KEOUGH + SWEENEY, LTD.

ATTORNEYS AND COUNSELORS AT LAW
41 MENDON AVENUE
PAWTUCKET, RHODE ISLAND 02861
TELEPHONE (401) 724-3600
FACSIMILE (401) 724-9909
www.keoughsweeney.com

JOSEPH A. KEOUGH JR.*
JEROME V. SWEENEY III*

SEAN P. KEOUGH*

JEROME V. SWEENEY II
OF COUNSEL

*ADMITTED TO PRACTICE IN
RHODE ISLAND & MASSACHUSETTS

RAYNHAM OFFICE:
90 NEW STATE HIGHWAY
RAYNHAM, MA 02109
TEL. (508) 822-2813
FAX (508) 822-2832

BOSTON OFFICE:
171 MILK STREET
SUITE 30
BOSTON, MA 02109
TEL. (617) 574-0054
FAX (617) 451-1914

April 25, 2018

Ms. Luly Massaro, Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

Re: Docket No. 4780 - The Narragansett Electric Co. D/B/A National Grid's Proposed Power Sector Transformation (PST) Vision And Implementation Plan

Dear Ms. Massaro:

Enclosed please find an original and nine copies of the following document:

1. Direct Testimony of Nathan Phelps on behalf of the Northeast Clean Energy Council and the Conservation Law Foundation (Exhibit NECEC-CLF-1).

Please note that an electronic copy of this document has been provided to the service list.

Thank you for your attention to this matter.

Sincerely,

Joseph A. Keough, Jr.

JAK/kf
Enclosures
cc: Docket 4780 Service List *(via electronic mail)*

STATE OF RHODE ISLAND
PUBLIC UTILITIES COMMISSION

THE NARRAGANSETT ELECTRIC	*	
COMPANY d/b/a NATIONAL GRID	*	Docket 4780
PROPOSED POWER SECTOR	*	
TRANSFORMATION (PST) VISION	*	
AND IMPLEMENTATION PLAN	*	

* * * * * * * * * * * *

DIRECT TESTIMONY

OF

NATHAN PHELPS

ON BEHALF OF
NORTHEAST CLEAN ENERGY COUNCIL (NECEC), AND
CONSERVATION LAW FOUNDATION (CLF)

April 25, 2018

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Attachment A Statement of Qualifications for Nathan Phelps

I. INTRODUCTION

Q. MR. PHELPS, PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Nathan Phelps. My address is 745 Atlantic Ave., 7th Floor, Boston, Massachusetts 02111.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I serve as the Regulatory Director for Vote Solar. In this capacity, I work on initiatives, development, and implementation of policy related to distributed generation ("DG")[1] and distributed energy resources ("DER")[2] more broadly. I also review regulatory filings, perform technical analyses, and testify in commission proceedings relating to DG.

Q. PLEASE DESCRIBE YOUR EXPERIENCE AND QUALIFICATIONS.

A. My primary focus at Vote Solar is utility regulatory issues related to DG. These regulatory issues include: the billing arrangement commonly known as net metering, rate design, rate recovery, and decoupling, primarily within restructured electricity markets in the Northeast. Prior to joining Vote Solar, I was a Senior Economist at the Massachusetts Department of Public Utilities for five years. While

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[1] DG resources include, but are not limited to, (a) photovoltaics (*a.k.a.* solar or solar electric), (b) wind, (c) micro-hydro, and (d) combined heat and power (*a.k.a.* cogeneration). DG are located closer to load than central power plants, and are mostly interconnected with the distribution system.

[2] DER technologies include, but are not limited to, (a) DG, (b) energy efficiency, (c) energy storage, (d) demand response, and (e) load shifting. DER are located on (*e.g.*, connected to) the distribution system.

at the Massachusetts Department of Public Utilities, I was the primary staff person who worked on issues related to DG and renewable energy, including net metering, interconnection, long-term contracts for renewable energy, and rate-related issues relevant to DG. Prior to joining the DPU, I was a Policy Intern with the Massachusetts Renewable Energy Trust.

I received my undergraduate degree from Willamette University in both Environmental Studies and Politics, and I attended Tufts University for graduate studies in Urban and Environmental Policy and Planning. My résumé is attached as Attachment A.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?

A. No, I have not.

Q. HAVE YOU PREVIOUSLY TESTIFIED IN OTHER STATES?

A. Yes. I have testified before the Massachusetts Department of Public Utilities, New Hampshire Public Utilities Commission and the Maryland Public Service Commission. In Massachusetts, I testified in: (a) docket D.P.U. 15-155, the most recent general rate case for the Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid; (b) docket D.P.U. 17-05, the most recent general rate case for NSTAR Electric Company and Western Massachusetts Electric Company, each d/b/a Eversource Energy; and (c) docket D.P.U. 17-140, the implementation of the Solar Massachusetts Renewable Target tariff. In New Hampshire, I testified in the Commission's proceeding to evaluate net metering,

docket DE 16-576. In Maryland, I testified in the proceeding concerning the proposed merger between Exelon Corporation and Pepco Holdings, and the general rate case of Southern Maryland Electric Cooperative, case No. 9361 and 9396 respectively. In addition to testimony, I have provided public comments in commission proceedings in Iowa, Maryland, Massachusetts, New Hampshire, New York, Oregon, and Vermont.

Q. PLEASE DESCRIBE VOTE SOLAR.

A. Vote Solar is a non-profit grassroots organization working to foster economic opportunity, promote energy independence, and fight climate change by making solar a mainstream energy resource across the United States. Since 2002, Vote Solar has engaged in state, local, and federal advocacy campaigns to remove regulatory barriers and implement key policies needed to bring solar to scale. Vote Solar is not a trade group and does not have corporate members.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING TESTIMONY?

A. I am submitting testimony on behalf of the Northeast Clean Energy Council ("NECEC") and Conservation Law Foundation ("CLF").

Q. PLEASE DESCRIBE NECEC.

A. NECEC is a clean energy business, policy and innovation organization. Its mission is to create a world-class clean energy hub in the Northeast delivering global impact with economic, energy and environmental solutions. NECEC is the only organization in the Northeast that covers all the clean energy market segments,

representing the business perspectives of investors and clean energy companies across every stage of development. Its members span the broad spectrum of the clean energy industry, including energy efficiency, demand response, wind, solar, combined heat and power, energy storage, fuel cells, and advanced and "smart" technologies. Many of its members are doing business and investing in Rhode Island, and many are interested in doing so in the future.

Q. PLEASE DESCRIBE CLF.

A. CLF is New England's leading environmental advocacy organization. Since 1966, CLF has worked to protect New England's people, natural resources and communities. CLF is a nonprofit, member-supported organization with offices throughout New England. The Rhode Island CLF office is located at 235 Promenade Street, Suite 560, Providence, RI 02908. Thanks to CLF's effective advocacy – in courtrooms, in statehouses, and in boardrooms – today Boston Harbor is the pride of the city, Georges Bank is free from oil and gas rigs, Lake Champlain's polluted waters are getting cleaner, and New England's remaining obsolete coal plants are on the verge of shutting down for good. As part of a 50-year legacy, CLF was a party in the landmark case in which the U.S. Supreme Court ruled that the U.S. Environmental Protection Agency has an obligation under the Clean Air Act to consider regulating tailpipe emissions that contribute to global warming, Massachusetts v. E.P.A., 127 S. Ct. 1438 (2007).

II. PURPOSE OF TESTIMONY AND SUMMARY OF RECOMMENDATIONS

Q. HAVE YOU REVIEWED THE TESTIMONY AND OTHER SUPPORTING DOCUMENTS SUBMITTED BY THE NARRAGANSETT ELECTRIC COMPANY D/B/A NATIONAL GRID ("COMPANY")?

A. Yes, I have.

Q. WHY HAS THE COMPANY MADE THIS FILING?

A. On March 2, 2017, Governor Raimondo submitted a letter ("Letter")[3] to the Rhode Island Public Utilities Commission ("Commission" or "PUC"), the Office of Energy Resources ("OER"), and the Division of Public Utilities and Carriers ("Division"). Governor Raimondo asked the three agencies "to collaborate in the development of a more dynamic regulatory framework that will enable Rhode Island and its utilities to advance a cleaner, more affordable, and reliable energy system for the 21st century and beyond."[4] The Letter started a collaborative process, including (1) Docket 4600, Power Sector Transformation Initiative ("PST Initiative"); (2) the Rhode Island Power Sector Transformation Phase One Report to Governor Gina M. Raimondo ("Report");[5] and (3) the Public Utilities

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3 Retrieved April 18, 2018. Available at: http://www.ripuc.org/utilityinfo/electric/GridMod_ltr.pdf

4 Letter at 1.

5 Accessed on April 18, 2018. Available at: http://www.ripuc.org/utilityinfo/electric/PST%20Report_Nov_8.pdf

Commission's Guidance on Goals, Principles and Values for Matters Involving The Narragansett Electric Company d/b/a National Grid ("Guidance Document").[6] All of this work has led to the filing by National Grid.

Q. WHAT ARE THE GOALS OF THE REPORT?

A. The Report provides three goals ("Report Goals"):

1. **Control the long-term costs of the electric system**. The regulatory framework should promote a broad range of resources to help right-size the electric system and control costs for Rhode Islanders. Today's electric system is built for peak usage. New technology provides us with more ways to meet peak demand and lower costs.
2. **Give customers more energy choices and information.** The regulatory framework should allow customers to use commercial products and services to reduce energy expenses, increase renewable energy, and increase resilience in the face of storm outages. Clean energy technologies are becoming more affordable. Our utility rules should allow customers to access solutions to manage their energy production and use.
3. **Build a flexible grid to integrate more clean energy generation.** The regulatory framework should promote the flexibility needed to incorporate more clean energy resources into the electric grid. These resources would help

[6] Accessed on April 18, 2018. Available at: http://www.ripuc.org/eventsactions/docket/4600A-GuidanceDocument-Final-Clean.pdf

Rhode Island meet the greenhouse gas emission reduction goals specified in the Resilient Rhode Island Act of 2014 and consistent with Governor Raimondo's goal of 1,000 megawatts of clean energy, equal to roughly half of Rhode Island's peak demand, by 2020.[7]

Q. DO NECEC AND CLF SUPPORT THE PST INITIATIVE AND REPORT GOALS?

A. Yes. NECEC and CLF are very supportive of the PST Initiative and the Report Goals. NECEC and CLF look forward to working with other stakeholders to help align the energy and environmental goals of the state, ratepayers, stakeholders, and National Grid in a regulatory framework that is in the public interest.

Q. WHAT ARE THE LISTED GOALS OF THE GUIDANCE DOCUMENT?

A. The Guidance Document provides goals for all PST proposals ("Guidance Document Goals"), and rate design principles. Since the Company's filing – and by extension my testimony – does not focus on rate design, I'll concentrate primarily on the Guidance Document Goals. They are:

1. Provide reliable, safe, clean, and affordable energy to Rhode Island customers over the long term (this applies to all energy use, not just regulated fuels);
2. Strengthen the Rhode Island economy, support economic competitiveness, retain and create jobs by optimizing the benefits of a modern grid and attaining appropriate rate design structures;

[7] Report at 8-9.

3. Address the challenge of climate change and other forms of pollution;
4. Prioritize and facilitate increasing customer investment in their facilities (efficiency, distributed generation, storage, responsive demand, and the electrification of vehicles and heating) where that investment provides recognizable net benefits;
5. Appropriately compensate distributed energy resources for the value they provide to the electricity system, customers, and society;
6. Appropriately charge customers for the cost they impose on the grid;
7. Appropriately compensate the distribution utility for the services it provides; and
8. Align distribution utility, customer, and policy objectives and interests through the regulatory framework, including rate design, cost recovery, and incentives.[8]

Q. DO NECEC AND CLF SUPPORT THE GUIDANCE DOCUMENT GOALS?

A. Yes. NECEC and CLF appreciate the leadership and guidance of the Commission in conducting the 4600 stakeholder process and issuing the Guidance Document. In addition, I note that the PST proposals included in the Company's filing should be evaluated in context, including how they relate to other activities and actions of the Company. Reviewing proposals in isolation – without consideration of the totality of the efforts of the utility – could lead to an inefficient and suboptimal outcome for ratepayers and Rhode Island in general.

[8] Guidance Document at 3-4.

Q. PLEASE PROVIDE AN OVERVIEW OF THE COMPANY'S FILING.

A. National Grid has proposed a Power Sector Transformation plan ("Plan") that addresses many topics. Broadly, National Grid breaks the filing into the following categories:

1. PST Initiatives
    a. Grid Modernization;
    b. Advanced Metering Functionality ("AMF");
    c. Electric Transportation Initiative;
    d. Electric Heat Initiative;
    e. Utility Owned Energy Storage; and
    f. Solar Demonstration Projects and Low-Income Customer Rewards Program.
2. Costs and Cost Recovery
    a. Performance Incentive Mechanisms;
    b. Revenue Requirement; and
    c. Cost Recovery.

The filing by National Grid addresses each of these categories. I note, however, that there is overlap between topics.

Q. DOES YOUR TESTIMONY ADDRESS ALL OF THESE TOPICS?

A. No. My testimony addresses: (1) grid modernization; (2) AMF; (3) energy storage; and (4) solar and Low-Income customers. My testimony is organized by these topics.

In addition, I note that the testimony of Ron Binz complements my testimony.[9] Mr. Binz's testimony addresses performance-based regulation, the Company's proposed performance incentive mechanisms, and cost recovery.

Q. HOW DOES THIS FILING RELATE TO THE COMPANY'S RATE CASE FILING IN DOCKET 4770?

A. National Grid originally made one filing, which was docketed as 4770. The Commission bifurcated the original filing, and moved aspects of the original filing relating to the Plan to Docket 4780.

Q. ARE ALL OF THE ISSUES IN DOCKET 4780 DISTINCT FROM THE ISSUES IN DOCKET 4770?

A. No, they are not. The two dockets overlap in both content and function. My understanding is that Docket 4770 was bifurcated for administrative efficiency, not because the PST component of the Company's filing docketed as 4780 should be considered in isolation. In practice, I assert that the two dockets cannot be considered in isolation.

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[9] Please see Direct Testimony of Ronald J. Binz, Exhibit NECEC-CLF-2.

Q. HAVE NECEC OR CLF FILED TESTIMONY IN DOCKET 4770?

A. No. To date, both organizations have not filed testimony in Docket 4770. However, some of the issues addressed in Mr. Binz's and my testimony directly relate to Docket 4770. For example, Mr. Binz discusses how PST costs should be recovered in base rates established in a performance-based regulatory framework, rather than through a separate PST cost recovery mechanism or tracker.

Q. DO NECEC AND CLF SUPPORT THE PLAN AS FILED?

A. Unfortunately, NECEC and CLF have concerns about the Plan as currently filed.

Q. HOW WILL THE PROPOSED PLAN IMPACT THE DEPLOYMENT OF DISTRIBUTED ENERGY RESOURCES IN RHODE ISLAND?

A. The deployment of DER in Rhode Island is extremely sensitive to how PST evolves in Rhode Island, and necessarily by extension the Plan. The provisions in the Plan will greatly affect the future deployment of DER in Rhode Island. For this reason, the aspects of the Plan related to DER must be evaluated with the DER-related Report Goals and the DER-related Guidance Document Goals in mind.

Q. WHAT CONCERNS DO NECEC AND CLF HAVE WITH THE PLAN?

A. NECEC and CLF have concerns with the following aspects of the Plan: (1) National Grid's proposal to separately collect the costs of the Plan from Infrastructure, Safety, and Reliability, System Reliability Procurement, and other investments that are recovered in a rate case is unnecessary, undermines integrated distribution planning, is inconsistent with the Report Goals, and is inconsistent with the

Guidance Document Goals; (2) the deployment of advanced meters in Rhode Island might be contingent on the actions of New York or Massachusetts; (3) the proposed transition to time-varying-rates will not result in optimal customer action; (4) National Grid's proposal to own behind-the-meter storage risks stunting (rather than stimulating) the growth of behind-the-meter storage in Rhode Island, and is inconsistent with the Report Goals and the Guidance Document Goals; (5) National Grid's ownership of solar will not achieve any material learning that will benefit customers and the development of a robust competitive market for solar products and services, and is inconsistent with the Report Goals and the Guidance Document Goals; and (6) there are not enough details of the Income Eligible Customer Rewards Program in order to properly evaluate the proposal.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS

A. NECEC and CLF recommend the Commission require the following: (1) the separate processes related to planning for and recovery of existing and new grid modernization costs all be combined, or at the very least closely coordinated; (2) the deployment of AMF in Rhode Island should not be contingent on deployment in other jurisdictions when the benefit/cost ratio is one or greater; (3) require National Grid to develop a more comprehensive transition plan to time-varying-rates that will maximize customer uptake, understanding, and empowerment; (4) National Grid should focus on facilitating third party and customer deployment of BTM storage, and utility procurement of energy storage should be limited to front-of-the-meter deployment; (5) National Grid has not

demonstrated that utility-owned solar is in the public interest, and the proposal should be rejected; and (6) the Income Eligible Customer Rewards Program proposal is deficient on details and impossible to evaluate at this time, and the proposal should be rejected.

III. GRID MODERNIZATION

Q. PLEASE DESCRIBE THE COMPANY'S GRID MODERNIZATION PROPOSAL.

A. The Company proposes an assortment of projects under the banner of Grid Modernization. In addition to the activities that National Grid is currently undertaking and has characterized as ongoing Grid Modernization[10], the Company is also proposing the following new Grid Modernization investment areas: (1) system data portal; (2) advanced metering functionality; (3) feeder monitoring sensors; (4) control center enhancements; (5) operational data management; (6) telecommunications; and (7) cybersecurity.[11] All of the investments involve information (*e.g.*, collecting, sharing, and analyzing information), physical grid infrastructure, and/or management technologies (*e.g.*, using information in order to most effectively operate the distribution system). The increased clarity into the usage of – and the greater control of – the distribution system will empower

[10] Power Sector Transformation Panel, Book 1 of 3, at Bates 42-43.
[11] Power Sector Transformation Panel, Book 1 of 3, at Bates 44-63.

customers and the Company to make better-informed decisions, and thereby enable DER providers to meet the needs of the ratepayers and National Grid.

Q. IS THE COMPANY'S CONCEPT OF GRID MODERNIZATION OVERLY BROAD?

A. I do not think so. I agree with the Company that "[t]he definition and scope of 'grid modernization' is broad and has implications for customers, DER providers, and the Company as grid owner and operator."[12] The Grid Modernization investments cover many aspects that cut across utility operations and functionality. For instance, the granular customer-usage information that will result from AMF will allow for different pricing structures (impacting rate design, billing, and wholesale market products procurement), operation precision (impacting control room monitoring and management, and ultimately reliability), and planning precision (impacting engineering load forecasts and analyses). Stated another way, the impacts of grid modernization will be realized in almost all aspects of the Company's operations.

Q. RECOGNIZING THE BROAD IMPACT THAT GRID MODERNIZATION HAS ON THE COMPANY'S OPERATIONS, DOES THE COMPANY'S APPROACH COMPLICATE PST IMPLEMENTATION?

A. In a way, yes. The difficulty with the Company's approach to Grid Modernization investments is not in their function, per se, but rather in the categorization of the investments. Separating Grid Modernization investments from Infrastructure,

[12] Power Sector Transformation Panel, Book 1 of 3, at Bates 40.

Safety, and Reliability ("ISR"), System Reliability Procurement ("SRP"), and other investments that are recovered in a rate case makes review, understanding, and evaluation of the Company's decision-making process unnecessarily difficult for the Commission and other parties.

Q. DO ALL OF THE COSTS NEED TO BE SEPARATED INTO THESE DIFFERENT CATEGORIES?

A. No. Separating the costs into different categories undermines integrated distribution planning, which should encompass grid modernization as a whole. The company's approach is inefficient, and is unlikely to recognize and capture the full value of the grid modernization investments. Furthermore, the separation of costs into the different categories is potentially confusing – due to the interrelatedness of the investments – and therefore could result in a more difficult review of future filings. At the very least, separating the costs into the different categories creates a false sense of accuracy about the costs of each of the program areas.

Q. IS THE COMPANY'S PROPOSAL TO SEPARATELY COLLECT THE COSTS OF PST, ISR, AND SRP CONSISTENT WITH THE REPORT GOALS?

A. No. First, isolated planning, deployment, and review of separate PST, ISR, and SRP could lead to additional costs to ratepayers, which is inconsistent with the first Report Goal. Isolation of each of these areas could result in redundant deployment of resources (*e.g.*, infrastructure that could achieve the same outcome), or

inefficient deployment of resources (*e.g.*, infrastructure that overlaps in purpose, but is not completely redundant) thereby increasing costs. At the very least, the administrative costs of reviewing separate filings are likely to be higher than if the filings are reviewed together.

Second, isolated planning and deployment of PST, ISR, and SRP assets could lead to a less flexible grid, which is inconsistent with the third Report Goal. The third Report Goal clearly articulates a vision for a grid that more easily integrates clean energy generation, and such an outcome is most likely to occur when the Company plans and deploys assets in a comprehensive manner. Stated differently, the Company is likely to achieve a flexible grid if all departments within the Company work together, rather than separately.

Moreover, one of the specific recommendations of the Report was to synchronize the ISR and SRP filings to support integrated planning and deployment of assets (which are currently treated separately).[13]

Q. IS THE COMPANY'S PROPOSAL TO SEPARATELY COLLECT THE COSTS OF PST, ISR, AND SRP CONSISTENT WITH THE GUIDANCE DOCUMENT GOALS?

A. Only in part. The Company's proposal is inconsistent with Guidance Document Goals one, four, and eight. The first goal requires affordable energy for Rhode

[13] *See* Recommendation 3.1 Synchronize filings related to Distribution System Planning. Report at 11.

Island customers, and the Company's proposal could increase the costs of the distribution system when compared to coordinated planning, deployment, and review of separate PST, ISR, and SRP categories. The fourth goal mandates the prioritization and facilitation of customer-owned DER, which would not be optimized if the electric grid is less flexible then it could be. Finally, the eighth goal is not met because the cost recovery framework is inefficient, and therefore does not align the utility, customers, and policy objectives. Moreover, one of the drivers of the 4600 process was to facilitate the comparison – and align the standards for evaluation – of investment options whose costs are being recovered through different mechanisms. For instance, the staff of the Commission noted:

> "Ideally, a single set of measurements would be developed by which all future programs funded through rates can be examined for reasonableness, including whether differences between program incentives are reasonable and whether the decision to implement a utility activity through one program versus another is reasonable. … [S]taff recommends that the PUC consider how rates are just and reasonable across all programs and components of the bill. Staff recommends that the natural guiding principle in considering rates across programs is the principle of least-cost procurement. To the extent possible and consistent with the law, benefits and costs considered in one program should be considered in all other programs so that state policy goals are procured in a consistent manner across programs."[14]

Furthermore, in the notice opening Docket 4600, the Commission stated "[i]n order to determine the factors necessary for determining rates pursuant to the Renewable

[14] March 1, 2016 Memorandum to the Commissioners concerning "Recommendations for a Docket to Investigate the Changing Distribution System" at 4. Available at: http://www.ripuc.org/eventsactions/docket/4600-PUC-Recommendation_3-1-16.pdf

Energy Growth Program, and to improve consistency within and across programs, the PUC needs to develop an improved understanding of the costs and benefits caused by various activities on the system."[15]

Q. WHAT DO YOU RECOMMEND?

A. I recommend that the separate processes related to Grid Modernization – the PST Plan, ISR, and SRP – all be combined, or at the very least closely coordinated. Although the breadth of review would be larger than if the processes were separate, stakeholders will more easily be able to review investments. In the aggregate, the review of all of the investments should be more administratively efficient and transparent.

More importantly, a comprehensive approach to review of the investments would encourage, if not require, a comprehensive integrated approach to planning for, and assessing the benefits and costs of, the investments. This would be consistent with the Commission's findings in Docket 4600 as well as recommendation 3.1, "Synchronize filings related to Distribution System Planning," in the Report.[16]

Ultimately, all of the costs from the different processes should be rolled into the Company's base rates during each rate case. These investments, just like all other investments, should become part of the base rates. There is no need to separately

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[15] Docket No. 4600, Notice of Commencement of Docket and Invitation for Stakeholder Participation, March 18, 2016, at 1. Available at: http://www.ripuc.org/eventsactions/docket/4600-Notice_InviteStakeholders.pdf

[16] Report at 47.

track these investments after they have been integrated into the base rates. I note that this recommendation is consistent with the recommendation of the Division in Docket 4770 (specifically the Direct Testimony of Tim Woolf),[17] and therefore NECEC and CLF appear to be aligned with the Division on this topic.

Furthermore, NECEC and CLF agree with the Division's recommendations on multi-year rate plans.[18] Multi-year rate plans are an effective way to implement comprehensive integrated distribution planning, especially when compared to separate reconciling cost-recovery mechanisms. Multi-year rate plans provide a much more transparent vision for distribution system planning than periodic rate cases and separate capital trackers.

IV. ADVANCED METERING FUNCTIONALITY

Q. PLEASE DESCRIBE THE COMPANY'S AMF PROPOSAL.

A. The Company proposes four elements as part of an AMF deployment for all electric and gas customers.[19] The deployment would include: (1) an integrated system of smart electric meters and natural gas encoded radio transmitters (ERTs); (2) a communications network; (3) an IT platform to collect, monitor,

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17 See Attachment B to Ronald J. Binz Direct Testimony (Docket 4770, Direct Testimony of Tim Woolf, at Bates 27-28).

18 *Id.* at Bates 33-43.

19 Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 35, lines 4-5.

manage, and process raw data into intelligent information, and to engage customers and third parties; and (4) project management and ongoing business operations.[20]

Q. WHAT BENEFITS DOES NATIONAL GRID EXPECT TO SEE FROM ITS AMF INVESTMENTS?

A. According to the Company, the AMF will result in the following functionalities:

1. Customer side
    a. Enhanced energy management capabilities;
    b. Enablement of third-party programs and offerings;
    c. Customer service enhancements;
    d. Easier move in/out process; and
    e. Savings on electric vehicle charging costs.
2. Grid side
    a. Volt-var optimization;
    b. Avoided operations and management costs;
    c. Storm outage management system improvements; and
    d. Revenue benefits.[21]

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[20] Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 35, lines 7-12.

[21] Power Sector Transformation Panel, Book 1 of 3, at Bates 69-70; Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 38, lines 4-18.

The Company also identifies "broader societal benefits from deployment of AMF such as reduced greenhouse gas emissions and economic development."[22]

Q. WHAT ARE THE COSTS ASSOCIATED WITH NATIONAL GRID'S AMF PROPOSAL?

A. As a first step towards implementation of AMF deployment, National Grid is seeking approval to undertake a one-year AMF design process and to recover costs estimated at $2 million in this proceeding.[23] The Company states that this design process "will provide the necessary groundwork for implementation of its future AMF investments," which it will submit for review and approval by December 31, 2018.[24, 25]

National Grid provides cost estimates for four scenarios of AMF deployment on a Rhode Island only and a joint Rhode Island and New York basis. These would take place over the fiscal years 2019 through 2022.[26] The Benefit/Cost Ratios for six of the eight scenarios are greater than one, which represent net benefits.[27] The

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22 Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 39, lines 2-3.

23 Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 37, lines 14-15.

24 Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 37, lines 15-18.

25 I note that the Company is not clear how the one-year design work would be completed prior to the proposed FY 2020 plan filing date of December 31, 2018.

26 Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 36.

27 Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 40-41.

Company also discusses how its proposal is consistent with the Guidance Document and the Report.[28]

Q. WHAT DOES THE REPORT RECOMMEND WITH RESPECT TO AMF?

A. One of the key findings and recommendations of the Report is:

> "National Grid should develop an advanced meter roll-out plan that includes: a business case, time-varying rates, an aggressive implementation schedule, and list of planned capabilities that includes the capabilities identified by the Power Sector Transformation process. The plan must include protections for low income ratepayers as well as a platform upgrade model to protect all ratepayers from a growing obsolescence risk. The plan must include a proposal to provide third-party access to the advanced meter platform data to ensure fair market access for grid upgrade opportunities."[29]

The Report repeatedly emphasizes that "Rhode Island will *need* to invest in AMF"[30] to achieve its goals – controlling long-term costs, giving customers more choices and information, and building a flexible grid to integrate more clean energy generation – and do it in the near future.[31,32]

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28 Joint Pre-Filed Direct Testimony of the Power Sector Transformation Panel at Bates 41-43.

29 Report at 10; see also Recommendation 2.1 at 41.

30 Report at 32, emphasis added.

31 Report at 8-9.

32 "AMF is vital to accomplish many of the goals expressed in the Power Sector Transformation … Initiative" (Report at 32). "The time for Rhode Island to invest in advanced meters is now" (Report at 33).

Q. IS NATIONAL GRID'S PROPOSAL CONSISTENT WITH THE REPORT GOALS?

A. In general, yes. New metering technology is essential to sending price and usage information to customers in order to provide them with choices and empower them to change their behavior, including enabling adoption of DER. In addition, receiving usage information from customers is necessary to better understand how customers – individually and in the aggregate – are using the distribution system, which will enable the Company to plan for a more flexible and efficient system to reduce costs over the long term. Ultimately, as the Report emphasizes, achieving the vision of Power Sector Transformation is not possible without AMF.

Q. DO YOU HAVE ANY COMMENTS ON THE PROCESS NATIONAL GRID HAS OUTLINED FOR DEVELOPING ITS AMF PLAN?

A. In general, I am supportive of the process. The proposal to begin with a design phase to develop a more detailed roll-out plan is reasonable. I would urge the Commission to require National Grid to engage with stakeholders, including third party providers of AMF-related products and services, in this design phase to ensure that the plan that results is consistent with the Report recommendations to plan for third party access and innovation, share the cost burden through partnerships, and focus on capabilities to avoid technological obsolescence.[33]

[33] Report at 10-11.

Q. YOU MENTIONED THAT NATIONAL GRID IS PROPOSING TO RECOVER ONLY THE COSTS OF THE DESIGN PHASE IN THIS PROCEEDING. HOW DOES IT PROPOSE TO RECOVER DESIGN PHASE COSTS AND FUTURE COSTS?

A. National Grid proposes to recover the costs of AMF design and deployment through a new PST tracker.

Q. DO YOU AGREE WITH THIS COST RECOVERY APPROACH?

A. No. As discussed further in the testimony of Ron Binz, NECEC and CLF do not agree with the establishment of a separate tracker for recovery of AMF and other investments the Company has characterized as associated with power sector transformation. As I mentioned earlier, National Grid and Rhode Island should be moving toward more integrated distribution system planning. Separate cost recovery would undermine the achievement of this integration. If grid modernization investments are "foundational" as National Grid states more than once, then grid modernization investments, including AMF, must be integrated into the company's distribution system planning processes. Given the pace of technological change we are seeing, new technologies today will rapidly become business as usual by tomorrow.

In addition, one of the purposes of Docket 4600 was to establish a benefit/cost analysis framework that would enable and encourage "head to head" comparisons of solutions to distribution system needs whether those solutions were traditional

infrastructure, third party product and service offerings or new technologies. This further argues against separate cost recovery mechanisms. Moreover, establishing a separate tracker is inconsistent with the recommendation in the Report to reform the regulatory framework by, among other things, creating multi-year rate plans[34] and – as I discussed earlier – synchronizing filings related to distribution system planning.[35]

Q. WHAT IS YOUR CONCERN ABOUT THE POTENTIAL CONTINGENCIES FOR THE DEPLOYMENT OF AMF?

A. National Grid itemizes the costs of AMF deployment only for Rhode Island, and separately for both Rhode Island and New York. The Company does not include costs for Massachusetts. While ideally all three jurisdictions would move ahead with the deployment of advanced meters in the near future, Rhode Island should not make the deployment of advanced meters contingent on the actions of New York (or Massachusetts). As the Report explained repeatedly,[36] AMF is critical to the realization of PST in Rhode Island. The Company should coordinate deployment across its jurisdictions to the extent possible, but it should proceed in Rhode Island regardless of the decisions in New York or Massachusetts. National Grid can and should update its costs to account for joint deployment with New York and/or Massachusetts as it moves forward with implementation.

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34 Report at 10.
35 Report at 11.
36 Report at 8-9, 32-33.

Q. DO YOU HAVE ANY COMMENTS ABOUT NATIONAL GRID'S PLANS TO IMPLEMENT TIME VARYING RATES ("TVR") ONCE AMF IS DEPLOYED?

A. Yes. One of the key benefits of AMF is that it enables TVR by providing both the Company and customers with the information needed to design and respond to rates that vary over the course of a day, season and/or year based on costs. So, until AMF is deployed, careful consideration should be given to whether any rate design changes are appropriate. Educating customers so that they can manage their energy use to reduce costs based on the price signals they see from new rate structures is an essential step in introducing new opt-out rate designs. If "interim" rate designs are to be only for a period until AMF is available, the cost of addressing the potential confusion of customers learning how to respond to rates that will soon, we hope, change needs to be weighed against the benefits to determine if it is worthwhile.

In addition, education on new rate structures and making resources available to customers to empower them to respond to price signals is critical. For this reason, I question whether the time suggested by National Grid for opting out of TVR is sufficient. When the Company rolls out TVR, we want the rate structure to be successful. The first step is to deploy AMF. After AMF has been deployed for all customers, the customers need to receive information on prices for a reasonable period of time before the Company moves to opt-out rate designs such as Critical Peak Pricing and TVR. Nonetheless, I note that there are interim options for TVR.

In the not-too-distant future (*i.e.*, 2019), National Grid could start an education and marketing plan for opt-in time-of-use rates, with a longer-term education and marketing plan for switching to opt-out TVR once AMF is fully deployed. To be clear, NECEC and CLF are supportive of TVR; achieving successful deployment of TVR requires a longer-term vision.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS REGARDING NATIONAL GRID'S AMF PROPOSAL.

A. National Grid's proposal to deploy AMF for all electric customers is consistent with the Report and the Guidelines Document. I support the deployment of AMF. I also agree with the Company's proposal to begin with a design process followed by implementation for Rhode Island, and ideally for Rhode Island jointly with New York and possibly Massachusetts. However, the Commission should not make the deployment of AMF in Rhode Island contingent on deployment in other jurisdictions when the benefit/cost ratio is one or greater. However, I do not agree with the Company's proposal to recover the costs of AMF in a separate PST tracker for the reasons outlined in Ron Binz' testimony on behalf of NECEC and CLF in this docket and Division witness Woolf's testimony in Docket 4770. Finally, the Commission should require National Grid to develop a more comprehensive transition plan to TVR that will maximize customer uptake, understanding, and empowerment. Such a transition to TVR would, ideally, include an opt-in period for TVR while AMF is being deployed to all customers, followed by a period of sending price signals to all customers, and finally opt-out TVR.

V. ENERGY STORAGE

Q. PLEASE DESCRIBE THE ENERGY STORAGE INDUSTRY IN RHODE ISLAND.

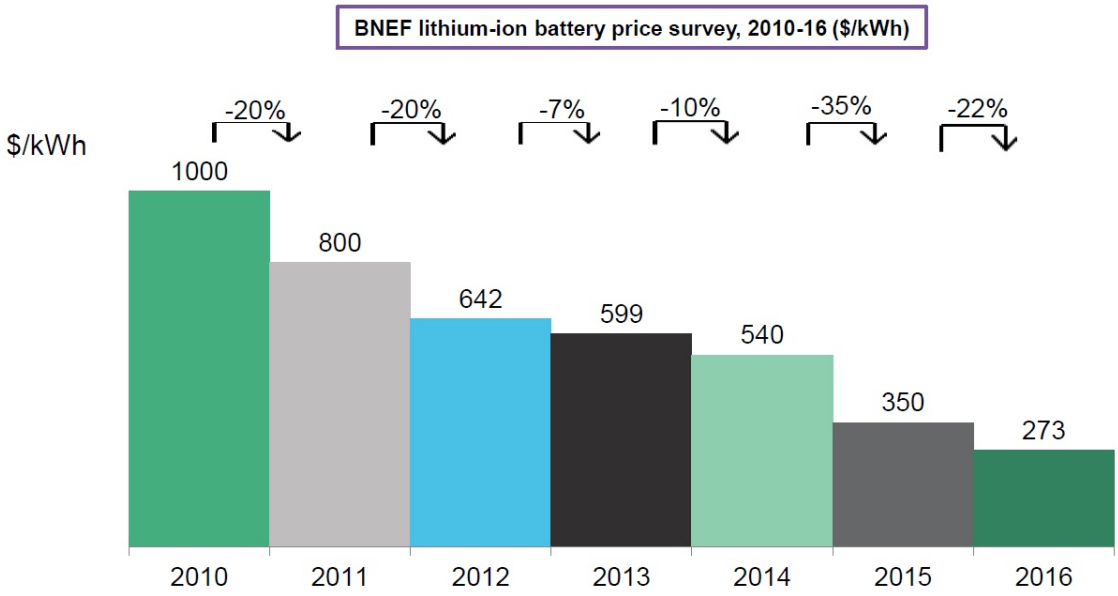
A. Currently, energy storage is a nascent industry in Rhode Island. Developers and customers are still becoming familiar with the products on the market, the value proposition that energy storage provides to different types of customers, and the necessary operational requirements in order to realize benefits for customers. While the market and business models for successfully deploying energy storage are still developing, there are many storage – and solar+storage – companies interested in market opportunities in Rhode Island and New England as evidenced by the increasing number of NECEC members active in this sector.[37]

In addition to the local market dynamics, the hardware costs of energy storage – just like the hardware costs of solar photovoltaics – are determined mostly by international supply and demand. The costs of energy storage have declined in recent years, and I expect that the costs of energy storage will continue to decline in the near future. For instance, according to Bloomberg New Energy Finance, the

[37] NECEC members involved in storage have grown over the last two years and now include, but are not limited to, Advanced Microgrid Solutions, Amber Kinetics, EnelX, Engie Storage, KeyCapture Energy, NEC Energy Solutions, Pika Energy, Sparkplug Power and Stem. Solar+storage companies include Ameresco, BlueWave Solar, Borrego, Cypress Creek Renewables, Dynamic Energy, Edison Energy, Newport Solar, Nexamp, Revision Energy, Solect, Soltage, Sunpower, Sunrun, Tesla, and Vivint Solar.

costs of lithium-ion batteries decreased 73 percent between 2010 and 2016 (*see* Chart 1).

Chart 1: The Price of Lithium-ion Batteries in 2016 was $273/kWh – A Drop of 73% since 2010[38]

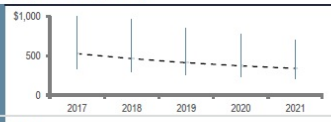
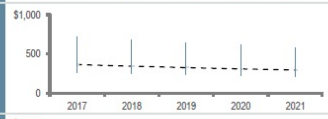
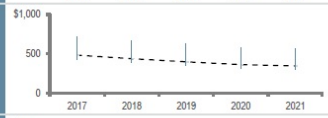
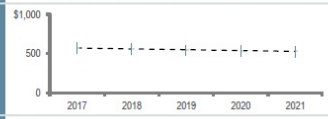
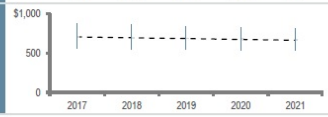


Furthermore, according to Lazard the cost of lithium-ion storage is expected to decline by 36 percent over the next five years (*see* Chart 2). Cost declines – both historical and expected future declines – contribute to the growing interest in energy storage by installers, customers, environmental advocates, and others.

38 "The Price of Lithium-ion Batteries in 2016 was $273/kWh – A Drop of 73% since 2010." Bloomberg New Energy Finance, *Lithium-ion Battery Costs and Market*, (June 20, 2017), at 2. Available at: https://data.bloomberglp.com/bnef/sites/14/2017/07/BNEF-Lithium-ion-battery-costs-and-market.pdf

Chart 2: Capital Cost Outlook by Energy Storage Technology[39]

The average capital cost outlook accounts for the relative commercial maturity of different offerings (i.e., more mature offerings influence the cost declines per technology)

	Capital Cost ($/kWh)		Avg	Technology Trends & Opportunities
Lithium-Ion		CAGR 5-Year	(10%) (36%)	• OEM competition continues to drive cost reductions • Lower cost allows for competing with long-duration applications • System integrators driving cost reductions in BOS and installation • Benefits from growing electric vehicle production
Flow Battery–Vanadium		CAGR 5-Year	(5%) (19%)	• Shift to long-duration application drives lower costs ($/kWh) • Focus on high energy throughput drives lower levelized costs ($/MWh) • OEMs provide complete turnkey system
Flow Battery–Zinc Bromide		CAGR 5-Year	(8%) (28%)	• Longer durations can be achieved by adding multiple flow battery modules at the same cost ($/kWh), but possibly requiring additional integration costs • OEM focus on high energy throughput with little operating costs • OEMs focusing on customers wanting modular AC unit
Lead		CAGR 5-Year	(2%) (8%)	• Low cost energy storage option • Limited usability and performance translates into high levelized cost • Limited cost improvement expected
Advanced Lead		CAGR 5-Year	(2%) (6%)	• Greater performance than typical lead-acid options • Cost reduction and performance improvements expected to continue • OEMs looking to use this class to address larger commercial systems not typically served by lead-acid

Nonetheless, if energy storage deployment in Rhode Island is going to flourish, then National Grid will need to help enable the competitive market for energy storage. National Grid should (a) facilitate third-party and customer ownership and adoption of energy storage; and (b) deploy energy storage or acquire energy storage services for itself as a distribution grid resource.

39 "Capital Cost Outlook by Technology." Lazard, *Lazard's Levelized Cost of Storage Analysis- Version 3.0*, (2017), at 16. Available at: https://www.lazard.com/perspective/levelized-cost-of-storage-2017/

Q. PLEASE DESCRIBE THE COMPANY'S PROPOSAL FOR ENERGY STORAGE.

A. The Company proposes to install and own approximately two megawatt-hours ("MWh") of energy storage located on the customer's side of the meter ("behind-the-meter" or "BTM") in order to develop process improvements and methods to properly and efficiently take advantage of the benefits of storage.[40] National Grid also proposes to work with a community partner that can integrate its experience with the energy storage into its Science Technology Engineering and Math ("STEM") educational curriculum.

Q. HAS NATIONAL GRID DEMONSTRATED A NEED TO INSTALL AND OWN BEHIND-THE-METER STORAGE?

A. No. More than twenty storage and/or solar+storage companies are currently developing and/or offering storage products and services to customers in New England, with many interested in serving and responding to requests to serve customers in Rhode Island. Every project where National Grid deploys BTM represents a lost opportunity for the energy storage industry to develop and mature. National Grid's activities in this area should be targeted to facilitating third party and customer deployment of storage. The BTM utility-ownership of storage that National Grid proposes actually risks stunting the potential growth of the energy storage industry in Rhode Island. In order for the energy storage industry in Rhode

[40] Power Sector Transformation Panel, Book 1 of 3, at Bates 137.

Island to mature, developers must be afforded the opportunity to develop projects for customers. National Grid should modify its storage proposal to enhance this opportunity.

Q. ARE YOU OPPOSED TO NATIONAL GRID OWNING ANY ENERGY STORAGE?

A. No. There are two situations where a monopoly utility could own or procure energy storage: (1) a market failure; and (2) front-of-the-meter ("FTM") energy storage to support the distribution system (*e.g.*, reliability services). Nonetheless, even in these situations, the Company should be required to competitively procure energy storage or the services that energy storage can provide.

Q. PLEASE EXPLAIN WHAT YOU MEAN BY A MARKET FAILURE IN THE DEPLOYMENT OF ENERGY STORAGE.

A. A market failure is when a competitive marketplace fails to supply customers with a product even though there is customer demand for the product. To be clear, a nascent market is not a demonstration of a market failure.

Q. IS THERE A MARKET FAILURE IN THE ENERGY STORAGE MARKETPLACE IN RHODE ISLAND?

A. The energy storage market is developing, not failing, in Rhode Island. Any involvement of National Grid in the BTM energy storage market in Rhode Island is premature. Until such time that there is a demonstrated market failure in the deployment of BTM energy storage in Rhode Island, utility ownership of BTM

energy storage should be prohibited.[41] Monopoly utility ownership of BTM energy storage – and BTM DER in general – should be an option of last resort.

Q. SINCE THE COMPANY'S PROPOSAL IS (ESSENTIALLY) FOR DEMONSTRATION PROJECTS, WHY WILL THEY NOT HELP THE ENERGY STORAGE MARKET MATURE?

A. My objection to the Company's proposal is not with tying the energy storage to STEM educational opportunities, but rather with the utility-owned BTM structure. If National Grid would like to support the maturation of the energy storage marketplace in Rhode Island with demonstration projects for STEM educational opportunities, there are two equally good opportunities. First, National Grid could procure FTM energy storage demonstration projects. For instance, the FTM demonstration projects could show how the energy storage can be used to reduce the costs of grid services. Second, if National Grid wants to demonstrate the value of BTM energy storage for STEM curriculum, then the Company could develop an incentive program. Such an incentive program – which could emulate aspects of successful programs such as the Self-Generation Incentive Program ("SGIP") in California – could be housed in (and integrated with) existing programs in Rhode Island. The energy efficiency programs could be particularly well-suited as a delivery channel for behind-the-meter energy storage and other active demand

[41] The exception to this prohibition would be National Grid owning energy storage at National Grid-owned locations, such as National Grid offices and other facilities. In this situation, National Grid would, effectively, own the energy storage as a customer.

management offerings. The incentive program would motivate developers to seek out opportunities and talk to customers. In this regard, an incentive program would help develop projects and help the market mature.

Q. ARE THERE OPPORTUNITIES FOR UTILITY-OWNERSHIP OF FRONT-OF-THE-METER ENERGY STORAGE?

A. Absolutely. National Grid should be allowed – even encouraged – to deploy energy storage as a grid asset. Energy storage may present a least-cost option for reliability upgrades or the deferral of upgrades. National Grid should deploy energy storage as a grid asset in order to learn more about the capabilities and potential for energy storage in distribution system planning.

Q. IS THE COMPANY'S PROPOSAL TO OWN BEHIND-THE-METER STORAGE CONSISTENT WITH THE REPORT GOALS?

A. No. First, the Company has not demonstrated that utility ownership of BTM storage will be cheaper than BTM storage procured in the competitive market. As such, the Company's proposal is impossible to evaluate in regard to controlling the long-term costs of the electric system, which is the first Report Goal.

Second, as I discussed earlier, utility ownership of storage could actually impede the development of a competitive storage market. Any storage projects that are done internally at National Grid represent a lost opportunity for storage developers. Accordingly, the Company's proposal will not provide customers with more energy choices, and therefore is inconsistent with the second Report Goal.

Q. IS THE COMPANY'S PROPOSAL TO OWN BEHIND-THE-METER STORAGE CONSISTENT WITH THE GUIDANCE DOCUMENT GOALS?

A. No. The Company's proposal to own BTM storage is inconsistent with Guidance Document Goals two and four. The second goal is to strengthen the Rhode Island economy, and the Company's proposal could stunt the growth of the storage industry in Rhode Island. The fourth goal emphasizes the prioritization and facilitation of customer-owned DER, which is not accomplished if the utility owns the DER.

Q. WHAT DO YOU RECOMMEND?

A. I have two recommendations in regard to energy storage. First, National Grid should focus on facilitating third party and customer deployment of BTM storage. It should be prohibited from owning BTM storage unless there is a demonstrated market failure. Second, utility procurement of energy storage should be limited to front-of-the-meter deployment where National Grid should incorporate energy storage as a potential grid asset.

VI. SOLAR AND LOW-INCOME CUSTOMERS

Q. PLEASE DESCRIBE THE SOLAR INDUSTRY IN RHODE ISLAND.

A. The solar market is growing in Rhode Island, supported by forward-looking state policies and programs. There are a significant number of actors in the marketplace, and considerable development. As an example, NECEC currently has approximately 22 members active in the Rhode Island solar market. According to

the Solar Foundation, there were 1,064 jobs associated with solar in Rhode Island, which ranks 11th in the nation for solar jobs on a per capita basis.[42] By the end of the first quarter of 2018, Rhode Island had 95 megawatts ("MW") of solar installed.[43] According to the Office of Energy Resources, the entire clean energy economy in Rhode Island includes 15,305 jobs.[44]

Q. PLEASE DESCRIBE THE COMPANY'S PROPOSAL FOR SOLAR AND LOW-INCOME CUSTOMERS.

A. The Company proposes two initiatives related to solar and low-income customers: (1) the Solar Demonstration Program; and (2) an Income Eligible Customer Rewards Program.[45] According to the Company, "[t]he proposed Solar Program consists of a utility-owned solar photovoltaic demonstration program for installations up to 3.75 MW" that will be used for community education and renewable energy generation.[46] National Grid goes on to state that "a project of this scope will allow the Company to learn from the siting, permitting, construction, interconnection, and operation of these systems," which will benefit customers and

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42 The Solar Foundation, *Solar Job Census 2017: Rhode Island*. Available at: https://www.thesolarfoundation.org/solar-jobs-census-factsheet-2017-ri/

43 State of Rhode Island Office of Energy Resources, *Governor's 1,000 by '20 Clean Energy Goal*. Available at: http://www.energy.ri.gov/renewable-energy/governor-clean-energy-goal.php

44 State of Rhode Island Office of Energy Resources, *Governor's 1,000 by '20 Clean Energy Goal*. Available at: http://www.energy.ri.gov/renewable-energy/governor-clean-energy-goal.php

45 Power Sector Transformation Panel, Book 1 of 3, at Bates 147.

46 Power Sector Transformation Panel, Book 1 of 3, at Bates 147.

solar developers.[47] The Company states that one of the benefits of the program is "[r]educing the electric bills of Income Eligible customers to reduce the burden of funding Income Eligible energy discounts for all Rhode Island customers."[48]

National Grid states that "[t]he Income Eligible Customer Rewards Program will be designed to achieve two goals, both in support of increasing the rate at which Income Eligible customers make timely bill payments and to reduce the incidence of arrears, collection, and service termination situations."[49]

A. Solar Demonstration Program

Q. IS NATIONAL GRID ALLOWED TO OWN SOLAR IN RHODE ISLAND?

A. Yes. R.I. Gen. Laws § 39-26-6(g) authorizes utility ownership of up to 15 megawatts of renewable generation demonstration projects, so long as a portion of projects reduces the electric bills of customers of nonprofit affordable housing projects. However, the aforementioned statute does not relieve the Company of the obligation to demonstrate that utility ownership of solar is in the public interest.

Q. DO YOU AGREE WITH NATIONAL GRID THAT THE PROPOSED PROJECT(S) "WILL ALLOW THE COMPANY TO LEARN FROM THE SITING, PERMITTING, CONSTRUCTION, INTERCONNECTION, AND

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47 Power Sector Transformation Panel, Book 1 of 3, at Bates 147.
48 Power Sector Transformation Panel, Book 1 of 3, at Bates 152.
49 Power Sector Transformation Panel, Book 1 of 3, at Bates 156.

OPERATION OF THESE SYSTEMS," WHICH WILL BENEFIT CUSTOMERS AND SOLAR DEVELOPERS?[50]

A. Only in part. I do not doubt that the Company could learn *something* about siting, permitting, construction, interconnection, and operation, but I do not agree that the learning will benefit customers and solar developers. National Grid has not demonstrated that the "learning" will be different than (a) the Company's existing experience with utility-owned solar in other states, or (b) developers' experience. Furthermore, the Company has not demonstrated why they need to learn about siting, permitting, and construction of solar. How is this information useful to the Company? As for interconnection, National Grid currently has a tariff that outlines the process, and I fail to see how the Company's ownership of solar will provide additional insight into the process. I also note that National Grid does not need to own solar in order to learn about the operational characteristics of solar. Finally, as I mentioned above, Rhode Island already has 95 MW of solar,[51] and the Company has failed to demonstrate that the utility-owned solar will lead to any new information. In short, National Grid's ownership of solar will not achieve any material learning that will benefit customers and the development of a robust competitive market for solar products and services.

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50 Power Sector Transformation Panel, Book 1 of 3, at Bates 147.

51 State of Rhode Island Office of Energy Resources, *Governor's 1,000 by '20 Clean Energy Goal*. Available at: http://www.energy.ri.gov/renewable-energy/governor-clean-energy-goal.php

Q. DOES THE SOLAR PROGRAM REDUCE THE ELECTRIC BILLS OF CUSTOMERS OF NONPROFIT AFFORDABLE HOUSING PROJECTS?

A. Unfortunately, I do not know. The solar program proposed by National Grid lacks enough detail to understand the mechanics of the proposal. Nonetheless, the proposal does not appear to *directly* reduce the electric bills (*a.k.a*. shared solar) of customers of nonprofit affordable housing projects.

Q. WHY SHOULD THE ELECTRIC BILLS OF CUSTOMERS OF NONPROFIT AFFORDABLE HOUSING PROJECTS BE DIRECTLY REDUCED BY THE SOLAR PROGRAM?

A. By their very nature, low-income customers represent the most financially vulnerable segment of the population. Electric bills represent a higher percentage of their total income than non-low-income customers, and therefore their electric bills are a greater financial burden than non-low-income customers. Of all electric customers, low-income customers would directly benefit from lower energy bills the most. Accordingly, solar represents a tremendous opportunity for low-income customers to lower their energy bill burden, and help create a pathway to more financial stability. In short, this financially vulnerable segment of the population would benefit the most from solar directly reducing their electric bills, rather than reducing the electric bills of all customers through a lower rate, or through funding targeted energy efficiency. Furthermore, the reduction in the total electric bill per low-income customer should be meaningful, as opposed to a token gesture. The bill

savings should, ultimately, reduce the energy cost burden of the low-income customers.

Without a direct link between the production of the solar facilities and the savings/credits that low-income customers see on their electric bill, the Solar Program is not really for low-income customers. The low-income customers should be able to clearly trace the bill savings to the solar facilities. Furthermore, there are solar companies – both shared solar and BTM solar – that are already providing bill savings to low-income customers that are directly linked to solar installations. National Grid has not explained why the Company needs to enter this market segment, nor has the Company demonstrated that they could provide solar to low-income customers more cheaply than the competitive market.

Q. IF NATIONAL GRID IS GOING TO OWN SOLAR, SHOULD THE COMPANY USE THIRD PARTY DEVELOPERS TO THE MAXIMUM EXTENT POSSIBLE?

A. Yes. The statute allows utility ownership of solar for a predetermined amount of capacity. If the Company demonstrates that there would be value to customers in utility ownership of solar, then National Grid should maximize use of the competitive marketplace for turnkey projects in order to help the market develop. There is no need for National Grid to cultivate the in-house expertise for developing solar projects.

Q. ARE THERE ALTERNATIVES TO UTILITY OWNERSHIP OF SOLAR THAT CAN BENEFIT LOW-INCOME CUSTOMERS?

A. Absolutely. On June 27, 2016, Governor Raimondo signed legislation[52] that created a 30 MW community remote net metering pilot program. The pilot program is aimed at promoting net metering resources that allocate credits to accounts associated with low or moderate housing eligible credit recipients. The program has been designed in close coordination with Rhode Island Housing. According to National Grid, as of April 3, 2018, 23.48 MW of the pilot program have been reserved.[53]

Q. IS THE COMPANY'S PROPOSAL TO OWN SOLAR CONSISTENT WITH THE REPORT GOALS?

A. No. First, the Company has not demonstrated that utility ownership of solar will be cheaper than solar developed by or procured in the competitive market, which is the first Report Goal.

Second, similarly to storage, utility ownership of solar could actually impede the development of a competitive market. Any solar projects that are done in-house at National Grid represent a lost opportunity for solar developers to mature and advance the solar market in Rhode Island. Accordingly, the Company's proposal

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52 The 2016 amendments to Chapter 26.4 of Title 39: P.L. 2016, ch. 149, § 3; and P.L. 2016, ch. 163, § 3.

53 "Community Remote Net Metering Pilot." National Grid, *Net Metering in Rhode Island*. Available at: https://www9.nationalgridus.com/narragansett/home/energyeff/4_net-mtr.asp

will not provide customers with more energy choices, and therefore is inconsistent with the second Report Goal.

Q. IS THE COMPANY'S PROPOSAL TO OWN SOLAR CONSISTENT WITH THE GUIDANCE DOCUMENT GOALS?

A. No. The Company's proposal to own solar is inconsistent with Guidance Document Goals two and four. The second goal is to strengthen the Rhode Island economy, and the Company's proposal could stunt the growth of the solar industry in Rhode Island. The fourth goal emphasizes the prioritization and facilitation of customer-owned DER, which is not accomplished if the utility owns the DER.

B. Income Eligible Customer Rewards Program

Q. WHAT IS YOUR UNDERSTANDING OF THE PRIMARY PURPOSE OF THE INCOME ELIGIBLE CUSTOMER REWARDS PROGRAM?

A. The Company does not provide many details about the Income Eligible Customer Rewards Program. As I recapped earlier, the stated goals of the proposal are to increase timely bill payments, and reduce the incidence of arrears, collection, and service termination situations.[54] As such, the primary purpose of the program appears to be reducing the billing and customer service costs associated with low-income customers, rather than actually reducing the electric bills of these customers.

[54] Power Sector Transformation Panel, Book 1 of 3, at Bates 156.

Q. WILL THE PROGRAM BENEFIT LOW-INCOME CUSTOMERS?

A. Once again, the details of the program are scarce, but the answer appears to be no. The program proposal does not appear to require National Grid to create a program that will reduce the electric bills of these customers. Accordingly, the program does not appear to reduce the financial burden that energy represents for these customers.

Q. WHY DOES A LOW-INCOME PROGRAM NEED TO REDUCE THE ENERGY BILLS OF LOW-INCOME CUSTOMERS?

A. Generally speaking, low-income customers do not pay their electric bill (if applicable) because they do not have the money to pay their electric bill. These customers are not delinquent in paying their bills out of choice or preference. If a program provides an incentive to these customers to pay their electric bill, that does not mean that these customers suddenly have more money to pay bills. Instead, the customers are likely not paying another bill such as heat, food, or medication. In this regard, such a program would not actually help these customers, but rather just reduce the utility's cost of serving these customers.

Q. IS THE COMPANY'S PROPOSED INCOME ELIGIBLE CUSTOMER REWARDS PROGRAM CONSISTENT WITH THE REPORT GOALS?

A. I do not know. There is not enough information in order to determine if the proposal is consistent with the Report Goals.

Q. IS THE COMPANY'S PROPOSED INCOME ELIGIBLE CUSTOMER REWARDS PROGRAM CONSISTENT WITH THE GUIDANCE DOCUMENT GOALS?

A. I do not know. There is not enough information in order to determine if the proposal is consistent with the Guidance Document Goals.

Q. IF THERE ARE FEW DETAILS ABOUT THE INCOME ELIGIBLE CUSTOMER REWARDS PROGRAM, CAN YOU PROPERLY EVALUATE THE PROGRAM?

A. No. Since there are few details about the Income Eligible Customer Rewards Program, intervenors (including NECEC and CLF) and the Commission cannot evaluate the proposal at this time. Due to the lack of details and the inability of parties to evaluate the proposal, the Commission should reject the proposal at this time.

C. Conclusion

Q. WHAT DO YOU RECOMMEND FOR THE SOLAR PROGRAM AND THE INCOME ELIGIBLE CUSTOMER REWARDS PROGRAM?

A. The Company has not demonstrated a societal or market need for utility-owned solar, nor how utility-owned solar would benefit customers. Stated another way, National Grid has not demonstrated that utility-owned solar is in the public interest. In addition, the Income Eligible Customer Rewards Program proposal is deficient on details and impossible to evaluate at this time. If the rationale the Company is

providing for owning solar is to help low-income customers (and this is unclear, since I cannot tell if the solar would actually help low-income customers), then the Company has failed to provide evidence that would demonstrate its proposal would accomplish this goal. The Commission should reject both the utility-owned solar proposal and the proposed Income Eligible Customer Rewards Program.

VII. CONCLUSION AND RECOMMENDATIONS

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.

A. After review of the Plan and the Company's testimony, NECEC and CLF recommend the Commission require the following: (1) the separate processes related to planning for and recovery of existing and new grid modernization costs all be combined, or at the very least closely coordinated; (2) the deployment of AMF in Rhode Island should not be contingent on deployment in other jurisdictions when the benefit/cost ratio is one or greater; (3) require National Grid to develop a more comprehensive transition plan to time-varying-rates that will maximize customer uptake, understanding, and empowerment; (4) National Grid should focus on facilitating third party and customer deployment of BTM storage, and utility procurement of energy storage should be limited to front-of-the-meter deployment; (5) National Grid has not demonstrated that utility-owned solar is in the public interest, and the proposal should be rejected; and (6) the Income Eligible Customer Rewards Program proposal is deficient on details and impossible to evaluate at this time, and the proposal should be rejected.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

ATTACHMENT A

Nathan Raymond Phelps
Vote Solar
Regulatory Director
745 Atlantic Avenue
7th Floor
Boston, MA
02111
(860) 478-2119
Nathan@votesolar.org

Education:

Tufts University
Medford, MA ABD
MA candidate in the Urban and Environmental Policy and Planning Department
Focus: Environmental Policy with a special emphasis on Energy Policy

Willamette University
Salem, OR BA Spring 2005
Majors: Environmental Science; and Politics
Minor: Geography

Manchester Community College
Manchester, CT AS Spring 2003
Major: General Studies

Connecticut School of Broadcasting
Farmington, CT Graduated Spring 1998

Professional Experience:

Vote Solar
Boston, MA October 2013 – Present
Director of distributed solar generation policy research, development, and implementation for Vote Solar. Engage in related state, regional, and national regulatory processes.

Massachusetts Department of Public Utilities
Boston, MA June 2008 – October 2013
Senior economist for the Electric Power Division of the Massachusetts Department of Public Utilities ("DPU"). Primary focus at the DPU was all issues related to distributed generation, and renewable energy, including net metering, interconnection, and long-term contracts for renewable energy.

Massachusetts Technology Collaborative- Renewable Energy Trust
Westborough, MA January 2007 – December 2007
Policy intern for Fran Cummings. Assisted Mr. Cummings in policy development and implementation for the Massachusetts Renewable Energy Trust.

Tufts Institute of the Environment
Medford, MA October 2005 - April 2006
Research Assistant for Professor Ann Rappaport.

Oregon Department of Energy
Salem, OR January 2005 – May 2005
Renewables Intern for Carl DeWitt. The primary focus of the research was to evaluate renewable portfolio standards from around the United States, and develop best practices for possible implementation in Oregon.

Connecticut General Assembly
Hartford, CT January 2001 – May 2001
Intern for Senator Martin Looney.

Testimony

Joint Petition of Electric Distribution Companies for Approval of Model Solar Massachusetts Renewable Target Tariff pursuant to An Act Relative to Solar Energy, St. 2016, c. 75, § 11(b), 225 CMR 20.00.
Massachusetts Docket D.P.U. 17-140

Petition of NSTAR Electric Company and Western Massachusetts Electric Company, each doing business as Eversource Energy, Pursuant to G.L. c. 164, § 94 and 220 CMR 5.00 et seq., for Approval of General Increases in Base Distribution Rates for Electric Service and a Performance Based Ratemaking Mechanism.
Massachusetts Docket D.P.U. 17-05

Development of New Alternative Net Metering Tariffs and/or Other Regulatory Mechanisms and Tariffs for Customer Generators
New Hampshire Docket DE 16-576

Investigation by the Department of Public Utilities on its own motion as to the propriety of the rates and charges proposed by Massachusetts Electric Company and Nantucket Electric Company in their petition for approval of an increase in base distribution rates for electric service
Massachusetts Docket D.P.U. 15-155

In the Matter of the Application of Southern Maryland Electric Cooperative, Inc. for Authority to Revise Its Rates and Charges for Electricity Service and Certain Rate Design Charges
Maryland Case No.: 9396

In the Matter of the Merger of Exelon Corporation and PEPCO Holdings, Inc.
Maryland Case No.: 9361

Presentations

Net Metering: History and Context
NARUC November 2017

Distribution Network Policy Matters
Northeast Energy and Commerce Assc. March 2016

Appropriate Valuation Factors for Small DER
MD PSC (PC 40) October 2015

Electricity 101
Northeast Sustainable Energy Assc. March 2015

Evaluating the Benefits and Costs of Solar PV
MADRI Working Group May 2014

Interconnection and Net Metering in Massachusetts
Innovations in Clean Energy September 2012

Net Metering in Massachusetts & Community Solar
ASES Solar 2010 May 2010

Net Metering in Massachusetts
EUEC February 2010

Utility Ownership of Solar Generation in a Deregulated Market
EUEC February 2010

CERTIFICATION

I hereby certify that on April 25, 2018, I sent a copy of the within to all parties set forth on the attached Service List by electronic mail and copies to Luly Massaro, Commission Clerk, by electronic mail and regular mail.

Name/Address	E-mail Distribution List	**Phone**
National Grid Celia O'Brien, Esq. Jennifer Hutchinson, Esq. National Grid 280 Melrose St. Providence, RI 02907	Celia.obrien@nationalgrid.com; Jennifer.hutchinson@nationalgrid.com; Najat.coye@nationalgrid.com; Joanne.scanlon@nationalgrid.com; Bill.Malee@nationalgrid.com; Melissa.little@nationalgrid.com; William.richer@nationalgrid.com; Theresa.burns@nationalgrid.com; Ann.leary@nationalgrid.com; Scott.mccabe@nationalgrid.com; Najat.coye@nationalgrid.com; kayte.o'neill2@nationalgrid.com; kate.grant2@nationalgrid.com; Mary.coleman@nationalgrid.com; Timothy.roughan@nationalgrid.com;	781-907-2153 401-784-7288
Adam Ramos, Esq. Hinckley Allen Hinckley Allen 100 Westminster Street, Suite 1500 Providence, RI 02903-2319	aramos@hinckleyallen.com;	401-457-5164
Division of Public Utilities (Division) Leo Wold, Esq. Dept. of Attorney General 150 South Main St. Providence, RI 02903	Lwold@riag.ri.gov; CHetherington@riag.ri.gov; Jmunoz@riag.ri.gov; Dmacrae@riag.ri.gov;	404-274-4400
Jonathan Schrag, Deputy Administrator Division of Public Utilities and Carriers 89 Jefferson Blvd. Warwick, RI 02888	Jonathan.Schrag@dpuc.ri.gov; Macky.McCleary@dpuc.ri.gov; John.bell@dpuc.ri.gov; Thomas.kogut@dpuc.ri.gov; Ronald.gerwatowski@dpuc.ri.gov; Joseph.shilling@dpuc.ri.gov;	401-780-2140

	nrohr443@g.rwu.edu;	
Tim Woolf Jennifer Kallay Synapse Energy Economics 22 Pearl Street Cambridge, MA 02139	twoolf@synapse-energy.com; jkallay@synapse-energy.com; mwhited@synapse-energy.com; jhall@synapse-energy.com;	617-661-3248
David Effron Berkshire Consulting 12 Pond Path North Hampton, NH 03862-2243	Djeffron@aol.com;	603-964-6526
Bruce Oliver Tim Oliver Revilo Hill Associates 7103 Laketree Drive Fairfax Station, VA 22039	Boliver.rha@verizon.net; tim.b.oliver@gmail.com;	703-569-6480
Matt Kahal 1108 Pheasant Crossing Charlottesville, VA 22901	mkahal@exeterassociates.com;	434-964-0604
M. Ballaban LaCapra Associates	mballaban@daymarkea.com;	
T. Bennett S. Bobo Daymark Energy Advisors	tbennett@daymarkea.com; sbobo@daymarkea.com;	
William Dunkel and Associates 8625 Farmington Cemetery Road Pleasant Plains, IL 62677	WilliamDunkel@consultant.com; RoxieMcCullar@consultant.com;	217-626-1934
Gregory L. Booth, PE, PLS Linda Kushner PowerServices, Inc. 1616 East Millbrook Rd. Suite 210 Raleigh, NC 27609	gbooth@powerservices.com; lkushner@powerservices.com;	919-256-5900

Office of Energy Resources (OER) Andrew Marcaccio, Esq. Dept. of Administration Division of Legal Services One Capitol Hill, 4th Floor Providence, RI 02908	Andrew.Marcaccio@doa.ri.gov;	401-222-8880
Carol Grant, Commissioner Office of Energy Resources	Carol.grant@energy.ri.gov; Christopher.Kearns@energy.ri.gov; Danny.Musher@energy.ri.gov; Nicholas.Ucci@energy.ri.gov ; Becca.Trietch@energy.ri.gov; Carrie.Gill@energy.ri.gov;	401-574-9100
Conservation Law Foundation (CLF) Jerry Elmer, Esq. Max Greene, Esq. Conservation Law Foundation 235 Promenade Street Suite 560, Mailbox 28 Providence, RI 02908	jelmer@clf.org; mgreene@clf.org;	401-228-1904
Dept. of Navy (DON) Kelsey A. Harrer, Esq. Office of Counsel NAVFAC Atlantic, Department of the Navy 6506 Hampton Blvd. Norfolk, VA 23508-1278	kelsey.a.harrer@navy.mil;	757-322-4119
Kay Davoodi, Director Larry R. Allen, Public Utilities Specialist Utilities Rates and Studies Office NAVFAC HQ, Department of the Navy 1322 Patterson Avenue SE Suite 1000 Washington Navy Yard, D.C. 20374	khojasteh.davoodi@navy.mil; larry.r.allen@navy.mil;	
Ali Al-Jabir Brubaker and Associates 5106 Cavendish Dr. Corpus Christi, TX 78413	aaljabir@consultbai.com;	

Maurice Brubaker Brubaker and Associates P.O. Box 412000 St Louis, Missouri 63141-2000	mbrubaker@consultbai.com;	
New Energy Rhode Island (NERI) Seth H. Handy, Esq. Handy Law, LLC 42 Weybosset St. Providence, RI 02903	seth@handylawllc.com;	401-626-4839
	helen@handylawllc.com;	
	randelle@handylawllc.com;	
The RI League of Cities and Towns c/o Brian Daniels, Executive Director One State Street, Ste. 502 Providence, RI 02908	bdaniels@rileague.org;	401 272-3434
PRISM & WCRPC c/o Jeff Broadhead, Executive Director	jb@wcrpc.org;	401-792-9900
Newport Solar c/o Doug Sabetti	doug@newportsolarri.com;	401.787.5682
Green Development, LLC c/o Michelle Carpenter	mc@green-ri.com;	401.295.4998
Clean Economy Development, LLC c/o Julian Dash	jdash@cleaneconomydevelopment.com;	
ISM Solar Development, LLC c/o Michael Lucini	mlucini@ismgroup.com;	401.435.7900
Heartwood Group, Inc. c/o Fred Unger	unger@hrtwd.com;	401.861.1650
Energy Consumers Alliance of NE James Rhodes Rhodes Consulting 860 West Shore Rd. Warwick, RI 02889	jamie.rhodes@gmail.com;	401-225-3441

Kat Burnham, PPL Joshua Berman, Sierra Club Noah Garcia, NRDC	ngarcia@nrdc.org; Josh.berman@sierraclub.org; Kat@ripower.org;	401-276-0600
Acadia Center Robert D. Fine, Esq. Chace, Ruttenberg & Freedman, LLP One Park Row, Suite 300 Providence, RI 02903	rfine@crfllp.com;	401-453-6400 Ext. 115
	aboyd@acadiacenter.org;	
Amy Boyd, Esq. Acadia Center 31 Milk St., Suite 501 Boston MA 02109-5128	ENiedowski@acadiacenter.org;	617-472-0054 Ext. 102
	Mlebel@acadiacenter.org;	
Northeast Clean Energy Council Joseph A. Keough, Jr., Esq. Keough & Sweeney 41 Mendon Ave. Pawtucket, RI 02861	jkeoughjr@keoughsweeney.com;	401-724-3600
	jbesser@necec.org;	
Jannet Besser, NECEC	jdickerson@necec.org;	
The George Wiley Center John Willumsen-Friedman, Esq. Deputy Director Rhode Island Center for Justice 1 Empire Plaza, Suite 410 Providence, RI 02903	jwillumsen@centerforjustice.org;	401-491-1101 Ext. 810
	georgewileycenterri@gmail.com;	
	Camiloviveiros@gmail.com;	
Camilo Viveros, Wiley Center	chloechassaing@hotmail.com;	
ChargePoint, Inc. Edward D. Pare, Jr., Esq. Brown Rudnick LLP One Financial Center Boston, MA 02111	EPare@brownrudnick.com;	617-856-8338
	jreyes@brownrudnick.com ;	
	PAfonso@brownrudnick.com;	
	Anne.Smart@chargepoint.com;	
Anne Smart, Charge Point, Inc.	Kevin.Miller@chargepoint.com;	

Direct Energy Craig R. Waksler, Esq. Eckert Seamans Cherin & Mellott, LLC Two International Place, 16th Floor Boston, MA 02110 Marc Hanks, Sr. Mgr./GRA Direct Energy Services,	cwaksler@eckertseamans.com; rmmurphy@eckertseamans.com; dclearfield@eckertseamans.com; Marc.hanks@directenergy.com;	617-342-6800 413-642-3575
Original & 9 copies file w/: Luly E. Massaro, Commission Clerk Public Utilities Commission 89 Jefferson Blvd. Warwick, RI 02888	Luly.massaro@puc.ri.gov; Cynthia.WilsonFrias@puc.ri.gov; Alan.nault@puc.ri.gov; Todd.bianco@puc.ri.gov ; Margaret.hogan@puc.ri.gov;	401-780-2107
Interested Persons		
EERMC Marisa Desautel, Esq. Kate Desrochers	marisa@desautelesq.com; guerard@optenergy.com; kdesrochers@veic.org; loiter@optenergy.com;	401-477-0023
Bob Chatham	bchatham@vcharge-energy.com;	401-742-8264
John DiTomasso, AARP	jditomasso@aarp.org;	401-248-2655
Frank Epps, EDP	Frank@edp-energy.com;	
Matt Davey	mdavey@ssni.com;	
Nathan Phelps	nathan@votesolar.org;	
Karl Rabago	krabago@law.pace.edu;	
Radina Valova, Pace Energy & Climate Ctr.	rvalova@law.pace.edu;	
Eli Sherman, PBN	sherman@pbn.com;	
Tim Faulkner, ecoRI News	tim@ecori.org;	
Douglas W. Gablinske, TEC-RI	doug@tecri.org;	

Joseph A. Keough, Jr., Esquire # 4925
KEOUGH & SWEENEY, LTD.
41 Mendon Avenue
Pawtucket, RI 02861
(401) 724-3600 (phone)
(401) 724-9909 (fax)
jkeoughjr@keoughsweeney.com