your testimony?

A. Yes, it does.

Exhibit NG-2
Illustrative EV TOU
Rate Design

Exhibit NG-2

Illustrative Electric Vehicle Time of Use Rate Design

Illustrative EV TOU Pricing
Basic Service Charge
May 2023 through October 2023

Line No.	TOU Period	Projected Commercial Basic Service kWh	Percentage Use in Period	Fixed Standard Basic Service Rate ($/kWh)	Basic Service Revenue ($)	Average ISO-NE Energy Price ($/MWh)	Unadj. TOU Energy Revenue ($)	Capacity Cost ($)	Total Unadj. TOU Revenue ($)	Reconciliation Factor	Illustrative Basic Supply TOU Rates ($/kWh)	Total Adj. TOU Revenue ($)	Revenue Change (%)
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
1	Off Peak	271,647,956	73.1%	$0.13020	$35,368,564	$74.58	$20,259,784	$0	$20,259,784	1.40	$0.10435	$28,346,442	-20%
2	On Peak	100,169,991	26.9%	$0.13020	$13,042,133	$99.90	$10,006,841	$4,333,495	$14,340,335	1.40	$0.20030	$20,064,255	54%
3	Total	371,817,947	100.0%	$0.13020	$48,410,697	$81.40	$30,266,625	$4,333,495	$34,600,119	1.40	$0.13020	$48,410,697	0%
4													
5													
6	Notes:												
7	Col. (b) =	Col. (c) * Col. (b), Line 3; Commercial Basic Service kWhs (Source D.PU. 23-BSF-D1)											
8	Col. (c) =	Percentage of Commercial Load during Peak and Off-Peak Periods											
9	Col. (d) =	Base Basic Service Fixed Rate for Commercial											
10	Col. (e) =	Col. (b) * Col. (d)											
11	Col. (f) =	Weighted Average 2022 ISO-NE Costs for Peak and Off-Peak periods											
12	Col. (g) =	Col. (b) / 1000 * Col. (f)											
13	Col. (h) =	Estimated Capacity costs for Commercial customers assigned to Peak periods											
14	Col. (i) =	Col. (g) + Col. (h)											
15	Col. (j) =	Col. (e) Total / Col. (i) Total											
16	Col. (k) =	Col. (i) * Col. (j) / Col. (b)											
17	Col. (l) =	Col. (b) * Col. (k)											
18	Col. (m) =	Col. (l) / Col. (e) - 1											

Illustrative EV TOU Pricing
Base Distribution

Line No.		Base Distribution Revenue ($)	Billing Units (kWh)	Percentage Use in Period	Base Distribution Rate ($/kWh)	MCOS ($/kWh)	Adjusted TOU Recovery ($)	Illustrative Base Distribution TOU Rate ($/kWh)	Revenue Change %
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	Off Peak	$75,882,680	1,551,793,053	73.1%	$0.0489		$58,240,448	$0.0375	-23%
2	On Peak	$27,981,685	572,222,590	26.9%	$0.0489		$45,623,917	$0.0797	63%
3		$103,864,365	2,124,015,643	100%	$0.0489	$0.042	$103,864,365	$0.0489	0%
4									
5									
6	Notes:								
7	Col. (a) =	Col (c) * Col (a), Line 3; Allocated Peak/Off-Peak Base Distribution Revenue for G-1 class (Source D.P.U. 23-55, Exhibit NG-7)							
8	Col. (b) =	Col (c) * Col (b), Line 3; Allocated Peak/Off-Peak Projected kWh usage for G-1 service class. (Source D.P.U. 23-55, Exhibit NG-7)							
9	Col. (c) =	Percentage of Commercial Load during Peak and Off-Peak Periods							
10	Col. (d) =	Col (b) / Col (a)							
11	Col. (e) =	2018 Electric Margial Cost Study for G-1 Rate Class (Source D.P.U. 18-150, Exhibit NG-MCS-12)							
12	Col. (f) =	Col (g) * Col (b); TOU Recovery with the TOU rate							
13	Col. (g) =	Adjusted TOU rate with MCOS included and revenue neutral [off-peak rate* (off-peak kWh) + (off peak rate + MCOS)*(peak kWh) = Base Distribution Revenue]							

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Exhibit NG-3
Illustrative EV TOU Tariff

Exhibit NG-3

Illustrative Optional Electric Vehicle Time-of-Use EV Retail Delivery Service Tariff

MASSACHUSETTS ELECTRIC COMPANY

OPTIONAL ELECTRIC VEHICLE TIME-OF-USE EV-1
RETAIL DELIVERY SERVICE

AVAILABILITY

Electric delivery service under this rate is available for provision of electric vehicle ("EV") charging. Charging station hosts may elect this rate if the aggregate on-site capacity of the Electric Vehicle Supply Equipment is less than or equal to 200 kilowatts.

Rate EV-1 is an optional schedule that is applicable only to EV charging station equipment which includes security lighting, networking, touch screens, component heating, charger fans and cooling equipment, of which the aggregate load must be metered separately. Any non-EV general service use must be separately metered and will be assigned the otherwise applicable general service rate.

Availability of this rate is dependent on the availability of advanced metering infrastructure as determined by the Company.

Customers receiving delivery service under this rate shall be charged the applicable charges contained in the Summary of Electric Service Rates Tariff as in effect from time to time.

MONTHLY CHARGE

The Monthly Charge will be the sum of the applicable Customer Charge and the kWh Charges.

MINIMUM CHARGE

The monthly minimum charge will be the applicable monthly Customer Charge.

PEAK AND OFF-PEAK PERIODS

Peak hours will be from 1:00 pm to 9:00 pm daily on Monday through Friday, excluding holidays.

Off-Peak hours will be all other hours including weekends and holidays

The holidays include all legal holidays observed in the Commonwealth

Billing period definitions will remain in effect for a minimum of three years from the last change in definition. The Company reserves the right to alter billing period definitions upon approval by the Department of Public Utilities.

RATE ADJUSTMENT PROVISIONS

The charges for delivery service under this rate shall be subject to adjustment pursuant to the following provisions:

Advanced Metering Infrastructure Provision
Attorney General Consultant Expenses Provision
Basic Service Adjustment Provision
Electric Vehicle Program Provision
Electronic Payment Recovery Provision
Energy Efficiency Provision
Grid Modernization Provision
Net Metering Provision
Pension/Post-retirement Benefits Other than Pension Mechanism Provision

MASSACHUSETTS ELECTRIC COMPANY

OPTIONAL ELECTRIC VEHICLE TIME-OF-USE EV-1
RETAIL DELIVERY SERVICE

Performance-Based Ratemaking Provision
Renewable Provision
Renewable Energy Recovery Provision
Residential Assistance Adjustment Provision
Revenue Decoupling Mechanism Provision
Smart Grid Adjustment Provision
SMART Provision
Solar Cost Adjustment Provision
Storm Fund Replenishment Provision
Tax Credit Provision
Transition Cost Adjustment Provision
Vegetation Management Pilot Provision

The charges for delivery service under this rate subject to adjustment pursuant to the above provisions shall be the same as the charges under the General Service Small Commercial and Industrial retail delivery service rate G-1.

TRANSMISSION SERVICE COST ADJUSTMENT

Transmission service is available to all retail customers taking service under this rate. For those customers, the transmission charge under this rate shall be calculated in accordance with the Company's Transmission Service Cost Adjustment Provision.

The charges for transmission service under this rate shall be the same as the charges for transmission service under the General Service Small Commercial and Industrial retail delivery service rate G-1.

BASIC SERVICE

Any Customer who does not have a supplier other than the Company will receive and pay the Company for Basic Service in accordance with the terms and price for Basic Service established by the Department of Public Utilities.

TERMS AND CONDITIONS

The Company's Terms and Conditions in effect from time to time, where not inconsistent with any specific provisions hereof, are a part of this rate.

Exhibit NG-4
Illustrative EV-1
Bill Impact

Exhibit NG-4

Illustrative EV-1 Bill Impact

Illustrative Bill Impacts

Rate R-1 (Residential) vs EV-1 (EV TOU)

Illustrative scenario: shift 100% of EV load to off-peak period

EV Load			Rate R-1			Rate EV-1			Rate R-1 vs Rate EV-1					
									Delivery		Supply		Total	
Monthly kWh	Peak kWh	Off Peak kWh							$	%	$	%	$	%
	0%	100%	Delivery	Supply	Total	Delivery	Supply	Total						
200	-	200	$31.15	$28.23	$59.38	$31.96	$20.87	$52.83	$0.81	1%	($7.36)	-12%	($6.55)	-11%
300	-	300	$46.73	$42.35	$89.08	$42.94	$31.31	$74.25	($3.79)	-4%	($11.04)	-12%	($14.83)	-17%
400	-	400	$62.31	$56.46	$118.77	$53.92	$41.74	$95.66	($8.39)	-7%	($14.72)	-12%	($23.11)	-19%
500	-	500	$77.89	$70.58	$148.46	$64.90	$52.18	$117.08	($12.99)	-9%	($18.40)	-12%	($31.39)	-21%
600	-	600	$93.46	$84.69	$178.15	$75.88	$62.61	$138.49	($17.58)	-10%	($22.08)	-12%	($39.66)	-22%
700	-	700	$109.04	$98.81	$207.84	$86.86	$73.05	$159.91	($22.18)	-11%	($25.76)	-12%	($47.94)	-23%
800	-	800	$124.62	$112.92	$237.54	$97.84	$83.48	$181.32	($26.78)	-11%	($29.44)	-12%	($56.22)	-24%
900	-	900	$140.19	$127.04	$267.23	$108.82	$93.92	$202.74	($31.37)	-12%	($33.12)	-12%	($64.49)	-24%
1,000	-	1,000	$155.77	$141.15	$296.92	$119.80	$104.35	$224.15	($35.97)	-12%	($36.80)	-12%	($72.77)	-25%

Rates	Rate R-1	Rate EV-1
Customer Charge*	$0.00	$10.00
Retail Delivery Energy - Peak	$0.15577	$0.15200
Retail Delivery Energy - Off Peak	$0.15577	$0.10980
Supply Energy - Peak	$0.14115	$0.20030
Supply Energy - Off Peak	$0.14115	$0.10435

*Note that Customer Charge for R-1 is set at $0 as the customer charge will be already included on the bill for non-EV charging load

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