The Narragansett Electric Company
d/b/a Rhode Island Energy

Advanced Metering Functionality Business Case

Vision and Strategy

Direct Testimony of:
David J. Bonenberger

AMF Business Case

Joint Direct Testimony of:
Philip J. Walnock and
Wanda Reder

Book 1 of 3

November 18, 2022

RIPUC Docket No. 22-49-EL

Submitted to:
Rhode Island Public Utilities Commission

Submitted by:

Rhode Island Energy™
a PPL company

Filing Letter
& Motion

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Rhode Island Energy™
a PPL company

November 18, 2022

VIA HAND DELIVERY AND ELECTRONIC MAIL

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

RE: Docket No. 22-49-EL-The Narragansett Electric Company d/b/a Rhode Island Energy
Advanced Metering Functionality Business Case

Dear Ms. Massaro:

Enclosed for filing with the Public Utilities Commission ("PUC") is an original and ten copies of the Company's[1] Advanced Metering Functionality ("AMF") Business Case pursuant to Article II, Section C.16.a of the Amended Settlement Agreement ("ASA") approved by the PUC at its Open Meeting on August 24, 2018, in Docket Nos. 4770 and 4780.[2]

Overview

The Company's filing consists of a detailed proposal for full-scale deployment of AMF[3] across its electric service territory in Rhode Island. The proposal will enable significant customer and grid benefits in line with the State's climate mandates. If approved, the program is estimated to cost $188 million on a net present value ("NPV") basis and provide benefits of $729.2 million NPV over the 20-year project life, yielding a benefit-cost ratio of 3.9. As explained in more detail in the AMF Business Case, the Company's AMF proposal is intended to address three key unmet needs in Rhode Island: (1) replacement of the existing electric automated meter reading ("AMR") meters, which are reaching the end of their design life, are obsolete, and will not scale; (2) ambitious State climate mandates, including the 2021 Act on Climate, that require greater visibility into and operational capability of the electric grid to maintain safety and reliability; and (3) evolving customer expectations and desire to make more informed energy choices. The Company's proposal

[1] The Narragansett Electric Company d/b/a Rhode Island Energy ("Rhode Island Energy" or the "Company").

[2] *See* Report and Order No. 23823, Docket Nos. 4770 and 4780 (May 5, 2020). This AMF Business Case replaces the filing that the Company previously submitted on January 21, 2021 in Docket No. 5113, while still under National Grid USA ownership. Rhode Island Energy filed a Notice of Withdrawal of that filing in Docket No. 5113 on September 12, 2022.

[3] AMF refers to the functionality provided by advanced meters, also referred to as smart meters. AMF is a broader concept than Advanced Metering Infrastructure ("AMI"); AMI commonly refers only to the smart meters themselves; AMF refers to the functionality that comes from the broader deployment of hardware and software solutions needed to utilize the smart meter data in a timely and efficient manner. The Company uses the term AMF universally throughout this filing to signify that the Company considered the viability of non-smart meter solutions.

represents an opportunity to deploy this foundational technology, which is a necessary first step to transforming Rhode Island's electric distribution grid.

Rhode Island Energy has undertaken a thoughtful and thorough approach to developing the AMF Business Case. Rhode Island Energy leveraged the work performed by the AMF/GMP Subcommittee of the Power Sector Transformation ("PST") Advisory Group that took place from approximately October 2018 through September 2020 while the Company was under National Grid USA ("National Grid") ownership. In addition, Rhode Island Energy arranged additional PST Advisory Group meetings in July and August of 2022 to present the Rhode Island Energy AMF Business Case approach to AMF/GMP Subcommittee members and obtain their input in preparation for this filing. As a direct result of feedback from those meetings, the Company engaged in other targeted deeper discussions with stakeholders and participated in a workshop with the PUC on September 1, 2022. The Company has worked to incorporate stakeholder and PUC feedback into the AMF Business Case and to address each of the AMF requirements set forth in the ASA. A summary of the ASA requirements and where each is addressed in the AMF Business Case is provided in Figure 1.2 of the AMF Business Case. A summary of the stakeholder engagement process and collaboration schedule is provided in Section 1.6 and Figure 1.3, respectively, of the AMF Business Case.

Revenue Requirement, Bill Impacts and Tariff Provision

Article II, Section C.16.c of the ASA permits (but does not require) the Company to reopen base distribution rates to recover the incremental revenue requirement associated with costs to implement AMF (the "Reopener"); however, the ASA does not require the Reopener to be the only mechanism for recovery of AMF costs. The Company's filing includes a request for approval to recover the incremental costs associated with the proposed AMF investments through a separate factor outside of base distribution rates ("AMF Factor"). The proposed AMF Factor would recover the actual incremental capital investments placed in service and the actual incremental operation and maintenance ("O&M") costs incurred on a historical basis. The Company proposes to update the AMF Factor semi-annually based on historical, actual data for the prior six-month period for rates to be effective July 1 and January 1, with the first AMF Factor to take effect January 1, 2024, pending the PUC's approval of the Company's AMF proposal. The joint pre-filed direct testimony of Company witnesses Stephanie A. Briggs and Bethany L. Johnson describes this proposal in detail, as well as the benefits of the AMF Factor as opposed to the Reopener. The Company's filing also includes a proposed tariff provision ("Tariff") to implement the AMF Factor.

As described in Ms. Briggs' and Ms. Johnson's joint pre-filed direct testimony, the revenue requirement on the incremental AMF investments to be recovered through the AMF Factor for AMF Recovery Year 1 (i.e., October 2022 through September 2023) is approximately $0.4 million with the highest revenue requirement in AMF Recovery Year 5 (i.e., October 2026 through September 2027), which subsequently decreases over the remaining years as the assets are depreciated, as shown on Schedule SAB/BLJ-1. The revenue requirement for AMF Recovery Year 1 reflects the incremental costs that the Company is proposing to recover through September 30, 2023. In addition, the Company is proposing an incentive structure that guarantees 80 percent of

the Non-Outage Management System Avoided Operations and Maintenance Costs benefits to customers, which are benefits from O&M savings not related to outage management. These avoided costs include such costs as reduced AMF operational costs, remote meter capabilities, and migration and/or reduction of damage claims. This incentive structure is reflected through reductions in the revenue requirements in the early years of the program before they would otherwise be realized by customers.

Because the Company is proposing to recover only actual, incremental capital and O&M costs through the semi-annual AMF Factor, the Company has provided illustrative AMF Factor calculations for each period beginning on January 1, 2024 through January 1, 2028 by rate class and illustrative bill impacts reflecting the illustrative AMF rates for AMF Recovery Years 1, 2, 3, 4, and 5 (the peak year of revenue requirement as shown on Schedule SAB/BLJ-1).[4] For AMF Recovery Year 1, the illustrative monthly bill impact for a residential electric customer on Last Resort Service (which was previously known as Standard Offer Service prior to January 1, 2021) and using 500 kWh per month is $0.07 or 0.04%. The total cumulative monthly bill impact over the first five AMF Recovery Years is $2.46 or 1.48%.

PPL Settlement with the Rhode Island Attorney General

In connection with the acquisition of 100 percent of the outstanding shares of common stock of the Company by PPL Rhode Island Holdings, LLC ("PPL Rhode Island Holdings"), a wholly owned indirect subsidiary of PPL Corporation ("PPL") from National Grid USA (the "Acquisition"), PPL made certain commitments as part of the Settlement Agreement dated May 19, 2022, by and among PPL, PPL Rhode Island Holdings, and Peter F. Neronha, Attorney General of the State of Rhode Island (referred to hereinafter as the "RIAG Settlement"). Rhode Island Energy addresses the following PPL commitments as they apply to the Company's AMF proposal:

- Commitment not to file for a change in base distribution rates for at least three years from the date of the transaction closing[5]: At the September 1, 2022 AMF workshop, the PUC directed the Company to address in its filing whether its cost-recovery proposal, i.e. either the Reopener or a separate AMF Factor, is consistent with PPL's commitment not to file for a change in base distribution rates during the stay-out period contained in the RIAG Settlement. The Company submits that the Reopener and the separate AMF Factor are both consistent with, and in any case, do not violate the terms of the RIAG Settlement. This commitment does not apply to the recovery of the incremental costs associated with the proposed AMF investments because the parties intended this provision to apply to the Company's filing of its next base distribution rate case, not its AMF proposal. This intent is evidenced by the plain language of the RIAG Settlement, which explicitly addresses the costs for AMF separately from the commitment around base distribution rates discussed below.

[4] The Company has also included an example of the increase in base distribution rates and the associated bill impacts if the reopener provision in Art. II, Sec. C.16.c of the ASA was applied, as shown on Schedule SAB/BLJ-3, Page 1, Line 10 and Page 11; Schedule SAB/BLJ-4, Page 1.

[5] RIAG Settlement, Exh. C, para. 1(c).

- Commitment regarding AMF Project Costs and Benefits: This commitment states, PPL will include in its plan for deployment of Advanced Meter Functionality ("AMF"):

  i. costs that are no more than the estimated costs in total as proposed by Narragansett in Docket No. 5113, and Narragansett will not seek to recover from customers costs in excess of that amount, which costs shall remain subject to regulatory review and approval.

  ii. a cost-benefit analysis that is at least as positive as the cost-benefit analysis included in the current Docket No. 5113 and bear the risk of lesser actual realized benefits.[6]

Figure 11.4 of the AMF Business Case shows a comparison of the Rhode Island Energy and National Grid costs and benefits. Rhode Island Energy's total costs on a NPV basis are $188.0 million as compared to National Grid's total costs of $192.6 million on a NPV basis. Likewise, on a NPV basis, Rhode Island Energy's benefit-cost ratio is 3.9 versus National Grid's benefit-cost ratio of 2.4.[7] The only restriction on the Company's ability to recover costs for AMF was the restriction to "not seek to recover from customers costs in excess" of the total costs proposed by National Grid in Docket No. 5113 (i.e., $192.6 million). Rhode Island Energy has, therefore, satisfied this commitment.

Accordingly, there is nothing in the RIAG Settlement that otherwise restricts or prohibits the Company from seeking to recover from customers the incremental costs for AMF investments that had been originally proposed by National Grid in Docket No. 5113, regardless of whether such cost recovery is through the Reopener provision or a separate AMF Factor.

- Commitment to include a written assessment of the potential impacts on the Act on Climate's requirements as part of any new filing, request, or proposal:[8] The Company has assessed that PUC approval of this AMF proposal is critical to meeting the Act on Climate mandates by preparing the electric distribution grid to integrate greater renewable energy generation and support beneficial electrification, as discussed in detail throughout the AMF Business Case.[9]

Filing Materials

Enclosed are three (3) books containing the Company's AMF proposal and supporting materials as follows:

[6] RIAG Settlement, Exh.C, para. 1(g)(i).
[7] *See* AMF Business Case, Figure 11.4 at Bates Page 135.
[8] RIAG Settlement, Exh. C, para. 2(g).
[9] *See* AMF Business Case, Executive Summary, Sections 1.2, 1.4, 3.1, 3.4, 4.1, 4.4, 11.1, 11.3.1, 11.5.13, 13.1.

Book 1

- Pre-filed Direct Testimony of David J. Bonenberger in support of Rhode Island Energy's vision and the role of AMF in Rhode Island; and
- Joint Pre-filed Direct Testimony of Philip J. Walnock and Wanda Reder in support of the Company's AMF Business Case.

Book 2

- Schedule PJW/WR-1 - AMF Business Case;
- Compliance With Rhode Island Docket 4600 (Attachment A);
- PPL Business Benefits From 15-Minute AMF Interval Data and 2020 Annual Report (Attachment B);
- Business Case Comparison: National Grid vs. Rhode Island Energy (Attachment C);
- Detailed Deployment Plan (Attachment D);
- Data Latency Benchmarking (Attachment E);
- Sample Customer Communications (Attachment F);
- Cybersecurity, Data Privacy And Data Governance Plan (Attachment G);
- AMF Benefit-Cost Analysis (BCA) Spreadsheet and Narratives – **CONFIDENTIAL** (Attachment H); and
- Acronym List (Attachment I).

Book 3

- Joint Pre-filed Direct Testimony of Stephanie A. Briggs and Bethany L. Johnson, with supporting schedules, presenting the increase in the electric revenue requirements, together with the illustrative AMF Factor calculations for AMF Recovery Years 1, 2, 3, 4, and 5, the associated bill impacts, and proposed Tariff.

This filing also includes a Motion for Protective Treatment in accordance with Rule 1.3(H)(3) of the PUC's Rules of Practice and Procedure, 810-RICR-00-00-1-1.3(H)(3) and R.I. Gen. Laws § 38-2-2(4)(B). The Company seeks protection from public disclosure of the confidential AMF Benefit-Cost Analysis spreadsheet in Excel format and the accompanying Narrative in Attachment H (Book 2). Because of the size and voluminous nature of the Excel file, the Company is providing the PUC with the confidential Excel file via the PUC's secure website marked as **"Contains Privileged and Confidential Information – Do Not Release."** Accordingly, the Company has not included redacted copies of this material for the public filing.

Rhode Island Energy respectfully requests that the PUC approve the enclosed AMF Business Case, together with the associated cost-recovery mechanism through the AMF Factor, and the proposed Tariff.

Thank you for your time and attention to this matter. If you have any questions, please contact Jennifer Brooks Hutchinson at 401-316-7429.

Very truly yours,

Jennifer Brooks Hutchinson

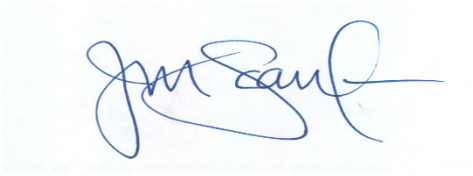
Enclosures

cc: Docket No. 22-49-EL Service List
John Bell, Division
Leo Wold, Esq.

Certificate of Service

I hereby certify that a copy of the cover letter and any materials accompanying this certificate was electronically transmitted to the individuals listed below.

The paper copies of this filing are being hand delivered to the Rhode Island Public Utilities Commission and to the Rhode Island Division of Public Utilities and Carriers.



Joanne M. Scanlon

November 18, 2022
Date

The Narragansett Electric Company d/b/a Rhode Island Energy
Docket No. 22-49-EL Advanced Meter Functionality (AMF)
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STATE OF RHODE ISLAND

RHODE ISLAND PUBLIC UTILITIES COMMISSION

In re: The Narragansett Electric Company d/b/a Rhode Island Energy's Advanced Metering Functionality Business Case	)	Docket No. 22-49-EL

MOTION OF THE NARRAGANSETT ELECTRIC COMPANY D/B/A RHODE ISLAND ENERGY FOR PROTECTIVE TREATMENT OF CONFIDENTIAL INFORMATION

The Narragansett Electric Company d/b/a Rhode Island Energy ("Rhode Island Energy" or the "Company") respectfully requests that the Rhode Island Public Utilities Commission ("PUC") provide confidential treatment and grant protection from public disclosure of certain confidential, competitively sensitive, and proprietary information submitted in this proceeding, as permitted by Rule 1.3(H)(3) of the PUC Rules of Practice and Procedure, 810-RICR-00-00-1-1.3(H)(3) ("Rule 1.3(H)"), and R.I. Gen. Laws § 38-2-2(4)(B). The Company also requests that, pending entry of that ruling, the PUC preliminarily grant the Company's request for confidential treatment pursuant to Rule 1.3(H)(2).

I. BACKGROUND

Contemporaneously with filing this motion, on November 17, 2022, Rhode Island Energy submitted its Advanced Metering Functionality Business Case (the "AMF Business Case") in the above-captioned docket. In that filing, the Company submitted its AMF Benefit-Cost Analysis ("BCA") Spreadsheet in Excel format and related Narrative as Attachment H to the AMF

Business Case (the "BCA Model").[1] The BCA Model contains confidential and proprietary commercial and financial information that the Company ordinarily would not share with the public. Therefore, the Company requests that, pursuant to Rule 1.3(H), the PUC afford confidential treatment to the BCA Model.

II. LEGAL STANDARD

Rule 1.3(H) provides that access to public records shall be granted in accordance with the Access to Public Records Act ("APRA"), R.I. Gen. Laws § 38-2-1, *et seq.* APRA establishes the balance between "public access to public records" and protection "from disclosure [of] information about particular individuals maintained in the files of public bodies when disclosure would constitute an unwarranted invasion of personal privacy." Gen. Laws § 38-2-1. Per APRA, "all records maintained or kept on file by any public body" are "public records" to which the public has a right of inspection unless a statutory exception applies. *Id.* § 38-2-3. The definition of "public record" under APRA, however, specifically excludes "trade secrets and commercial or financial information obtained from a person, firm, or corporation that is of a privileged or confidential nature." *Id.* § 38-2-2(4)(B). The statute provides that such records "shall not be deemed public." *Id.*

The Rhode Island Supreme Court has held that when documents fall within a specific APRA exemption, they "are not considered to be public records," and "the act does not apply to them." *Providence Journal Co. v. Kane*, 577 A.2d 661, 663 (R.I. 1990). Further, the court has held that "financial or commercial information" under APRA includes information "whose disclosure would be likely either (1) to impair the Government's ability to obtain necessary

[1] The AMF Business Case is Schedule PJW/WR-1 to the prefiled joint direct testimony of Philip J. Walnock and Wanda Reder.

information in the future, or (2) to cause substantial harm to the competitive position of the person from whom the information was obtained." *Providence Journal Co. v. Convention Ctr. Auth.*, 774 A.2d 40, 47 (R.I. 2001) (internal quotation marks omitted). The first prong of the test is satisfied when information is provided voluntarily to the governmental agency, and that information is of a kind that would not customarily be released to the public by the person from whom it was obtained. *Id.* at 47.

III. BASIS FOR CONFIDENTIALITY

The BCA Model constitutes "commercial or financial information" to which the APRA public disclosure requirements do not apply. *See* Gen. Laws § 38-2-2(4)(B); *Kane*, 577 A.2d at 663. It contains confidential and proprietary commercial and financial information relating to the Company's business operations. The Company ordinarily does not make this information available to the public. The Company has provided it on a voluntary basis to assist the PUC with its decision-making in this proceeding. Therefore, this information satisfies the APRA exception found in Gen. Laws § 38-2-2(4)(B).

Accordingly, Rhode Island Energy respectfully requests that the PUC grant protective treatment to the BCA Model and take the following actions to preserve its confidentiality: (1) maintain the BCA Model as confidential indefinitely; (2) not place the BCA Model on the public docket; and (3) disclose the BCA Model only to the PUC, its attorneys, and staff as necessary to review this docket.

IV. CONCLUSION

For the foregoing reasons, Rhode Island Energy respectfully requests that the PUC grant its Motion for Protective Treatment of Confidential Information.

Respectfully submitted,

The Narragansett Electric Company
d/b/a Rhode Island Energy

By its attorney,

Jennifer Brooks Hutchinson, Esq. (#6176)
The Narragansett Electric Company
d/b/a Rhode Island Energy
280 Melrose Street
Providence, RI 02907
(401) 784-7288
Dated: November 18, 2022

Testimony of
David J. Bonenberger

PRE-FILED DIRECT TESTIMONY

OF

DAVID J. BONENBERGER

Table of Contents

I. Introduction and Qualifications

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

A. My name is David J. Bonenberger. My business address is 280 Melrose Street, Providence, Rhode Island 02907.

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

A. I am the President of The Narragansett Electric Company d/b/a Rhode Island Energy ("Rhode Island Energy" or the "Company"), an indirect wholly-owned subsidiary of PPL Corporation ("PPL").

Q. What are your principal responsibilities in that position?

A. As President of Rhode Island Energy, I have responsibility for overseeing the regulated electric and gas distribution operations of PPL in Rhode Island provided by Rhode Island Energy and for providing safe and reliable service to Rhode Island customers, while achieving Rhode Island Energy's operational and financial performance objectives.

Q. Please describe your educational background and professional experience.

A. I have a bachelor's degree in accounting from Bloomsburg University and a Master of Business Administration from Wilkes University.

I originally joined PPL in 1984 as assistant field office manager at PPL's Susquehanna nuclear power plant. Over the course of my tenure, I held various positions in the corporate audit, financial, customer service and operations departments with increased levels of responsibility. I played a key role in the startup of the PPL EnergyPlus retail business and PPL Solutions in the unregulated markets. I served as Vice President of Distribution Operations, General Manager of Transmission & Substations, Director of Distribution Operations and Regional Director of the utility's central region. I also served as the Vice President of Transmission & Substations for PPL Electric Utilities Corporation ("PPL Electric"), overseeing the operations, planning, engineering, project and construction management, siting, real estate, and compliance to ensure safe and reliable service while providing exceptional customer service at a reasonable cost. Before becoming President of Rhode Island Energy, I was Vice President of Operations Integration for PPL and was responsible for overseeing the integration planning and implementation to bring The Narragansett Electric Company into the PPL organization, including the creation of transition/integration strategy, implementation of change management across multiple stakeholder groups, and achievement of acquisition business case revenue and pretax income.

A comprehensive list of the positions I have held during my time at PPL and the times I held them is provided as Attachment A to this testimony.

Q. Do you have any other professional experience that assists you in your current role in overseeing the safety and reliability of the electric and gas distribution systems in Rhode Island?

A. Yes. I am a member of several industry organizations, including the Edison Electric Institute's ("EEI") Preparedness & Recovery Executive Advisory Committee, the Electric Power Research Institute's Transmission Executive Advisory Committee, the South-eastern Electric Exchange Executive Engineering and Operations Committee, and the Association of Edison Illuminating Companies' Power Delivery Committee. I also am the Chair Emeritus of the EEI National Response Executive Committee.

Q. Have you previously testified before the Rhode Island Public Utilities Commission ("PUC") or any other regulatory commissions?

A. I have not testified before the PUC; however, I did testify on behalf of PPL and PPL Rhode Island Holdings, LLC, a wholly owned indirect subsidiary of PPL, before the Rhode Island Division of Public Utilities and Carriers (the "Division") in Docket No. D-21-09, in which the Division reviewed and approved PPL Rhode Island Holdings, LLC's acquisition of 100 percent of the outstanding shares of common stock of The Narragansett Electric Company ("Narragansett") from National Grid USA (the "Acquisition").

Q. Please describe the purpose of your testimony in this proceeding.

A. The purpose of my testimony is to introduce Rhode Island Energy and to describe its vision and strategy for the future of energy in Rhode Island and the role of advanced metering functionality ("AMF") in supporting that vision. I also discuss PPL's experience with deployment of AMF in its other jurisdictions and how that will benefit Rhode Island.

Q. How is your testimony organized?

A. My testimony is organized as follows: Section I is the Introduction. Section II discusses Rhode Island Energy's vision for the future of energy and the role of AMF. Section III describes PPL's experience with AMF deployment in its other jurisdictions. Section IV provides a brief overview of Rhode Island Energy's AMF Business Case, including its cost recovery proposal.

Q. Please explain the naming conventions that you will be using in your testimony to identify the various entities involved in this proceeding.

A. On May 25, 2022, PPL closed on the Acquisition and immediately re-branded Narragansett as Rhode Island Energy. This filing is Rhode Island Energy's AMF Business Case under PPL's ownership to propose full deployment of electric AMF meters across its service territory in Rhode Island. In this case, I will refer to the regulated entity under PPL's ownership as "Rhode Island Energy" or the "Company."

When I refer to PPL Corporation, I will use the term "PPL." When I refer to the Company under National Grid USA's ownership, I will use the term "National Grid" to distinguish it from the re-branded entity that is Rhode Island Energy. When referring to "National Grid USA" as the former owner of Narragansett, I will use that precise term.

II. Rhode Island Energy's Vision

Q. Please describe Rhode Island Energy and its vision for Rhode Island?

A. Rhode Island Energy is the primary provider of electric and gas distribution services in Rhode Island. Rhode Island Energy's vision is backed by PPL's mission, which is, in part, to provide safe, affordable, reliable, and sustainable energy to its customers. PPL has a rich history of providing safe, reliable, and affordable service for PPL customers, as documented by notable achievements earning numerous awards for customer satisfaction and national recognition for its operational performance through AMF implementation and grid modernization,[1] which it brings to Rhode Island Energy. PPL also has a superior customer satisfaction record, having been awarded 58 total J.D. Power residential and business customer satisfaction awards for its utilities in Pennsylvania and Kentucky combined, and it is working to integrate the operational practices that delivered those results into Rhode Island Energy.

[1] In 2019, PPL's Pennsylvania utility, PPL Electric Utilities Corporation ("PPL Electric"), won the Reliability One Best Improved Utility for Reliability based upon a measure of reliability performance data that was certified as part of the program. According to IEEE and EEI analyses, PPL Electric has performed in the first quartile for SAIFI every year for the last seven consecutive years.

Q. What is Rhode Island Energy's strategy for the future of energy in Rhode Island?

A. The electric distribution system is changing significantly because of changing customer behaviors and expectations, which are marked by: (i) the increasing adoption of additional renewable generation sources, including distributed energy resources ("DER"); (ii) beneficial electrification; (iii) electric vehicles ("EVs"); (iv) electric heat pumps; and (v) advanced "smart" technologies that enable customers to actively manage energy use in their homes and places of business. These changes have caused a shift from the traditional one-way flow of electricity from the utility distribution system to the customer to a two-way power flow that is more dynamic and less predictable. This phenomenon already has begun and will hasten exponentially with the continued proliferation of DER. Although Rhode Island already has begun to integrate significant DER, these changes will accelerate as the energy generation industry and Rhode Island Energy act to meet the State's aggressive policy mandates to transition to renewable energy generation and net zero greenhouse gas emissions. The 2021 Act on Climate set forth enforceable, statewide, and economy-wide greenhouse gas emissions mandates that require Rhode Island to reduce greenhouse gas emissions by 45 percent below 1990 levels by 2030, 80 percent by 2040, and to achieve net-zero emissions by 2050. The 2022 amendments to the Renewable Energy Standard further accelerate the shift to renewable energy resources by requiring 100 percent of electricity used in the State to be generated by renewable energy resources by 2033. These State policy mandates (collectively referred to as the "Climate Mandates") and the actions that energy generators and transmission

and distribution utilities must perform to achieve them will cause Rhode Island Energy's operation of the distribution system to become much more dynamic and complex.

To protect electric system safety and reliability and keep pace with this transformation, Rhode Island Energy must invest in the development of a safer and modernized grid that provides advanced functionality, such as more frequent system information for grid operators and more granular billing and usage information for customers.

Q. Why is Rhode Island Energy filing the AMF Business Case at this time?

A. Operationally, Rhode Island needs AMF now. Rhode Island Energy has a legal obligation to provide safe and reliable service to its customers.[2] The Company must deploy AMF to overcome the operating challenges that arise from today's changing energy landscape and play its critical role in delivering the clean energy future while continuing to meet its obligations. AMF is a necessary tool to operate the grid amidst the increasing adoption of DER. Without AMF, the Company will be challenged to meet its public service obligation to provide safe and reliable service to customers at the unwavering service level that customers demand and deserve.

Rhode Island's planned transition to a decarbonized, clean energy future requires increased capability, visibility, and control for grid operators. AMF provides near-real

[2] R.I. Gen. Laws § 39-2-1(a) ("Every public utility is required to furnish safe, reasonable, and adequate services and facilities.").

time information that enables this capability in a manner that is unachievable with the functionality of the Company's current automated meter reading ("AMR") meters. The current AMR meters provide usage information one time per month for the purpose of billing. Without AMF, Rhode Island Energy cannot operate a modernized grid because it will not have situational awareness of electric grid system conditions that are increasingly dynamic and complex.

Also, now is the right time to deploy AMF economically for customers. The existing electric meter fleet in Rhode Island consists largely of electromechanical meters retrofitted with an encoder receiver transmitter ("ERT") that provides AMR functionality. This AMR electric meter fleet is reaching the end of its design life, is becoming obsolete, and needs to be replaced to ensure continuous and reliable billing. The current AMR system also does not provide functionality that is needed now for operating, managing, and controlling the modern-day grid and effectively integrating customer-owned resources. Therefore, it would not be prudent to replace the aging meter fleet with like-for-like AMR meters.

Finally, as part of the Acquisition, PPL committed to filing the AMF Business Case within twelve months following the closing of the Acquisition because it believed in the benefits that AMF can deliver to Rhode Island. Filing this AMF proposal within six months after the Acquisition demonstrates the Company's commitment to delivering on

that promise to address an imminent need for AMF in Rhode Island. Moving forward expeditiously with this AMF Business Case now is critical for Rhode Island Energy to improve reliability and enhance customer satisfaction, while enabling the State to meet its Climate Mandates.

Q. How does AMF advance Rhode Island Energy's strategy for the future of energy?

A. Deploying and using AMF to its full potential is essential to PPL's overarching strategy, as evidenced by PPL's deployment of AMF in PPL's other service territories. Utilities like Rhode Island Energy must have greater operational visibility – both to ensure safe and reliable operations and to have more dynamic interaction with customers to empower them to take active control of their energy usage. This need for continuous two-way flows of data and information between Rhode Island Energy and its customers is driving the need to upgrade Rhode Island Energy's electric metering systems with modern technology. The granular information provided from the AMF platform offers necessary visibility to operate reliably and safely as DER interconnections increase. Also, AMF addresses an aging AMR fleet, and will provide customers with more information to make informed choices on their energy usage.

Q. Is AMF needed to meet Rhode Island's Climate Mandates?

A. Yes. For Rhode Island to achieve its Climate Mandates, the electric grid needs to accelerate its transition from a distribution system that was designed originally for one-way power flow with little situational awareness provided to operators to one that operationally enables increased penetration of DER, EV charging, energy storage, dynamic rates and more. Although some targeted investments have been made to facilitate the DER already in place in the State, acceleration is necessary, and AMF is the linchpin to achieving the necessary transformation. Integrating these technologies without the transformational grid investment to improve the visibility and control, starting with AMF, puts Rhode Island's safe, reliable electric supply at risk for the future. AMF is needed now because it is an operational necessity for the grid transformation that is occurring today, and it is a building block for future grid modernization technologies.

Q. Could Rhode Island achieve its Climate Mandates absent the increased penetration of DER that, in Rhode Island Energy's view, drives the need for AMF and additional grid modernization technologies?

A. No. DER adoption is already occurring, and there is no evidence that the rate of adoption will slow. Although the State theoretically could pursue alternative measures to meet the Climate Mandates, such as through the purchase of Renewable Energy Certificates ("RECs"), DER adoption is largely driven by private parties, including individuals and businesses. In connection with the Benefit Cost Analysis ("BCA") discussed in the pre-

filed joint direct testimony of Company witnesses Philip J. Walnock and Wanda Reder, Rhode Island Energy performed sensitivity analyses with respect to high and low levels of DER adoption. All the evidence points to a high level of localized DER adoption. Accordingly, the Company views increased DER penetration as inextricably linked to achievement of Rhode Island's Climate Mandates.

Q. Will the new AMF meters improve electric system reliability?

A. Yes. AMF is foundational for providing situational awareness to the system operator, such as near real-time voltage levels, current, connectivity, and energy usage at each AMF meter. AMF meters will have the ability to detect customer outages and other system anomalies, such as low and high voltage, and automatically notify Rhode Island Energy. This near real-time information can be used in conjunction with grid modernization software and automated line devices in a variety of ways, such as automatically isolating outages, dispatching crews more efficiently and adjusting system voltages. This minimizes the impact that outages have on customers and improves power quality. Without AMF, Rhode Island faces an increased risk for blackouts and other outages, which compromise safety and reliability, as well as customer satisfaction.

Q. Why would the lack of AMF increase the risk of blackouts and other outages?

A. Various forms of DER, many of which are intermittent and uncertain, are inevitable to achieving Rhode Island's Climate Mandates, and Rhode Island Energy will need to

provide a safe and reliable electric system that can enable this future state. Rhode Island Energy will need AMF to monitor near-real time conditions to recover from outages and major events safely and reliably, plan for upgrades, and offer time varying rates to shift load off the peak, automatically transfer load to manage reliability and take advantage of energy storage to optimize system utilization. In the event of a blackout, AMF can be useful for system recovery by providing necessary visibility when local generation needs to be balanced with load to meet urgent public health and security needs, or if centralized generation supply is not adequate or available. Without AMF, the visibility would not be there to balance load and generation locally.

Q. How are customers' interests served by Rhode Island Energy's AMF implementation proposal?

A. Serving its customers is the driving force behind everything Rhode Island Energy does. Safety and reliability are paramount. Fewer outages and faster restoration times means improved customer satisfaction. PPL's experience in its other jurisdictions has demonstrated that AMF is a powerful tool for meeting customer expectations and improving customer satisfaction, as further discussed in the pre-filed joint direct testimony of Company witnesses Philip J. Walnock and Wanda Reder.

Q. Please elaborate on why AMF is important for customers in Rhode Island.

A. AMF is important to Rhode Island customers because it will save them money over time and help to improve reliability. It provides the capability to address unmet customer needs, replaces obsolete AMR technology that is at the end of its design life, and enables the Company to continue to maintain a safe and reliable electric system while taking steps to achieve the State's Climate Mandates. AMF establishes a platform to modernize the electric infrastructure and better enable customers to make informed energy choices because they will have the information to do so. As a result, Rhode Island customers would be able to:

- Correlate their actions to bill impacts empowering them to better manage energy usage;
- Access tools that help to optimize their energy consumption;
- Adopt technologies that can automate their responses to time varying rates to make it easy for them to participate;
- Enjoy opportunities to reduce their energy cost burden; and
- Easily share their energy information with third parties to expand the service and product options that are available to them.

Q. How does a significant investment, such as AMF, facilitate affordability for customers?

A. AMF enables customers to have more choice and control over their energy usage. Electric AMF investments are necessary to assist customers in understanding the nature and costs of their underlying energy use. AMF also is foundational to the implementation of rate structures that offer customers a means to reduce energy costs,

while simultaneously providing Rhode Island Energy with significantly improved capabilities to manage system performance, enhance reliability, and further ensure that the planning and design of utility systems is undertaken in the most cost-effective manner.

Finally, the Company is committed to a cost recovery structure that closely aligns the costs customers will pay for AMF with the timing of such investments to help mitigate rate impacts. The Company's cost-recovery proposal is further discussed in the pre-filed joint direct testimony of Company witnesses Stephanie A. Briggs and Bethany L. Johnson.

Q. How does the AMF Business Case demonstrate PPL's commitment to bringing value to Rhode Island?

A. Rhode Island Energy's AMF Business Case demonstrates that customers will realize benefits that are at least as favorable on a net present value ("NPV") basis as those defined in National Grid's Updated AMF Business Case, meaning the benefits are greater and/or occur sooner under Rhode Island Energy's proposal. One of the aspects that makes this possible is that PPL is bringing the advanced distribution management system

basic software ("ADMS Basic")[3] to Rhode Island Energy and its customers as part of the Acquisition. Using ADMS Basic, Rhode Island Energy can integrate AMF data with utility operations in a way that provides incremental benefits, such as faster outage notification, remote connect/disconnect, and other operational efficiencies, immediately as each new AMF meter is installed.

Q. Why is AMF independent of the Company's forthcoming grid modernization plan ("GMP")?

A. As explained in more detail in the pre-filed joint direct testimony of Company witnesses, Philip J. Walnock and Wanda Reder, the transition the electric distribution grid is undergoing currently represents a once-in-a-generation shift. This is not "business as usual," and the Company does not approach it as such. Rhode Island Energy is intentionally filing its AMF proposal separately from its GMP to emphasize the fundamental importance it places on AMF.[4] Also, by filing in advance of the GMP, the Company has chosen to emphasize the conceptual value of AMF and give due salience to

[3] ADMS Basic is the ADMS platform PPL currently has in place for its electric utility in Pennsylvania, PPL Electric Utilities Corporation, and which Rhode Island Energy will have in place for its operations upon exit from the Transition Services Agreement with National Grid USA Service Company, Inc. As part of the Acquisition approval, PPL committed that Rhode Island Energy would not seek recovery from customers of any transition costs. Part of the transition includes bringing ADMS Basic to Rhode Island Energy. Accordingly, PPL is providing the ADMS Basic platform to Rhode Island Energy, the allocated costs of which will not be recovered from Rhode Island customers. ADMS Basic is an enhancement from the National Grid distribution management system. PPL and Rhode Island Energy plan to propose enhancements to ADMS Basic (which are not a part of the transition) to increase functionalities and benefits. In this testimony, I use the defined term ADMS Basic to refer specifically to the software that PPL is providing to Rhode Island Energy as part of the transition.

[4] Although the filings are distinct, the Company is diligently working to ensure compatibility between the AMF and GMP filings.

AMF's benefits, even in the absence of other grid modernization investments. AMF by itself is necessary and should move forward expeditiously. Because the ADMS Basic system is being made available to Rhode Island Energy through the Acquisition, it is capable of unilaterally delivering nearly all benefits quantified in the BCA for this Business Case, as discussed in the pre-filed joint direct testimony of Mr. Walnock and Ms. Reder.[5] The granular information that AMF provides is both foundational to and enhances many of the GMP functionalities. As a result, it makes sense to move forward with AMF first. Simply put, AMF is necessary and valuable independent of the GMP, and grid modernization cannot be fully realized without AMF, making AMF a prerequisite for, and foundational to, the GMP.

III. PPL's Experience in Its Other Jurisdictions

Q. Please elaborate on the AMF experience that PPL brings to Rhode Island.

A. PPL is well-positioned to implement AMF in Rhode Island. PPL has installed a second generation of advanced meters for all its Pennsylvania customers and began meter installation for its Kentucky customers in September 2022. In Pennsylvania, PPL implemented its first-generation automated meter reading system from 2002 to 2004; the second-generation advanced meter reading infrastructure was installed from 2016 to 2019 and is currently in service. PPL's substantial experience with realizing AMF benefits for customers and network operations is at the forefront of industry best practices. PPL's

[5] The exception is benefits of Volt VAR Optimization, which is co-dependent on GMP investments.

extensive experience in deploying and using these advanced meters will maximize the efficiency of AMF deployment in Rhode Island and provides evidence that PPL can execute according to plan.

Q. Please describe PPL Electric's overall smart meter (i.e., AMF) program performance in Pennsylvania.

A. PPL Electric's smart meter implementation plan ("SMIP") was approved by the Pennsylvania Public Utility Commission in September 2015 at Docket No. M-2014-2430781. PPL Electric implemented its SMIP on schedule and on budget, as detailed in its 2020 Annual Smart Meter Progress Report ("2020 Progress Report").[6] As stated in the 2020 Progress Report, the Company's deployment plan was executed in accordance with the SMIP. The full-scale deployment of radio frequency ("RF") meters began in December 2016 with mass deployment completed by the end of 2019. The program concluded on schedule at the end of 2020; meeting objectives with planned functionality, meter installs, and cost. In summary, PPL Electric followed its approved SMIP without the need for any material modifications.[7]

[6] *See* PPL Electric Utilities Corporation's 2020 Annual Smart Meter Progress Report (filed August 31, 2020) and 2021 Annual Smart Meter Progress Report (filed August 31, 2021) at the following link: https://www.puc.pa.gov/pcdocs/1717999.pdf.

[7] *See Id*. at 3, 8, and 13.

Q. In PPL's experience, has AMF improved reliability?

A. Yes. PPL is a proven innovator, having been one of the first utilities in the country to use automatic reclosers system-wide and ADMS software in conjunction with AMF meter information. This combination has changed how the distribution system operates by automating the distribution network reconfiguration, minimizing the number of customers impacted by a power outage, and enabling more effective and efficient response to restore service. Outages are managed using the Last Gasp function from the AMF meter to understand where power is down and the Power Up alert to provide information that power has been restored. This AMF capability, coupled with distribution automation, provides the ability to better manage the restoration process because the outage notification process occurs immediately, outages are automatically isolated, and restoration crews can be more efficiently dispatched to pinpointed outage locations. Consequently, reliability in Pennsylvania has improved steadily since the investments began, as shown in Figure 1.1 in the Business Case, ultimately reaching top decile performance. As a result, customer satisfaction scores have increased steadily. The technology investments also have been useful for PPL to realize business savings through automation and by providing information to make better planning and operating decisions. Similar investments in Rhode Island should result in similar customer benefits.

IV. Overview of Rhode Island Energy's AMF Business Case

Q. Please summarize Rhode Island Energy's AMF Business Case?

A. Rhode Island Energy's AMF Business Case presents the Company's proposal for full-scale deployment of AMF across Rhode Island Energy's electric service territory. To support approval of the Company's AMF Business Case, Rhode Island Energy has developed a comprehensive business case sponsored by an expert panel of witnesses, consisting of Philip J. Walnock, Wanda Reder, Stephanie A. Briggs, and Bethany L. Johnson.

Q. What is the proposed timing of AMF implementation in Rhode Island?

A. The Company is proposing a three and one-half-year implementation plan and project timeline, which consists of three overlapping and overarching functions: Regulatory, Systems, and Deployment. The project timeline and the work associated with each function is described in detail in Section 8 of the AMF Business Case and in Section IV.D of Mr. Walnock's and Ms. Reder's joint testimony. In addition, the Company has developed a multi-phase deployment plan that outlines a preliminary overall strategy for deploying the RF mesh network equipment and meter devices in Rhode Island. Meter deployment is projected to begin in a test area during the third quarter of 2024 and will be rolled out by geographic sector through the end of the fourth quarter of 2025. The detailed deployment plan is presented in Attachment D of the AMF Business Case.

Q. What is the overall cost to deploy AMF across Rhode Island Energy's electric service territory in Rhode Island?

A. If approved, the AMF project is estimated to cost $188 million on a net present value ("NPV") basis over the 20-year project life. The pre-filed joint direct testimony of Company witnesses Stephanie A. Briggs and Bethany L. Johnson and their associated schedules present the calculation of the Company's revenue-requirement on this incremental investment.

Q. Please provide an overview of the BCA for the proposed AMF investments.

A. Mr. Walnock and Ms. Reder discuss the BCA that the Company used to determine the cost-effectiveness of full-scale AMF deployment in Section 5 of their joint testimony. In summary, full-scale deployment of AMF provides benefits of $729.2 million NPV over the 20-year project life. When compared to the costs of $ $188.0 million NPV, the Benefit/Cost ("B/C") ratio is strong at 3.9 NPV. When the benefits from the GMP are decoupled from AMF, the AMF stand-alone B/C ratio remains significantly above 1.0, at 3.1 NPV, making a strong and compelling case to proceed with AMF now.

Q. How does Rhode Island Energy propose to recover the costs of its AMF implementation proposal?

A. Rhode Island Energy already is making investments to advance implementation of AMF, as described in Section IV.D of the pre-filed joint direct testimony of Mr. Walnock and

Ms. Reder. To successfully implement AMF, the Company needs assurance that it can obtain timely recovery of the significant additional investments required. Accordingly, Rhode Island Energy is proposing the creation of an AMF Factor to recover the actual costs incurred for the implementation. The details of the proposed cost recovery mechanism are set forth in Section 12 of the Business Case and the pre-filed joint direct testimony of Ms. Briggs and Ms. Johnson.

Q. Why is timely recovery of the costs for full-scale deployment of AMF critical to Rhode Island Energy?

A. Rhode Island Energy's investment in AMF is above and beyond the normal course of business today and is necessary to continue to provide safe and reliable service, while it transitions the electric distribution system to a clean energy future. Timely cost-recovery for AMF is necessary for Rhode Island Energy to make the level of investment required to implement AMF in Rhode Island.

Q. Are there any circumstances that would lead Rhode Island Energy not to implement AMF?

A. Yes. If Rhode Island Energy is not able to obtain approval for timely recovery of the full cost for the AMF implementation investment, Rhode Island Energy would not be able to implement AMF because the financial investment is too significant for the Company to carry on its books absent some form of assurance for cost-recovery.

Q. What would Rhode Island Energy do instead?

A. Without AMF, Rhode Island Energy would need to continue investments in the legacy AMR system. This is not cost-effective or practical as aging technology becomes obsolete and unavailable. Rhode Island Energy has determined that AMR meters will not provide the necessary functionalities required to perform now or in the future given the confluence of drivers facing Rhode Island Energy's electric operations. AMR will not be capable of providing the functionality to achieve Rhode Island's Climate Mandates because granular information that is needed to support dynamic rate offerings such as TVR would not be available. Furthermore, the capability to provide operators with the visibility needed as system complexity increases from DER and demand changes from EV charging would be lacking, negatively impacting reliability and safety.

Q. What would happen with respect to the investments Rhode Island Energy already has undertaken to advance AMF implementation?

A. The AMF work that is underway for Rhode Island Energy is being performed at-risk, and if the Company does not receive approval for AMF implementation, it will write off those costs.

V. Conclusion

Q. Do you have any summary comments on Rhode Island Energy's AMF Business Case?

A. Yes. Rhode Island Energy is putting forth a comprehensive business case in support of AMF to put Rhode Island on the path to a modernized grid and equip the Company with the tools necessary to improve reliability, enhance customer satisfaction, and meet the State's Climate Mandates. PPL's experience with deploying AMF in its other jurisdictions provides evidence that it can deliver AMF to Rhode Island in a cost-effective and timely manner. Rhode Island Energy urges the PUC to approve this proposal, including cost recovery for these critical investments, to deliver the important benefits AMF can bring to Rhode Island customers.

Q. Does this conclude your testimony?

A. Yes, it does.

Attachment A
David J. Bonenberger

David J. Bonenberger

Job Title	Department	Job Sen Dt
VP-Operations Integration	Corporate Ops and Integration	4/12/2021
VP-Transmission & Substations	Transmission & Substations	1/1/2018
VP-Distribution Operations	Dist-Operations Admin	7/10/2012
GM - Transmission Operations	Transmission Operations	11/29/2010
Director of Operations	Dist-Operations Admin	1/26/2009
Regional Director Operations	Field Services Central	7/30/2007
R-Mgr Field ServicesOps Suppor	Field Services	7/17/2006
R-Mgr-Business Consulting	Utilities Business Consulting	5/10/2004
Mgr-Customer Care	Customer Operations	4/6/1998
Mgr-Technology Applications	CS Technology Applications	7/28/1997
Supv-Technical Support	Customer Contact Center	4/3/1995
Supv-Technical Supp-D.O.	Customer Contact Center	6/6/1994
Systems Analyst-Contact Center	Customer Contact Center	11/12/1990
Sr Accountant	Corporate Accounting	4/9/1990
Sr Auditor	Audit Services	12/14/1987
Staff Auditor	Audit Services	6/17/1985
Asst Field Office Mgr	Inactive Cost Areas 4xx	1/23/1984

Joint Testimony of
Walnock & Reder

JOINT PRE-FILED DIRECT TESTIMONY

OF

PHILIP J. WALNOCK

AND

WANDA REDER

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I. Introduction and Qualifications

Philip J. Walnock

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

A. My name is Philip J. Walnock. My business address is 2 North 9th Street, Allentown, PA 18101.

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

A. I am employed by PPL Services Corporation, a subsidiary of PPL Corporation ("PPL"), and I currently hold the position of Director, Product Portfolio – Field Operations & Metering. My responsibilities include leading the development of the business case and supporting materials as part of PPL's effort to secure regulatory approval for the deployment of advanced metering functionality ("AMF") for The Narragansett Electric Company d/b/a Rhode Island Energy (referred to herein as "Rhode Island Energy" or the "Company").

Q. Please describe your educational background and professional experience.

A. I hold a Bachelor of Arts degree from East Stroudsburg University of Pennsylvania (1995) and a Master of Science degree from Stevens Institute of Technology (2005). I have more than 13 years of leadership experience at PPL Electric Utilities Corporation ("PPL Electric") across Customer Service, Advanced Metering, and Transmission & Distribution operations and project management. Prior to my current role, I was Director,

Customer Service Project Management Office with direct responsibilities for PPL Electric's energy efficiency and low-income programs, along with the planning and implementation of the customer experience portfolio. From 2015-2019, I was responsible for leading the overall implementation of PPL Electric's Smart Meter Implementation Plan ("SMIP"), where approximately 1.45 million automated meter reading ("AMR") meters were exchanged with second-generation AMF meters in Pennsylvania. From 2009 through 2014, I held leadership roles in Attachments, Vegetation Management, Construction Management, and Project Management. I was employed with Verizon Communications from 1996 – 2009 in various front line and leadership roles in Construction, Installation and Maintenance, Customer Operations, and Strategic Initiatives.

Q. Have you previously testified before the Rhode Island Public Utilities Commission ("PUC") or any other regulatory commissions?

I have not testified before the PUC; however, I presented to the PUC regarding the AMF Business Case at the Workshop conducted by the PUC in Docket Nos. 4770 & 4780, In re: The Narragansett Electric Company d/b/a Rhode Island Energy – Electric and Gas Distribution Rate Filing, on September 1, 2022, together with Ms. Reder. I sponsored several responses to data requests in Docket No. D-21-09 before the Rhode Island Division of Public Utilities and Carriers (the "Division"), which was the proceeding in which PPL and PPL Rhode Island Holdings, LLC ("PPL Rhode Island") obtained

approval to acquire 100% of the outstanding common stock of The Narragansett Electric Company ("Narragansett") from National Grid USA.

In Pennsylvania, I provided testimony in the 2015 Petition for Waiver of the Distribution System Improvement Charge (Docket No. P-2015-2474714) which was related to (and consolidated with) the 2015 Rate Case (Docket No. R-2015-2459275).

Wanda Reder

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

A. My name is Wanda Reder. My business address is 34W676 Country Club Road, Wayne, Illinois 60184.

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

A. I am the President and CEO of Grid-X Partners, which is a certified Women's Business Enterprise consulting firm that provides insight and direction for electric and gas utility grid transformation. Grid-X Partners brings senior executive experience having a unique balance of technical, strategic and practitioner capability. It assists utilities and their stakeholders in developing strategy, regulatory and execution plans to address the complex challenges confronted by utilities in an evolving industry landscape. As CEO, my primary responsibilities include making all major corporate decisions, financial responsibility, managing the overall operations and resources of the company, acting as

the main point of communication between the consultants and our clients. I am testifying on behalf of Rhode Island Energy.

Q. Please describe your educational background and professional experience.

A. I earned a Master of Business Administration with emphasis in New Ventures from the University of St. Thomas in St. Paul, Minnesota, and a Bachelor of Science in Engineering from South Dakota State University.

I have more than 30 years of experience in the electric utility industry, with much of my career aimed at grid modernization thought leadership and transformation for electric utilities. Before founding Grid-X Partners, I served as Chief Strategy Officer and Vice President of Power Systems Services for S&C Electric Company ("S&C") from 2004 to 2018. There, I developed consulting, engineering, field services, and project management capability to address global service needs. Among many offerings, we designed, integrated, and commissioned grid-scale distribution automation projects as well as wind-power, solar, and storage projects for utilities and developers. Prior to S&C, I was a Vice President for Exelon Energy Delivery responsible for several areas such as Asset Management, Engineering and Planning. My group of more than 1,000 employees defined the transmission and distribution work portfolio in excess of $1 billion annually, developed and managed the budget, and prepared and scheduled the execution of work. Before Exelon, starting in 1987, I served in various capacities for Northern

States Power (now Xcel) in executive and engineering roles, including leading business planning and technology implementation for automated meter reading, distribution automation, distribution management, and demand-side management. I bring my experience with creating the business plan and executing automated meter reading that led to the conversion of approximately 1 million electric meters in the Minneapolis and St. Paul service area to this AMF Business Plan. Efforts included securing long-term contracts, overseeing IT efforts, and leading three work groups to exchange meters while maintaining contiguous billing operations. I am an Institute of Electrical and Electronics Engineers ("IEEE") Fellow, served as President of the IEEE Power & Energy Society ("PES") from 2008 to 2009, and was appointed to the U.S. Department of Energy ("DOE") Electricity Advisory Committee by the U.S. Secretary of Energy, serving a six-year term from 2011 to 2017, and again re-appointed in 2018 until the present, where I currently serve as its Chair. Also, I was invited to, and became a member of, the prestigious National Academy of Engineers in 2016 for my leadership in electric power delivery and workforce development, where I currently serve on the Membership Policy and Finance Committees.

Q. Have you previously testified before the PUC or any other regulatory commissions?

A. I have not testified before the PUC. However, I presented regarding the AMF Business Case at the Workshop conducted by the PUC in Docket Nos. 4770 & 4780, In re: The

Narragansett Electric Company d/b/a Rhode Island Energy – Electric and Gas Distribution Rate Filing, on September 1, 2022, together with Mr. Walnock, and I presented about the Company's forthcoming Grid Modernization Plan ("GMP) at the Technical Session held in Docket No. 5209, In re: The Narragansett Electric Company Electric Infrastructure, Safety & Reliability Plan FY 2023, on October 18, 2022.

In addition to my work in Rhode Island, I was an expert witness for PPL Electric's DER Management Petition, where the Company requested to proactively implement the 2018 revisions to IEEE Standard 1547, "Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces" ("IEEE Standard 1547" or "IEEE 1547-2018") and the related UL Standard 1741 to require new customers applying to interconnect new distributed energy resources ("DER") with PPL Electric's distribution system to use approved smart inverters that are compliant with IEEE 1547-2018 and to install devices that enabled PPL Electric to monitor and proactively manage individual customer DERs. This included tariff revisions for the utility to monitor and manage customer inverters located behind the meter. My role was to present the background for the IEEE standard and showcase global trends and use cases that highlight the importance of the using the IEEE standard.

II. Purpose, Background and Structure of Joint Testimony

Q. Please describe the purpose of your joint testimony in this proceeding.

A. The purpose of our joint testimony is to present Rhode Island Energy's AMF Business Case to implement AMF across its electric service territory in Rhode Island.

Q. What does the Company seek from the PUC with this filing?

A. With this filing, the Company requests that the PUC approve the Company's proposal to expeditiously implement AMF across its electric service territory in Rhode Island, together with its proposed cost recovery mechanism, as further described in the pre-filed joint direct testimony of Company witnesses, Stephanie A. Briggs and Bethany L. Johnson.

Q. Why is the Company seeking PUC approval to implement AMF?

A. The investment in an AMF platform is critical for system safety, reliability, and customer satisfaction because it provides grid operators with granular[1] and timely information such as voltage, power flow, and visibility into power outage locations to enable more efficient power restoration. These operational improvements are necessary to operate Rhode Island Energy's distribution system safely and reliably as it becomes increasingly

[1] Granular data is detailed data, or the lowest level of data in a target set. The granular data provided through AMF are the 15-minute interval, time sequenced data measurements. These are much more detailed measurements than what has been available to the Company historically, and they provide the level of information necessary for improved analytics and greater operational visibility.

complex and uncertain as a result of the proliferation of DERs and electric vehicle charging, as well as increased demand, both from electric vehicle charging and beneficial electrification. The Company's current AMR meter fleet is not capable of providing the detailed and timely information necessary to meet today's energy system management needs. In addition, AMF provides enhanced customer access to more timely and granular usage data and provides the wherewithal for the Company to create and for customers to take advantage of more dynamic rate offerings. Finally, the Company's proposed AMF implementation timeline aligns with the need to replace the current Rhode Island electric meter fleet, the majority of which have reached the end of the useful design life.

Q. By when does the Company seek a decision from the PUC?

A. Given the urgent need for AMF in Rhode Island, the Company requests a decision on or before June 30, 2023 to be able to meet the deployment timeline set forth in Rhode Island Energy's AMF Business Case.

Q. Please explain the naming conventions that you will use in your testimony to identify the various entities involved in this proceeding.

A. On May 25, 2022, PPL Rhode Island, a wholly owned indirect subsidiary of PPL, acquired 100% of the outstanding shares of common stock of Narragansett from National

Grid USA (the "Acquisition") and immediately re-branded Narragansett as Rhode Island Energy. This filing is Rhode Island Energy's AMF Business Case to propose full deployment of electric AMF meters across its electric service territory in Rhode Island under PPL's ownership. In this case, we will refer to the regulated entity under PPL's ownership as "Rhode Island Energy" or the "Company." When we refer to PPL Corporation, we will use the term "PPL." When we refer to Narragansett under National Grid USA's ownership, we will use the term "National Grid" to distinguish it from the re-branded entity that is Rhode Island Energy. When referring to "National Grid USA" as the former owner of Narragansett, we will use that precise term.

Q. Please describe the procedural background leading to Rhode Island Energy's filing of the AMF Business Case in this proceeding.

A. On November 28, 2017, National Grid filed its Power Sector Transformation Plan ("PST Plan") in Docket No. 4780 simultaneously with its general distribution rate case in Docket No. 4770. The PST Plan included a preliminary AMF business case and benefit-cost analysis ("BCA").[2] The Amended Settlement Agreement ("ASA") approved by the PUC at its Open Meeting on August 24, 2018, in Docket No. 4770 provided $2 million in

[2] *See The Narragansett Elec. Co. d/b/a National Grid, Proposed Power Sector Transformation Vision and Implementation Plan*, Docket No. 4780, Book 1 of 3, Schedule PST-1, Ch. 4 at Bates Pages 68-99; Book 2 of 3, Appendix 4.1 at Bates Pages 1-31 (November 28, 2017).

funding for National Grid to develop an Updated AMF Business Case and established the PST Advisory Group, a stakeholder process, to develop and refine the AMF implementation proposal. Article II, Section C.16 of the ASA required National Grid to file the Updated AMF Business Case with the PUC for review. National Grid filed its Updated AMF Business Case on January 21, 2021 in Docket No. 5113.[3]

As part of the Acquisition, PPL committed to filing a further updated AMF Business Case[4] within twelve (12) months following the closing of the Acquisition. Rhode Island Energy is filing this AMF Business Case within 6 months after the Acquisition to emphasize the urgency of addressing Rhode Island's need for AMF now.

Q. Did PPL take into account National Grid's Updated AMF Business Case ("National Grid AMF Filing") in developing Rhode Island Energy's AMF Business Case?

A. Yes. In developing this AMF Business Case, PPL considered and leveraged, where appropriate, the National Grid AMF Filing. In doing so, Rhode Island Energy, with support from PPL and Grid-X Partners, researched the various aspects of the National Grid AMF Filing, such as the supporting financial analysis, technology assessment, and

[3] The PUC stayed National Grid's AMF filing in Docket No. 5113 pending further consideration following the Division's 's issuance of a final Order in *In Re: Petition of PPL Corporation, PPL Rhode Island Holdings, LLC, National Grid USA and The Narragansett Electric Company for Authority To Transfer Ownership of The Narragansett Electric Company to PPL Rhode Island Holdings, LLC, and Related Approvals*, Docket No. D-21-09. *See* Written Order No. 24089, Docket No. 5113 at 5 (July 14, 2021). The Division issued its Report and Order on February 23, 2022, which became final on May 23, 2022. The Acquisition closed on May 25, 2022. The Company subsequently filed a withdrawal of National Grid's Updated AMF Business Case in Docket No. 5113 on September 12, 2022.

[4] To avoid confusion and to distinguish Rhode Island Energy's business case with National Grid's Updated AMF Business Case filed in Docket No. 5113, the Company will use the term "AMF Business Case" or the "Business Case" to refer to Rhode Island Energy's AMF proposal in this filing.

stakeholder input, all of which contributed to the AMF Business Case presented here. Both plans recognize that the existing AMR meters must be replaced because they are aging (and in most cases are at or nearing the end of their useful life) and not capable of enabling customer choice, grid modernization, and scaling to provide future functionalities required to achieve the State's aggressive climate and other clean energy mandates (collectively, the "Climate Mandates").[5] AMR meter limitations stem from having one consumption read per month that is used solely for billing. The present AMR capability lacks trending, alarming, and granular interval information, on which Rhode Island Energy can base operating decisions given modern-day grid conditions, and on which customers can base their energy choices. Although Rhode Island Energy's rationale for proposing to implement AMF is like that of National Grid, Rhode Island Energy places greater emphasis on the need to invest in AMF because of its contribution to system reliability. In light of: (i) the passage of time since National Grid first introduced AMF in 2017 in Docket Nos. 4770 and 4780, (ii) the robust stakeholder process undertaken through the PST Advisory Group, and (iii) PPL's experience deploying AMF in its other jurisdictions, now is the right time to invest in AMF in Rhode

[5] The 2021 Act on Climate set forth enforceable, statewide, economy-wide greenhouse gas emissions mandates that require Rhode Island to reduce greenhouse gas emissions by 45% below 1990 levels by 2030, 80% by 2040, and to achieve net-zero emissions by 2050. The 2022 amendments to the Renewable Energy Standard further accelerate the shift to renewable energy resources by requiring 100% of electricity used in the State be generated by renewable energy resources by 2033.

Island. Expeditious AMF deployment is essential to Rhode Island Energy's ability to provide its customers with safe and reliable service, while providing infrastructure that can enable the State to achieve its Climate Mandates.

Q. What are some key differences between the National Grid AMF Filing and this AMF Business Case?

A. The following key differences are discussed in greater detail in Attachment C to the Business Case:

- Rhode Island Energy, with support from PPL, took a broader view of the strategic importance of the AMF investment as an essential pre-requisite and enabling platform by designing a more hardened and robust communication network that anticipates potential future opportunities for areas such as grid modernization, AMF for gas customers, DER, new energy markets and beneficial electrification.

- Rhode Island Energy leveraged insights gained from PPL's AMF experience in its other jurisdictions, which will increase the efficiency, quality, and confidence of Rhode Island Energy's AMF deployment in Rhode Island.

- Certain benefits will occur faster due to system integration, business processes and tools that PPL already has developed and successfully implemented, as well as the

integration with the basic Advanced Distribution Management System ("ADMS Basic")[6] that PPL is bringing to Rhode Island Energy and its customers as part of the Acquisition.

- Rhode Island Energy, with support from PPL, included the additional cost of preparatory visits to customer meters (called "pre-sweeps") in the proposal. Rhode Island Energy will perform these pre-sweeps prior to the AMF meter deployment. Based on PPL's experience in its other jurisdictions, these pre-sweeps will allow the Company to identify and address any obstacles to meter installation before the day of installation, thereby allowing meter installation to proceed more safely and efficiently.

[6] ADMS Basic is the ADMS platform PPL currently has in place for its electric utility in Pennsylvania, PPL Electric Utilities Corporation, and which Rhode Island Energy will have in place for its operations upon exit from the Transition Services Agreement with National Grid USA Service Company, Inc. As part of the Acquisition approval, PPL committed that Rhode Island Energy would not seek recovery from customers of any transition costs. Part of the transition includes bringing ADMS Basic to Rhode Island Energy. Accordingly, PPL is providing the ADMS Basic platform to Rhode Island Energy, the allocated costs of which will not be recovered from Rhode Island customers. ADMS Basic is an enhancement from the National Grid distribution management system. PPL and Rhode Island Energy plan to propose enhancements to ADMS Basic (which are not a part of the transition) to increase functionalities and benefits. In this testimony, we use the defined term ADMS Basic to refer specifically to the software that PPL is providing to Rhode Island Energy as part of the transition.

Q. Does the AMF Business Case meet the requirements of the ASA?

A. Yes. The AMF Business Case addresses each applicable element required by Article II, Section C.16.iv of the ASA.[7] Figure 1.2 in the AMF Business Case identifies the specific sections of the AMF Business Case in which each ASA element is addressed.

Q. Does the AMF Business Case include a proposal for the deployment of AMF meters across the Company's gas distribution system?

A. No. The Company is developing a long-range gas strategy assessment for Rhode Island. The gas metering infrastructure and Rhode Island's future needs will be considered in the assessment, and, if viable, the Company will utilize the fixed communication network established in this AMF proposal to support upgraded gas metering and sensing capability in Rhode Island.

Q. How is your testimony structured?

A. Sections I and II include an Introduction and Qualifications, and the Purpose, Background, and Structure of the Testimony, respectively. Section III presents the case for AMF in Rhode Island, including why now is the best time to invest in AMF

[7] The AMF Business Case does not include: (i) both a Rhode Island only scenario and a Rhode Island/New York scenario, or (ii) BCA sensitivities for different meter deployment periods because those scenarios are no longer applicable. PPL does not operate in New York and already has deployed AMF in Pennsylvania and is in the process of deploying AMF in Kentucky; therefore, a multi-jurisdiction scenario is not applicable to Rhode Island Energy's Business Case. Rhode Island Energy's BCA is based upon a 1 ½ year meter deployment period because it is more efficient, as concluded in National Grid's AMF proposal and PPL's AMF deployment in Pennsylvania. As a result, the BCA sensitivity for various meter deployment periods is no longer applicable and was not performed for this Business Case.

technologies based on the state of metering in Rhode Island (i.e., inaction is not an option), as well as changing customer and grid needs. Section IV provides an overview of the proposed AMF Program, including why AMF is a prerequisite to grid modernization, the functionalities that will be available through an AMF deployment, as well as the details of program implementation. Section V presents the BCA. Section VI outlines the Company's Customer Engagement Plan. Section VII summarizes the Company's approach to Data Governance. Section VIII presents the Company's proposed reporting Metrics. Section IX is the conclusion.

Q. Are you sponsoring any attachments in support of your joint testimony?

A. Yes, we are sponsoring the following attachments:

Schedule PJW/WR-1 is the AMF Business Case, which includes the following attachments:

- Attachment A: Compliance With Rhode Island Docket 4600
- Attachment B: PPL Business Benefits From 15-Minute AMF Interval Data and 2020 Annual Report
- Attachment C: Business Case Comparison: National Grid vs. Rhode Island Energy
- Attachment D: Detailed Deployment Plan
- Attachment E: Data Latency Benchmarking
- Attachment F: Sample Customer Communications
- Attachment G: Cybersecurity, Data Privacy And Data Governance Plan

- Attachment H: AMF Benefit-Cost Analysis ("BCA") Spreadsheet and Narrative **CONFIDENTIAL**

- Attachment I: Acronym List

Because the BCA Spreadsheet and Narrative contain confidential and proprietary commercial and financial information that would ordinarily not be shared with the public, the Company is seeking confidential treatment for Attachment H, pursuant to Rule 1.3(H).

III. The Case for AMF in Rhode Island: Why AMF Is Needed Now

Q. Please describe Rhode Island Energy's current metering capabilities.

A. The Company provides energy delivery services to approximately 500,000 electric customers across 38 cities and towns in Rhode Island.[8] The Company's current electric meters are primarily electromechanical meters retrofitted with an encoder receiver transmitter ("ERT") and solid-state electric AMR meters with integrated drive-by communication capability that provides automated meter reading functionality. The design life of the electromechanical meters is 30 years, and the ERTs and solid-state meters each have a design life of approximately 20 years. The Company retrofitted the electromechanical meters with ERTs beginning in 2000 and began installing solid-state electric meters in 2003. Rhode Island Energy currently uses AMR drive-by technology

[8] Customers served by area is provided on Rhode Island Energy's web site: https://outagemap.rienergy.com/reports/50b6d221-6023-4b03-8255-656506b60825?c=Rhode%20Island&o=option-03254aee-1ae7-4d37-a19b-2b37fb24cba6

throughout its service territory to read most electric meters. ERTs on the electric meters are equipped with a communication module that sends a radio signal to a fleet of service vehicles as they drive by to collect monthly reads. Approximately 60 percent of the electric AMR meters currently in the field have reached or are reaching their estimated 20-year life. Figure 2.4 in the AMF Business Case provides the age distribution of the electric AMR assets.

Q. How is the AMR technology that Rhode Island Energy is currently utilizing different from the AMF technology proposed in the Business Case?

A. Most AMR meters in Rhode Island are read using the AMR drive-by technology, which captures a read that is downloaded to a system for billing every month. The proposed AMF meters are electronic and equipped with wireless communication technology that will use a secure, fixed radio frequency ("RF") communication network to send 15-minute interval data, status and alarms, such as temperature and voltage, to Rhode Island Energy. Unlike the limited data collected by the current AMR meters, the proposed AMF meters will provide granular information to deliver a wide range of benefits that extends well beyond billing. As used in the testimony and the Business Case, the term "AMF" refers to the functionality provided by advanced, or "smart," meters.

Q. How do Rhode Island's current meters compare with the current state of metering in the United States?

A. Currently, Rhode Island's meter technology is behind that of other states. According to the Federal Energy Regulatory Commission ("FERC"), "[a]dvanced meters [are] the most prevalent meter type in the United States and, in 2019, the penetration rate of advanced meters passed 60% for the first time."[9] That number is expected to increase in the coming years as approved implementation programs continue and proposals for approval are advanced in numerous states. The Edison Foundation's Institute for Electric Innovation, for example, has identified that more than fifty electric utilities across the United States have fully deployed smart meters as of the end of 2019.[10] Figure 2.1 in the AMF Business Case illustrates the residential smart meter deployment progress by state as of 2019. Wood Mackenzie estimates that the total number of automated meters installed in the U.S. at of the end of 2020 reached almost 102 million. This is below what was forecast before COVID-19, but still represents robust growth from the 2019 installed base. After realizing deployment delays due to the impact of the pandemic, many utilities are in the process of installing automated meters. According to the data from Wood Mackenzie's Grid Edge Data Hub and the latest Form EIA-861 from the U.S. EIA, a total of 560 utilities had contracted to automate their meters or had expressed their intention to as of the end of 2020. As a result, automated meter penetration is forecasted to rise from 70% at the end of 2020 to 84% by the end of 2026.[11]

[9] *See* Federal Energy Regulatory Commission, *2021 Assessment of Demand Response and Advanced Metering,* Staff Report (December 2021).)

[10] *See* AMF Business Case, Section 2.1 at f.n. 21 (citing Adam Cooper & Mike Shuster, *Electric Company Smart Meter Deployments: Foundation for a Smart Grid (2021 Update),* Institute for Electric Innovation (April 2021)).

[11] Wood Mackenzie AMI global forecast, 2021-2026 Annual update.

Q. Why is a new metering solution a necessary investment for Rhode Island today?

A. There is a compelling need to replace existing AMR metering infrastructure now because of the convergence of the following three factors: (1) the current electric meter fleet that is reaching the end of design life, is obsolete, and will not scale; (2) the State's ambitious Climate Mandates require greater visibility and grid modernization with increased operational capability to achieve while maintaining a safe and reliable system; and (3) evolving customer expectations to have information sufficient to make more informed energy choices. Any one of these three factors create the requirement for AMF. When the factors are considered together, the case is especially compelling as is the need to act urgently.

First, the Company has a regulatory obligation to ensure meter accuracy and to remove from service any meters with worn or damaged parts.[12] Implicit in this obligation is the requirement that the Company address its aging electric AMR metering assets that are approaching the end of design life. "Doing nothing" is not an option. Without AMF, Rhode Island Energy will need to continue investments in the legacy AMR system, which is not cost-effective or practical as the aging technology becomes increasingly obsolete for modern day needs and, eventually, unavailable in the marketplace.

[12] *See* Rhode Island Division of Public Utilities and Carriers Standards for Electric Utilities, 815-RICR-30-00-1.7.

Second, as discussed in the pre-filed direct testimony of Company witness David J. Bonenberger, Rhode Island Energy needs a new metering solution to fulfill its vision for advancing the development of a safer and modernized electric grid – one that provides more granular billing and usage information for customers, more frequent system information for grid operators, and AMF – all of which are needed for the State to achieve its Climate Mandates, while at the same time providing a safe, reliable electric system.

In contrast to Rhode Island's advanced and accelerated transition to renewable energy, adoption of energy efficiency, and move toward decarbonization, the State lags most of the country in transitioning to modern metering technology to support and enhance the modern energy environment. AMR technology is incapable of aiding the transition of the grid to reliably accommodate the intermittency, uncertainty and increased system complexity that result from high penetrations of DER interconnections. Further, AMF, unlike AMR, allows grid operability that improves grid reliability and resiliency by increasing system visibility to better respond to adverse grid conditions and outages, minimizing the impacts to customers and reducing effects of service interruptions.

Third, AMR technology cannot provide the enhanced functionality or the energy usage data with the granularity and frequency of AMF meters, which is required to deliver energy insights, personalized energy efficiency, and effective demand response programs

to customers. This includes an inability to realistically support time varying rate ("TVR") structures.

Q. Why are TVR structures important for Rhode Island?

Scenarios to achieve Rhode Island's Climate Mandates involve significant penetration of solar generation in the State coupled with beneficial electrification of transportation and heating. System analysis, which Rhode Island Energy is performing for its GMP, defines implications from these significant changes in electricity use in the State and reveals that the peak system load could nearly double by 2050. The analysis points to significant seasonal and daily load shape[13] changes and variability compared to the load patterns that Rhode Island Energy sees today. For example, the annual system peak that currently occurs in the summer is projected to occur in the winter sometime during this period. These changes also will cause unforeseen system challenges that are not anticipated in the modelling. There are pockets of localized activity where this phenomenon already is occurring. In these geographic areas, the system can be especially challenged when the unexpected happens and it is in non-normal system configuration, such as with the recent Nasonville substation event that occurred in September 2022.

One way to reduce spikes in demand and better manage system challenges is with rates that vary by time of use in a way that engages customers to make behavior changes that become a meaningful part of the solution. For example, by pricing electricity higher at

[13] Load shapes result when mapping electricity usage over a particular time period.

times when demand peaks, consumers both large and small have an incentive to reduce electricity use when it matters the most. Rates where the price changes over time are applied to volumetric or demand-based billing elements are known as TVR and can be used to incent behavior by better reflecting the actual cost of both supply and delivery service. TVR is important to Rhode Island customers because it presents an opportunity to save costs. TVR is important to Rhode Island Energy because it presents an opportunity to expand solutions that can defer building infrastructure, which would otherwise be needed during peaking conditions and can further optimize existing asset utilization.

Q. Why is AMR technology incapable of supporting TVR structures?

AMR meters provide usage information one time per month for the sole purpose of billing, which is a significant barrier for implementing TVR. Consumption usage is made known at the time of monthly billing, which is well after the system peak event, making it impossible to implement TVR with present-day AMR capabilities. With AMR, customers have no visibility into their real-time usage, the meters are not capable of measuring or communicating interval data, and there is no mechanism in place to communicate variable pricing. As a result, customers have no timely information upon which to base their usage decisions, and Rhode Island Energy has no mechanism to communicate variable rates in near-real time.

Q. In contrast to AMR technology, how does AMF technology enable TVR?

A. Economic theory suggests that in efficient markets, prices for goods are equal to their marginal cost. The rate design principles that the PUC adopted in Docket No. 4600 ("Docket 4600") endorse this notion, whereby a proposed rate design may be found reasonable if, among other factors, it "[p]romotes economic efficiency over the short and long term"; "[p]rovides efficient price signals that reflect long-run marginal cost"; and, "[e]valuates rate structures based on whether they encourage or discourage appropriate investments that enable the evolution of the future energy system."[14] As the system becomes increasingly complex, the times that the generation, transmission and distribution conditions are challenged will likely not be aligned; existing and new markets will likely evolve and be created accordingly to unleash new value propositions. AMR and the current utility pricing practices are not capable of marginal cost pricing for either supply or delivery; however, AMF which provides a platform for TVR rate design, offers Rhode Island Energy the ability to fix this mismatch. With AMF, customers' demand and interval energy usage will be visible and presented in a way that customers can easily understand their load profile and make choices that reflect rate incentives in near-real time. AMF provides a platform that will enable the Company to overlay rate design parameters that vary by time, which could be by season, month, day, hour or every few minutes; are consistent with the Docket 4600 rate design principles; and aligned to assumptions in a future TVR filing. With TVR, the timing of charges can be matched to

[14] *See Pub. Util. Comm'n's Guidance on Goals, Principles and Values for Matters Involving the Narragansett Elec. Co. d/b/a National Grid,* Docket 4600-A at 4-5 (October 27, 2017).

customers usage which will provide customers with an opportunity to better manage their bills and help reduce energy burden. TVR, enabled by AMF, will provide customers with the ability to internalize the cost impact of how they use electricity, understand the impact of changing their behavior to adjust usage patterns, improve system utilization, and save money. The most cost effective and secure means to achieve the described TVR functionality is by utilizing AMF. With multiple value streams, AMF-enabled TVR is a superior economical solution.

Q. How is the increased complexity of the electric distribution grid impacting system safety and reliability?

A. The traditional distribution system, which largely remains in place today (with some targeted modifications to address current DER penetration), was designed originally for one-way power flow, where centralized generation ebbed and flowed to produce exactly the power needed as customers consumed electricity. Because there are limited communications, the traditional approach used for distribution operations at Rhode Island Energy uses local, autonomous distribution control settings embedded in the field equipment, or the operations are performed manually in the field because remote capability is not available. As a result, the distribution operator currently has little real-time visibility into the grid downstream of the substation. The traditional distribution model is now becoming a hybrid system, where distributed generation resources with intermittent and unpredictable output are being interconnected across the distribution system in a way

that it was not originally designed to host or accommodate. Some DERs consist of individual installations, and others reflect clusters of roof-top solar facilities and EVs, depending upon customer preferences. These distributed generation resources have the positive impact of advancing Rhode Island's Climate Mandates; however, their unpredictable nature can disrupt electrical operations, introduce bi-directional flows across electrical circuits serving customers, and submit the system to conditions for which it was not designed. The unpredictable nature of DERs will cause unforeseen power flows, cause voltage fluctuations, and compromise the effectiveness of protection schemes, which operators cannot see or control leading to decreased reliability and safety performance.

Q. Why is AMF needed for safety and reliability as the electric distribution system becomes more complex?

A. Increased situational awareness and increased control of the distribution system is required now and becomes significantly more important to manage the electric distribution grid safely and reliably as it grows in complexity with increased DER penetration.

The key for operator success in attaining continuous situational awareness is to bring together multiple streams of important data and synthesize that data in a cogent way to provide real-time, relevant information in a single location. AMF technology enables this situational awareness by providing granular information every 15 minutes from each

meter location so dynamic system conditions can be monitored and understood at any place or level on the distribution system. Coupling the visibility provided by AMF interval data with grid modernization investments, which would provide added system visibility and increased system control, would give Rhode Island Energy the tools necessary to help the State achieve the Climate Mandates, while maintaining safety and reliability. This is because the unpredictable nature of the system can be modeled to understand impacts on power flow, operational procedures can be adjusted, and remote actions can be taken to course correct voltage violations and change protection schemes.

Q. Is AMR capable of supporting Rhode Island in meeting its Climate Mandates?

A. No. The State cannot meet its Climate Mandates with continued use of the existing AMR meters because AMR meters lack the functionality necessary to provide grid operators with the system visibility they need. AMR cannot detect voltage anomalies or pinpoint system outages, even when augmented with grid-edge sensors. Furthermore, AMR meters are incapable of providing the near-real time interval data and potential dynamic pricing needed to support future rate offerings, such as TVR. In short, AMR technology cannot retrieve metering data frequently enough to provide visibility to operate the electric distribution system safely and reliably in a future that includes the level of DER integration necessary to achieve the State's Climate Mandates or deliver information at a rate that enables customers to make informed energy choices.

Q. What happens if AMR is continued in lieu of making a proactive decision to proceed with AMF?

A. A re-investment in like-for-like AMR technology, rather than pursing AMF today, could be more costly for Rhode Island customers in the long-term. AMR meters would need to be replaced with AMF during their life cycle for two reasons: 1) to achieve desired functionality to meet the Climate Mandates, and 2) because the manufacturer will eventually stop providing AMR parts and adequately servicing a legacy solution that is outdated. As a result, re-investing in the current AMR system is a costly path because it would be an unworkable solution to meet future needs that would strand the AMR investment when it is replaced with a future-proofed AMF solution.

Q. How did Rhode Island Energy integrate learnings from PPL's experience in Pennsylvania and Kentucky into the AMF Business Case?

A. PPL already has developed, implemented, and integrated many of the systems needed to derive efficiencies based on its prior work and experience with AMF in Pennsylvania and Kentucky and will bring these insights to Rhode Island. Section 2 of the AMF Business Case describes how Rhode Island Energy used PPL's demonstrated expertise in its other jurisdictions. Rhode Island Energy customers will benefit from PPL's prior work and experience in developing and deploying AMF in Pennsylvania and Kentucky. Rhode Island Energy will be able to leverage many aspects that PPL has developed over time, such as active strategic partnerships, insights to pricing and delivery, deployment

management techniques, network design knowledge, IT systems and effective customer engagement. The BCA has anticipated that these integrated learnings from PPL will be applied in Rhode Island. This is readily available due to having procedures and systems, such as the ADMS Basic software, operational at the onset of the AMF project. Although these efficiencies are difficult to quantify individually, they are considered in the overall BCA, where the design, timing of functionality, resourcing, and deployment planning all have factored in. Finally, the AMF Business Case is supported by experienced subject matter experts who have employed their hindsight from earlier AMF projects, which increases the accuracy, specificity and ultimately the confidence in the proposal.

Q. How will Rhode Island Energy be able to leverage PPL's insights with systems integration?

A. PPL has systems already developed and in use, such as with ADMS, and can, therefore, customize and scale those system to Rhode Island. ADMS is a state-of-the-art system that has the capability to fully integrate grid modernization functionalities, including Outage Management System, Fault Location Isolation and Service Restoration , voltage optimization/conservation voltage reduction ("VVO/CVR"), DER Monitoring/Management, and other features. PPL is providing the ADMS Basic system to Rhode Island Energy as part of the Acquisition to Rhode Island Energy customers. The Company will be able to integrate the data from AMF into the ADMS Basic system

and use it for dispatching and real-time distribution operations at TSA exit. PPL also has developed and implemented portals that provide customers and non-regulated power producers ("NPPs") with the ability to view their usage data. The customer and supplier portals that are currently in use in Pennsylvania will be leveraged to develop similar solutions for Rhode Island. PPL also has experience integrating AMF systems with other systems that utilize AMF data. AMF data is used to support outage management, billing, retail settlement, analytics, and asset management. The experience PPL has in developing and implementing the interfaces between AMF systems and these other systems will be leveraged in Rhode Island. The requirements and test plans that were developed, as well as the actual software implemented in Pennsylvania will be available for use in Rhode Island.

Q. Did the Company consider metering solutions other than AMF?

A. Yes. Rhode Island Energy first considered National Grid's two-step evaluation process detailed in its January 2021 Updated AMF Business Case to determine the relative merits and cost effectiveness of a variety of customer, grid, and meter-level technology solutions. Rhode Island Energy adopted this analysis, describing the various metering solutions mapped to future functionality to determine the best approach. Some of the customer-and grid-facing solutions that Rhode Island Energy evaluated include:

- Current AMR meters;
- Enhanced AMR meters;

- End-User Solutions;
- Transformer and Feeder Sensors;
- Pole Top Readers:
- Targeted AMF Deployment; and
- Full AMF Deployment.

Section 3.2 of the AMF Business Case provides a detailed analysis of the different solutions, with Figure 3.1 mapping the functionality to the various solutions.

Q. What did the Company conclude based on this functionality assessment?

A. Although all the options provide some functionalities, only the full-scale deployment of AMF meters provides the functionality needed as Rhode Island continues to move to a clean energy future. Consistent with National Grid's earlier analysis and PPL's own AMF findings in Pennsylvania and Kentucky, Rhode Island Energy concluded that full-scale AMF deployment represents the most cost-effective solution for its electric distribution system, making it the only reasonable option. This full-scale AMF deployment not only provides advanced meters to all customers in Rhode Island, but also provides an integrated communications network, back-office and IT enhancements, and the programmatic support to enable customers to use their new information to save energy and help reduce the system peak. The broad deployment of AMF supports

maximum functionality and adaptability of the intelligent computer platform residing within each metering device, along with peer-to-peer communication, and data analytics.

Q. What is PPL's experience with network design to support AMF?

A. PPL has determined through experience that a 100% RF mesh network is the most cost-effective approach to support AMF communication requirements. This conclusion has been formed after installing a 100% RF communication system that services the entire PPL service territory in Pennsylvania and another similar system that is being installed in Kentucky. It is further supported by the fact that most new AMF solutions across the United States use RF for their AMF communication needs.[15]

A financial analysis was performed to compare the cost difference between an AMF communication system for Rhode Island Energy using 100% cellular compared to a network designed using 100% RF mesh. The analysis revealed that the total nominal cost of an 100% RF mesh system over 20 years is approximately half (57%) of the cost of a 100% cellular system. The cost difference is primarily driven by the relatively high lease cost required for the cellular network, which was substantially more than a fixed RF

[15] "Most AMI systems today operate on either the 400 MHz or 900 MHz spectrum bands."
Blog post titled, "*Which Radio Frequency is best suited for Advanced Metering Infrastructure*" written by Matthew Besch: Which Radio Frequency is Best Suited for Advanced Metering Infrastructure? | Making Connections (sensus.com)

communication network. The cellular analysis assumed $2 per meter per month for backhaul for a 5MB plan, which is required based upon test results. The financial analysis assumed that the systems and program costs were less for the cellular option because the network installation costs were avoided, and the RF mesh did not need to be deployed. Beyond the financial advantage, the RF mesh is secure and dedicated to the task, making it more resilient and available during storms or other periods of hardship when cellular systems can get congested. Because of the financial and strategic advantage of security and resiliency, PPL has proposed to own, build, and operate a 100% RF fixed communications network for AMF. This aligns with utility trends where a growing number of utilities are choosing to replace their "first generation" automated metering system that has been supported with one-way RF communications with a "second generation" AMF system.[16] The major driver for the replacement is that existing meters are reaching the end of their life and second-generation AMF systems, which use a two-way RF communication system, provide a wide array of functionality for full-scale deployments as scoped in the Company's proposed Business Case. PPL has significant experience with RF systems. PPL's AMF deployment in Pennsylvania replaced a first-generation RF system with a second-generation RF system, and PPL's deployment that is underway in Kentucky is implementing a second-generation RF system.

[16] Wood Mackenzie AMI Global Forecast 2021 – 2026 (March 2021).

Q. How did the Company evaluate the value of the proposed AMF investment?

A. To quantify and evaluate the benefits of the proposed investment, the Company developed the AMF BCA consistent with the PUC's goals and Benefit-Cost Framework adopted in Docket No. 4600 ("Docket 4600 Framework").[17] The BCA demonstrates the value of taking advantage of a once-in-a-generation opportunity. In addition to being needed to "keep the lights on," full AMF deployment will provide approximately $729.2 million in benefits using a 20-year net present value (NPV using 2022 dollars) analysis, compared to the proposed $188 million (NPV using 2022 dollars) investment, yielding a 3.9 Benefit/Cost ("B/C") ratio. The $729.2 million ($2022) in total benefits that Rhode Island Energy calculated include Utility, Customer, and Societal benefits as described in the Docket 4600 Framework. When isolating the Utility benefits, the AMF project is still cost-effective with $354.7 million ($2022) in benefits, yielding a 1.9 B/C ratio.

The Company's BCA is discussed in further detail in Section 11 of the AMF Business Case and Section V, below, of this joint testimony.

[17] *See Investigation Into the Changing Electric Distrib. Sys. and the Modernization of Rates In Light of the Changing Distrib. Sys.,* Docket No. 4600, Report and Order No. 22851 at 29 (July 31, 2017).

IV. Rhode Island Energy's AMF Business Case Overview

A. Technology

Q. Please describe the AMF technology that Rhode Island Energy is proposing.

A. The proposed AMF technical solution includes four key advanced metering elements: (1) an integrated network of AMF electric meters capable of capturing customer energy usage data at defined intervals and supporting grid-edge applications; (2) a two-way RF mesh communications network and information technology (IT) infrastructure for transmitting the data and control signals with cellular backhaul technology; (3) metering systems/IT platform including a meter data management system ("MDMS"), head-end system ("HES"), and cybersecurity protections to securely and efficiently collect, validate, store and manage the meter data; and (4) billing-interfaced customer systems and a Customer Portal ("CP") to provide energy usage data access and insights to enable customer energy management. Figure 5.1 of the AMF Business Case illustrates these technology elements. Section 5 of the AMF Business Case discusses this technology in greater detail.

Q. Which features should AMF include to best serve Rhode Island Energy's customers?

A. At a minimum, there are five features that should be included in the deployment of AMF to best serve customers. First, AMF should be capable of capturing 15-minute usage data because of the utility benefits that it provides (*see* Attachment B to the Business Case),

and the ability to help customers make more informed energy choices. Second, the infrastructure should include a fixed communications network having the ability to read meters remotely, on demand, and in near real time. Third, because the new meters will result in Rhode Island Energy receiving significantly more information than it receives today, systems will need to be developed and integrated to maintain the information received, offer functionality, and provide the data to customers in a timely manner. Fourth, the infrastructure should have the ability to interact with customers and be capable of interacting with customer-owned devices within the home to facilitate customer response to critical pricing changes. Finally, the infrastructure should include the ability to remotely disconnect electric service when a customer is moving out of a premise or remotely connect electric service when a customer is moving into a premise.

Q. Please describe the importance of the granularity and timeliness of energy usage data from AMF.

A. Unlike AMR technology, which provides a meter read one time per month, AMF technology can capture and transmit electric meter data back to the utility at 15-minute intervals through an IP-based RF mesh routing communications network. Granular, 15-minute interval data is essential to transition from the traditional grid to a modern grid because it provides operator visibility, short-term analysis, and longer-range planning, as well as supports increased DER penetration, dynamic rate offerings, such as TVR,

enhanced customer education, and demand response ("DR") capabilities. Rhode Island Energy chose 15-minute data granularity because it strikes the balance of providing functionality to realize utility and customer benefits that are represented in this Business Case, while being achievable and affordable using state-of-the art AMF technology that is available in the marketplace.

Some examples of how Rhode Island Energy can use the granular 15-minute interval data to improve operations include: (i) understanding and following load curve and power flow changes, (ii) becoming aware of voltage violations, (iii) understanding hidden load that must be served during a distribution switching routine, and (iv) having the ability to implement dynamic pricing and assess changes in usage trends. Section 2 of the AMF Business Case discusses in more detail why granular data is needed and how PPL has utilized it successfully in its other jurisdictions.

Q. How will customers be able to access this energy usage data?

A. Customers will be able to access raw granular interval data refreshed with the latest usage information every 30-45 minutes. The Company's AMF proposal provides access to energy usage information for all customer classes through three primary channels: (1) the CP; (2) data sharing with authorized third parties using Green Button Connect ("GBC"), which will be accessible from the CP; and (3) direct meter access through a Home Area Network ("HAN"). Customers will ultimately have access to the CP through

the web and mobile devices. Billing quality data will be available within 24 hours. With this functionality, customers will have access to actionable energy usage information during peak periods, receive additional energy insights, and have an opportunity to optimize savings from personalized Energy Efficiency and potential DR offerings.

A description of data access channels and latency parameters is provided in Figure 5.2 of the AMF Business Case.

Q. Has a communications study been completed to define the communication network design requirements to support the AMF Business Case?

Yes. A preliminary analysis has been performed to provide an initial scope for the IP-based, RF mesh communication network design. Parameters were provided as input based upon PPL Electric's experience in Pennsylvania and communication Service Level Agreements that define the network operational performance requirements to be delivered by the vendor, such as the success rate to remotely connect and disconnect meters. The analysis took into account inputs such as communication bandwidth requirements, terrain/topography data, land use, meter locations, the number of points to be supported and antenna height. The goals of the study were to provide reliable meter communication that has redundant communication paths from the meter to the network, while minimizing the number of network hops required from each meter to the network. The study has incorporated key learnings from the Pennsylvania deployment, such as

using dedicated structures for high capacity/substation located sites where practical. The study defined the architecture design of the communication network and the quantity of equipment required to achieve it forming a network cost basis for the BCA.

B. Alternative Business Models

Q. Did the Company consider multiple asset and telecommunication ownership and service options for implementing AMF?

A. Yes. PPL leveraged National Grid's external consultant's assessment of different ownership and service options, referred to as "business models," for components of the AMF solution that had been presented in the Company's PST Plan in Docket No. 4780. These business model alternatives are more fully discussed in Section 7 of the AMF Business Case.

Q. How did Rhode Island Energy consider the alternative business models from National Grid's earlier assessment in this AMF Business Case?

A. National Grid's assessment considered the full spectrum of ownership and operational options for third-party services, referred to as "as-a-service" offerings, across the software, telecommunications, and meter components of the AMF solution. As-a-service offerings aim to reduce upfront costs and the total cost of ownership, while also ensuring that utilities have access to the latest technologies and periodic software upgrades. On the other hand, such models decrease a utility's control over future technology

development and represent new commercial contracting risks. For this reason, National Grid's consultant undertook extensive market research to look at approximately 40 alternative ownership examples of utility advanced metering networks (i.e., electric, gas, and water). Rhode Island Energy's consideration of these options are described in detail in Section 7 of the AMF Business Case.

Q. What were the findings of business model assessment?

A. That assessment found that the AMF ownership model that the Company first proposed in the PST Plan filed in Docket Nos. 4770/ 4780 constituted an innovative and cost-effective approach. The alternatives were not found to be cost-effective and, for some options, presented significant implementation risk due to the lack of market maturity, as described in Section 7 of the Business Case.

Rhode Island Energy's current proposal includes "as-a-service" approaches for the wide-area network ("WAN") and back-office IT systems. Rhode Island Energy is considering outsourcing the network installation and pre-sweeps. The meter installation will utilize a combination of insourced and outsourced resources. The SaaS approach for the back-office IT systems is a general trend in the IT space and is increasingly being adopted as part of AMF implementations. The Company's proposed AMF solution leverages third-party services where they can improve cost-effectiveness and/or capabilities.

C. AMF As An Enabling Platform

Q. Why is AMF the prerequisite to grid modernization?

A. AMF is an enabler to achieving grid modernization. Grid modernization investments expand capabilities in monitoring, sensing, communication, management, and control, which increase grid visibility, situational awareness, data collection, and the ability to respond to varying grid conditions and anomalies in real time. AMF meters enhance grid modernization investments by providing increased visibility into grid conditions that support distributed system platform planning functions, DER adoption, and promote the development and operations of a more efficient, reliable, and resilient energy network.

Through AMF, the granular interval and voltage data available every 15 minutes, coupled with remote management and configuration capabilities, support grid-side applications through more efficient operation of the distribution system, resource diversity, and integration of DER today and into the future. By deploying AMF, the State will realize the initial steps to a modernized grid, enabling achievement of the Climate Mandates.

Q. Explain how AMF enables grid modernization?

A. AMF is key to delivering functionalities defined in the Company's GMP. The enablement of grid modernization functionalities from AMF and the critical linkages between them are fully discussed in Section 4.1 and 4.2 of the AMF Business Case. Some of the most significant grid modernization functionalities are noted below in bold

followed by a description of how AMF enables each functionality. AMF enablement is defined as either "foundational" – where the grid modernization functionality would not be possible without AMF – or "enhancing" – where the grid modernization functionality is improved through AMF. This is evidence that AMF is a bedrock technology necessary to achieve the GMP objectives.

- ***Customer Information:*** AMF is foundational to this grid modernization capability because it provides the necessary access to timely, granular energy usage information for all customer classes through the CP, GBC, and integration with in-home technologies.
- ***Advanced Pricing:*** AMF is foundational to this grid modernization capability because it provides the interval energy usage information required to support variable pricing mechanisms.
- ***Remote Control:*** AMF is foundational to this grid modernization capability because it enables the ability to perform remote meter reading and remotely connect and disconnect electric service.
- ***Observability (Monitoring & Sensing):*** AMF is enhancing to this grid modernization capability because it provides granular and timely customer load data and voltage data, which will be used as an input and integrated with grid modernization operational platforms to provide system visibility at every location where a customer interconnects with the grid

- ***Power Quality Management:*** AMF is enhancing to this grid modernization capability because it provides the voltage data that is used as an input and integrated with grid modernization voltage control schemes.
- ***Distribution Grid Control:*** AMF is enhancing to this grid modernization capability because it provides the granular and timely customer load data that supports more accurate load-flow calculations, enabling the system operator to better control power flows on the distribution system and optimize power output from renewable DER through the ADMS platform that PPL is bringing to Rhode Island Energy as part of the transition from National Grid USA ownership. This capability will assist Rhode Island Energy to relieve or avoid thermal or voltage constraints rather than investing in traditional solutions (e.g., reconductoring, substation upgrades).
- ***Grid Optimization:*** AMF is enhancing to this grid modernization capability because it provides the granular interval load data from customer meters, which provides a step-change in available data for grid planning and operations.
- ***Reliability Management:*** AMF is enhancing to this grid modernization capability because it provides automated, real-time outage and restoration notifications and restoration, as well as granular fault location data that is used as an input and integrated with grid modernization operational platforms.
- ***DER Monitor and Management:*** AMF is enhancing to this grid modernization capability, which will increase hosting capacity, because it supports DER remote interval meter reading and provides granular and timely load and voltage data.

Additionally, the RF telecommunications network proposed as part of the AMF Business Case is foundational to DER Monitor and Management because it enables operational telecommunications capabilities to interface with DER.

Q. Are there other potential future capabilities that AMF enables?

A. Yes. AMF has the potential to enable gas network modernization, DER integration, beneficial electrification, and innovative rate structures, all of which support Rhode Island Energy's and the State's shared vision and helps to create future value streams. The AMF RF communication network embeds these potential future opportunities and can be expanded. These capabilities are discussed, in detail, in Section 4 of the AMF Business Case. Benefits from these potential future capabilities are not included in the BCA.

D. Deployment and Implementation Plan

Q. What does the AMF deployment entail?

A. Section 8 of the AMF Business Case details Rhode Island Energy's AMF implementation plan. Full deployment of AMF requires the following major equipment and processes:

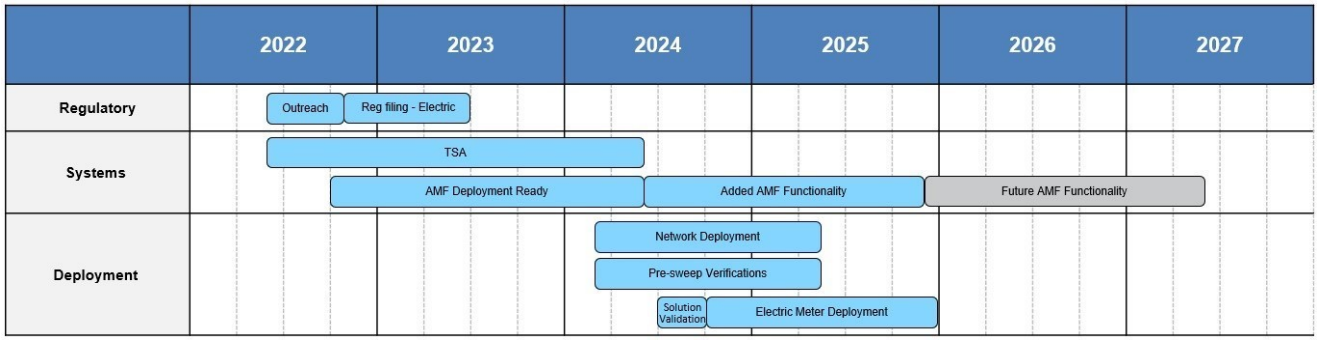
- Pre-sweeping and exchanging customer meters, which entails previewing and then manually replacing approximately 525,000 electric meters.
- Installing the RF communications network to support the new meters, which will facilitate communication with each of the AMF meters.

- Scaling, integrating, and building systems to deliver a wide range of functionality. Data acquisition systems need to be built to "talk" to the meters and, at a minimum, download data for billing. Billing software will need to be modified to process significantly more information than it currently does; new algorithms are needed to pull from the data to present it in 15-minute usage increments and perform billing as required by tariffs; and portals need to be customized to engage with customers and suppliers.
- Acquiring the equipment and contractors necessary to test, maintain, and install the meters and the onsite communication devices.
- Establishing customer engagement, which includes outreach before, during and after the meter exchange.
- Standing up a project management office and offering training to address change management, oversee the AMF Program, secure contracts, and train customer service personnel to understand the AMF Program, answer questions and provide resolution to issues.

Q. Please describe the timing of the Company's proposed AMF implementation plan.

A. The Company proposes a three and one-half-year implementation plan and project timeline, as shown in Figure 8.1 in the AMF Business Case and reproduced below.

AMF Project Timeline



The project timeline consists of three overlapping and overarching functions: Regulatory, Systems, and Deployment. The Regulatory function is already underway and includes stakeholder engagement, filing the AMF Business Case, and PUC review and decision. The Systems function is split in two distinct groups. First, the transitional work that is necessary for a seamless transition from National Grid USA to PPL pursuant to the Transition Service Agreement ("TSA"), which obligates National Grid to sustain and maintain its back-office systems for Rhode Island Energy customers for up to two years after the Acquisition to ensure continuous operations, such as meter reading and billing utilizing the existing AMR system. This is shown for context but is not part of the AMF implementation plan. Second, are the systems efforts specific to AMF to enable the associated RF functionality (as outline in the functionality roadmap). The Deployment function is comprised of a series of activities making up the bulk of the physical deployment activities and customer premise work to be performed, including pre-sweeps (i.e., pre-meter installation verifications), the installation of the RF mesh communication network, and meter deployment.

Q. Is the Company doing any work toward AMF deployment at-risk prior to receipt of regulatory approval?

A. Yes. The Company will be performing work associated with Systems, Meters, RF Network Equipment and Planning functions totaling approximately $8 million prior to receipt of regulatory approval for the AMF Business Case. The Company designed the project schedule in this manner to facilitate AMF capability for Rhode Island customers as soon and as efficiently as possible. Ninety percent (90%) of the $8 million is for System development where AMF system work will be done in parallel with the transitional work occurring under the TSA. The rationale is to have these system development efforts occur in parallel to manage interdependencies, rather than performing them sequentially. The remaining expenses (10%) are associated with the planning and procurement of RF Network equipment to support timely deployment. The Company is performing this activity at risk because it believes it is prudent given the urgent need to keep progressing the schedule for AMF, especially given the positive B/C ratio. If, however, the AMF project is not approved, the Company will revert to using AMR meters.

Q. Please describe the rate treatment of the $8 million if the PUC does not approve the AMF Business Case.

A. The Company has included the $8 million in its calculation of the proposed revenue requirement, as shown in the schedules to the pre-filed testimony of Company witnesses

Stephanie Briggs and Bethany L. Johnson. If the PUC does not approve the AMF Business Case, the Company, not customers, will bear the risk of these costs. In other words, Rhode Island Energy will not seek recovery of these costs if the PUC does not approve AMF implementation.

Q. What is the timing and the approach associated with the Systems function?

A. The Systems work associated with the TSA and AMF functionality is planned in three phases, as presented in Figure 6.1 of the Business Case: (1) "AMF Deploy Ready" phase that occurs through the end of the TSA-Exit milestone, as shown on the project timeline in Figure 8.1 of the Business Case; (2) "AMF Enhancements During Meter Deployment" phase; and (3) the "Future" phase that will occur after the AMF meters have been deployed, as shown on the project timeline in Figure 8.1. The "AMF Deploy Ready" phase includes system integration work that is core and essential to exchange AMR meters with AMF meters and is already underway, as shown in Figure 8.1 of the AMF Business Case.

The functionality in the "AMF Deploy Ready" phase will be completed by the TSA Exit and will be available when the meters start to be exchanged. Before the TSA Exit, capability is needed to: (i) support the deployment of the Rhode Island Energy communication network, (ii) coordinate with the Customer Service System (CSS) transition while supporting AMR and billing, and (iii) develop functionality defined in

Groups 1 and 2. These IT developmental efforts will occur in parallel with the TSA work; however, they are separate and apart from scope defined within the TSA.

Functionality enhancements also are planned as meters are exchanged where enhancements will be incrementally rolled out according to the functionality and timing as defined in the remaining Groups shown in Figure 6.1 of the Business Case. This approach provides an implementation plan to meet the critical milestone of TSA exit and the added functionality as defined in the AMF Business Case.

Q. What functionalities are included in the "AMF Deploy Ready" phase?

A. The functionalities that will be available at "AMF Deploy Ready" phase are summarized in groups 1 and 2 of Figure 6.1 in the AMF Business Case and defined more fully in Figure 6.2. Specifically, they include the ability to: (i) read and bill interval energy usage using AMF meters; (ii) perform "over-the-air" firmware and software updates and investigations of malfunctions; (iii) provide the status of accounts that have received an AMF meter deployment exchange; implement operational dashboards for AMF; (iv) send internal temperature alerts and alarms to the work management system for disposition; (v) provide outage alarms (Last Gasp) and power restored (Power Up)[18] notifications;

[18] "Last Gasp" and "Power Up" are automatic notifications provided by the AMF meter indicating when electric service is lost and restored respectively. Last Gasp functionality provides a key benefit, the more rapid notification of outages, which has been captured in the BCA as a customer benefit.

(vi) activate remote connect/disconnect to turn service on or off and receive meter tamper alerts; (vii) provide the foundational customer facing portal that includes usage data availability; (viii) proactively communicate outage alerts to customers identified in the outage management system.

Q. What functionalities are included in the "AMF Enhancements During Meter Deployment" phase?

A. The functionalities that will be available at "AMF Enhancements During Meter Deployment" phase are identified as Groups 3, 4 and 5 in Figure 6.1 in the AMF Business Case and defined more fully in Figure 6.3. These functionalities will be rolled-out in six month increments in parallel with the AMF meter exchanges. From the customer perspective, these functionalities include things such as bill alerts, near real-time customer data access, and in-home device support through the newly created CP. Also, the CP will provide an integrated marketplace for customer research of solar PV adoption, the ability for customers to calculate their carbon footprint, and the ability for C&I and multi-family customers to have a portfolio view of C&I facilities and multifamily units, aggregate data, and normalized usage based on variables, such as production, occupancy, or weather.

From the grid-facing perspective, AMF information will be interfaced with ADMS technology to provide interval voltage and reactive power data, voltage real-time alerts,

and the ability to monitor and manage DERs. The granular voltage information from AMF is useful to achieve Volt VAR Optimization ("VVO") capability and it mitigates the need to purchase and install some voltage sensors that would have otherwise been required to realize the benefit. Other functionalities include network model analytics to identify outliers that can lead to problem identification and resolution connecting circuit to transformer to meter endpoint.

Q. What functionalities are included in the "Future" phase?

A. Figure 6.4 describes the AMF-enabled future functionality, which is identified as Group 6 in Figure 6.1. Rhode Island Energy will evaluate the future functionalities as the Company implements AMF and will implement viable functionalities after the AMF meters have been installed. TVR is a Future functionality. All AMF meters, network and systems infrastructure must be deployed before TVR can be implemented to support communication of TVR as well as processing the billing complexity.[19] In addition to TVR, examples of other potential future functionalities include the ability to provide a breakdown of electric consumption by appliance and a platform for customer-facing and grid-facing software applications at the meter. An example of a grid-facing software application potentially includes grid location awareness that could create an accurate map of the grid to integrate renewables and support the mass adoption of electric vehicles more efficiently. Examples of customer-facing software applications include home

[19] Rhode Island Energy expects to seek regulatory approval of TVR structures in a subsequent, separate docket.

analytics where the details into energy usage by appliance could be provided to empower customers by making energy insights more relevant, resulting in increased energy efficiency, and reducing billing complaints. Another potential customer-facing application is high usage alerts where intelligent usage tracking will proactively notify customers when they are about to exceed certain thresholds, making them aware and increasing the adoption of particular rates or behaviors that could save them money.

Q. What is the timing and approach for AMF implementation?

A. AMF implementation is described in Section 8 of the AMF Business Case. Attachment D to the Business Case presents a detailed deployment plan that outlines a preliminary overall strategy for deploying the RF mesh network equipment and meter devices in Rhode Island. Deployment consists of a series of multi-phased activities, including the pre-sweeps phase, which represents a detailed physical review and gathering of customer premise meter information; the "Network Deployment" phase, which represents the design, planning, and installation of the RF Mesh Communications Network; the "Solution Validation" phase, which installs a few hundred AMF meters and the related network hardware in the test area to verify that the IT systems, end-to-end processes, and deployment activities are working properly prior to the "Electric Meter Deployment" phase. The Electric Meter Deployment phase represents the planning for and installation of new AMF meters. Meter deployment will be performed by geographic sector, where meters are monitored for successful operations during the stabilization period. The

"Solution Validation" phase is planned to start at the beginning of the third quarter of 2024. The full deployment of electric meters will begin following the Solution Validation phase and will continue through the end of the fourth quarter of 2025. To fully deploy the remaining electric meters throughout Rhode Island Energy's service territory will require a gradual monthly ramp up to an average deployment rate of between 35,000 – 40,000 meters/month, followed by a gradual ramp down in the last couple of months.

Q. When will customers begin to experience the enhanced functionality from AMF meters?

A. Customers will be able to enjoy "AMF Deploy Ready" functionalities after their new AMF meter is installed and connected to the network. The AMF meter deployment will occur in a planned geographic order based on regionally defined sectors within Rhode Island. This means that customers will be connected to the communication network and enjoy benefits at different times depending on where their sector is located on the deployment roadmap.

The "AMF Enhancements" are capabilities that build upon the AMF Deploy Ready functionalities to provide additional value to a customer's AMF experience and will be rolled out in several phases after deployment begins.

Q. What is ADMS Basic and how does it impact the AMF Business Case?

As described above, ADMS Basic is the ADMS platform PPL currently has in place in Pennsylvania, and which Rhode Island Energy will have in place for its operations upon TSA exit. PPL will be deploying ADMS Basic for Rhode Island customers as part of the Acquisition. Cost to integrate AMF information into ADMS Basic have been included in the AMF Business Case. Timing of the functionality afforded by ADMS Basic has a notable impact on the AMF Business Case and is strikingly different from assumptions that were included in the National Grid Updated AMF Business Case. Because ADMS Basic will be in place before AMF meters are deployed, certain benefits will be realized as each new AMF meter is installed, such as automatic outage notification, remote meter connect/disconnect, and associated operational efficiencies. This has a positive impact on the NPV of the benefits presented in the Business Case because it allows customers and Rhode Island Energy to achieve multiple benefits sooner than would have been possible in National Grid's Updated AMF Business Case. National Grid assumed that the integration of AMF data with the ADMS operational system would occur after all the AMF electric meters were deployed.

Q. What is Rhode Island Energy's plan for implementing VVO on the system?

A. Rhode Island Energy's base case includes approximately 10% of the Company's feeders having VVO that are already installed. Because PPL is providing the ADMS Basic system to Rhode Island Energy as part of the Acquisition, the Company will use ADMS

as the go-forward solution for implementing VVO and has included this assumption in its base case. Rhode Island Energy plans to advance the ADMS system to offer VVO capability such that benefits will start to occur in 2026 using the voltage information from the AMF meters after the installation is completed, and a significant number of capacitors and regulators will have been automated to achieve this functionality as planned in the GMP and scoped in the fiscal year 2024 Infrastructure, Safety and Reliability Plan.

Q. What will happen to the existing load research meters that are used today to provide load curve analysis as a result of AMF?

A. The current population of load research meters used to collect sample load shape data on a select pool of residential and small commercial customers in Rhode Island will continue to be available during the AMF deployment. The load research meters will be replaced with AMF meters as defined in the Deployment Plan in Attachment D. No data will be lost during the AMF meter exchange process. As AMF meters begin to replace AMR meters, the pool of meters that can support load research will increase as all meters will provide 15-minute interval data.

Q. What is the status of the Company's vendor selection process for implementing the AMF program?

A. Rhode Island Energy will be leveraging existing strategic partnerships that have been established through PPL's AMF deployments in both Pennsylvania and Kentucky over

the last several years. To achieve the AMF schedule, Rhode Island Energy will look to leverage and scale existing PPL vendors coupled with request for proposal "best cost" considerations. The use of existing relationships, along with the completion of new "best cost" contracts, will have a disclaimer that is contingent upon receiving PUC approval of the AMF Business Case.

Q. What opportunities does AMF provide for third-party market participation?

A. AMF will animate the market for third-party products and services by enabling customers to share energy usage information with authorized entities. Customers can access their own data through the CP and download usage data for third parties. A Supplier Portal will be made available to NPPs to access customer data at differing levels. With access to granular energy usage information, such third parties may be able to develop and offer new products and services such as mobile apps, handhelds, or other connected devices to provide services such as demand reduction awareness, potential alternative TVR incentives and notifications to avoid high-cost hours of consumption. An example of what data the customer would provide to third parties is shown in Figure 5.4 of the Business Case. Using this approach, third-party market participants can work with customers to manage energy usage, either by providing actionable insights or by providing them with in-home products that can connect to the AMF meter through the HAN to monitor and manage energy usage in near real-time.

E. Project Governance

Q. How will the Company manage the AMF program?

A. Rhode Island Energy will utilize an AMF Project Governance Model, defined in Section 10.6 of the Business Case, to define the structure, processes, methods, and interfaces to manage and oversee the AMF project. This Project Governance Model replicates the organizational framework that PPL successfully used for the AMF deployment in Pennsylvania where responsibilities, decision-making authority, and processes for the project are clearly defined. Lastly, it describes the process for issue resolution and provides a communication framework.

Q. How does the AMF Business Case hold the Company accountable for meeting project objectives?

A. Rhode Island Energy is committed to tracking and communicating its overall progress of the AMF project. During the AMF deployment, Rhode Island Energy will provide an annual AMF Program Report based upon the reporting metrics that span the cost and benefit categories to demonstrate how the Company is progressing in the delivery of the AMF Business Case. A report that includes progress on these metrics will be filed with the PUC annually at the end of each deployment year. In addition, the Company will provide a mid-year status update in between the annual AMF Program Report filings. See Figure 14.1 in the Business Case for specifics to be included in the reports. An example of the Annual Report that PPL filed with the Pennsylvania Public Utilities

Commission in 2020 is included in Attachment B of the Business Case. Rhode Island Energy plans to adopt relevant aspects of the Pennsylvania report for Rhode Island.

F. Stakeholder Engagement

Q. What approach did Rhode Island Energy use for stakeholder engagement?

A. In developing the AMF Business Case, Rhode Island Energy considered the valuable stakeholder input that was provided throughout the stakeholder engagement process that National Grid implemented through the PST Advisory Group and the AMF/GMP Subcommittee. Rhode Island Energy reviewed National Grid's power point presentations and minutes from the prior AMF/GMP Subcommittee meetings and spoke with the National Grid employees who attended those meeting to understand the history of stakeholder input. Following the Acquisition, Rhode Island Energy met with the AMF/GMP Subcommittee over the course of three separate meetings between July 2022 and August 2022 to present the AMF Business Case and gather stakeholder input in preparation for this filing. The stakeholder engagement process is discussed in more detail in Section 1 of the AMF Business Case. Figure 1.3 of the AMF Business Case details the Subcommittee workplan and meeting schedule.

Q. How did Rhode Island Energy take stakeholder feedback into account?

A. Rhode Island Energy has incorporated many of the components that were defined in the National Grid Updated AMF Business Case as a result of prior stakeholder feedback in

Rhode Island Energy's AMF Business Case. In response to the PST Advisory Group AMF/GMP Subcommittee questions and feedback, the Company engaged in several deeper dive discussions and incorporated associated clarifications and detail into the Business Case. Topics that prompted additional discussion and follow-up material included network design; the process for exchanging C&I customer meters; implementation approach for renters, low-income, and non-English customers; the availability and timeliness of specific information on the CP; EV and DER projection methodology and assumptions to achieve greenhouse gas reduction targets; assumptions for TVR and the anticipated availability; and customer behavior research that led to the forecasted reduction in energy usage from Energy Insights.

Q. Please explain how the Company incorporated PUC feedback from the September 1, 2022 Workshop into the AMF Business Case.

A. Rhode Island Energy has worked to address that feedback throughout the AMF Business Case. The Company has addressed the following areas:

- The PUC sought additional clarification on the linkage between AMF and GMP to understand both filings holistically. The Company further refined the scope of the filings and described the linkages and interdependencies in Section 4 of the AMF Business Case to ensure harmony between the two filings.
- The Company is submitting the AMF Business Case filing ahead of the GMP because it believes firmly that it is necessary to move forward expeditiously with AMF for the

reasons discussed in this joint testimony, as well as in the pre-filed direct testimony of Company witness David J. Bonenberger and as set forth in the Business Case. The AMF Business Case brings sufficient benefits with a strong B/C ratio to warrant proceeding with AMF, independent of the GMP, as presented in Figure 11.36 of the Business Case; AMF benefits are further strengthened when implementation is considered in conjunction with GMP.

- The other areas that Rhode Island Energy addressed based on PUC feedback received during the AMF Workshop on September 1, 2022 include, but are not limited to, consequences to the clean energy goals if AMR is continued, the financial treatment of undepreciated AMR meters and pre-sweeps, assumptions and rationale for the proposed cost-recovery tracker mechanism, Pennsylvania AMF program performance, description of the benefits from having 15-minute granular data, the sensitivity of the financial impact from AESC 2018 and 2021 in the BCA, alignment with Least Cost Procurement Standards, cost allocation for certain shared services and infrastructure, and the viability of AMF alternatives for TVR implementation. Additional PUC feedback that the Company addressed in the Business Case included clarity on the baseline assumptions and a discussion on the treatment of avoided AMR costs.

V. Benefit-Cost Analysis and Docket 4600 Framework

Q. Does the Updated AMF Business Case address the Docket 4600 Framework and goals of a future electric system that the PUC adopted in Docket No. 4600?

A. Yes. In Docket No. 4600, Investigation into the Changing Electric Distribution System ("Docket 4600"), the PUC adopted goals for a new electric system, the Docket 4600 Framework, and the rate design principles set forth in the Stakeholder report.[20] The PUC subsequently issued a guidance document ("Guidance Document") that set out and explained the goals, rate design principles, and the Docket 4600 Framework for use in future dockets.[21] Attachment A to the Business Case discusses how the Company developed the AMF Business Case consistent with the Docket 4600 Framework and Guidance Document. Figure A.1 in Attachment A addresses how the AMF investments advance/detract from/are neutral to each of the goals set forth in the Guidance Document.

The Docket 4600 Framework is based on the cost-effectiveness test known as the "Rhode Island Test." Because the Rhode Island Test is intended to evaluate a variety of programs, it includes a wide array of categories for consideration, some of which may or may not apply depending on the proposal. Specifically, the benefit categories that are most relevant to the AMF Business Case are based on the capabilities and functionalities

[20] *See* Report and Order No. 22851, *supra* note 17.

[21] *See Guidance*, *supra* note 14.

of AMF. The Company has applied the Docket 4600 Framework to the BCA that it used to evaluate the cost-effectiveness of the proposed AMF investment.

Table A.2 in Attachment A maps each category of the Docket 4600 Framework to the benefits for the proposed AMF investments and indicates if the category is quantified in the BCA, and if not, the table provides the reason for exclusion.

Q. Please describe the BCA for the proposed AMF investments as presented in the AMF Business Case.

A. The AMF Business Case contains the results of the BCA the Company developed to determine the cost-effectiveness of full-scale AMF deployment consistent with the Docket 4600 Framework.

Section 11 of the AMF Business Case presents the BCA in more detail. Most AMF costs appear in the first four years of project implementation. Years one and two consist of costs associated with setting up back-office and IT systems to support the new meter functionality. Years three and four show an increase in costs associated with the actual AMF meter capital and installation cost during meter deployment, together with corresponding large benefits from avoided AMR costs.[22] Following meter installation, O&M savings are anticipated in every year thereafter. Later-year benefits increase with

[22] Avoided AMR costs are the costs that the Company otherwise would incur purchasing new AMR meters to replace existing AMR meters that reached the end of their useful life.

the phasing in of TVR and as customer participation/response to price signals reaches a steady state.

Q. What are the costs associated with the Company's proposed AMF investments?

A. The cost of the proposed total deployment of AMF meters and the associated infrastructure/software is $289.0 million Nominal and $188.0 million NPV discounted to $2022. The proposed investments fall into four major categories: Systems costs at $143.41 million Nominal, Meter costs at $102.85 million Nominal, Network costs at $27.49 million Nominal, and Program costs at $15.27 million Nominal. Of these total nominal costs, capital expenditures are approximately 60% and O&M costs are 40%.

Q. Please explain how the Company assessed the benefits for the AMF Business Case.

A. Rhode Island Energy reviewed all the benefits developed by National Grid and calculated approximately 80 benefits in total. In some cases, where the benefit values were small, Rhode Island Energy used National Grid's numbers directly. Where the benefit values were larger, Rhode Island Energy followed National Grid's approach generally, but updated the inputs to the benefit calculations to reflect PPL's experience and results with AMF installations in its other jurisdictions, and updated values where more recent information was available.

Specifically, Rhode Island Energy updated five basic areas of benefits:

1. Updated the operational savings based on PPL's experience;
2. Include two additional direct Customer benefits – a 22-minute faster outage notification benefit and the customer bill savings from the Energy Insights program;
3. Updated avoided cost values using the AESC 2021 report;
4. Used societal and AESC discount rates where appropriate rather than the utility's Weighted Average Cost of Capital ("WACC"); and
5. Eliminated three benefits that National Grid calculated because they could not be verified – the Bad Debt Write-off reduction, Operational benefits associated with faster storm restoration, and the Mitigation of Damage claims.

Q. What are the summary results of the BCA for full-scale deployment of AMF?

A. A full-scale deployment of AMF provides benefits of $1,059.3 million Nominal and $729.2 million NPV. When compared to the costs of $289.0 million Nominal and $188.0 million NPV, the B/C ratios are 3.7 Nominal and 3.9 NPV. When the benefits from the GMP are decoupled from AMF, the AMF stand-alone B/C ratio remains significantly above 1.0, at 3.0 and 3.1 for nominal and NPV values, respectively, making a strong and compelling case to proceed with AMF independent of the GMP.

Rhode Island Energy sorted the benefits into three major categories, Utility, Direct Customer and Societal savings. Below are the Nominal and NPV values for each category:

1. Utility $529.7 million Nominal $354.7 NPV
2. Direct Customer $314.5 million Nominal $213.2 NPV
3. Societal $215.1 million Nominal $161.2 NPV

Q. Please describe the expected quantified benefits from the AMF investments?

A. The Company quantified approximately 80 individual benefits expected from AMF investments. Below is a table that lists the benefits by "program."

RIE Benefits Included in BCA Sorted by Program Category		
As of November 12, 2022	Nominal ($M)	NPV ($2022 M)
Direct Customer Benefits	$ 314.5	$ 213.2
VVO/CVR Benefit	$ 168.9	$ 126.1
Energy Insights Savings	$ 147.6	$ 110.7
Whole House TOU/CPP - Opt-In (20%)	$ 115.1	$ 84.1
EV/TVR Benefit - Opt-In (20%)	$ 112.4	$ 79.5
Avoided AMR Costs	$ 89.5	$ 61.7
Remote Metering Benefits	$ 56.1	$ 25.1
Avoided DSP Sensors	$ 23.2	$ 14.4
Reduced Field Investigations	$ 17.2	$ 7.7
AMF Meter Reading Benefits	$ 14.8	$ 6.7
Total RIE Benefits included in B/C Ratios	**$ 1,059.3**	**$ 729.2**

Some benefits will be realized utilizing only the AMF meters. These benefits are Faster Outage Notification (included in the Direct Customer Benefits), Avoided AMR Costs, Remote Metering Benefits, Avoided DSP Sensors, Reduced Field Investigations and AMF Meter Reading Benefits. Energy Insights Savings and Energy Insights Bill Savings (included in Direct Customer Benefits) require both AMF meters and education/customer connection materials and programs which have been included in the overall AMF costs. The EV/TVR benefit and the Whole House TOU/CPP benefits will require AMF meters and an approved Time Varying Rate tariff along with program costs. The program costs have been included in the overall AMF costs but filing for a tariff change will occur in the future.

Within each program, typical benefits included avoided:

1. energy costs;
2. capacity payments;
3. transmission and distribution costs;
4. monetized CO2 costs;
5. non-embedded CO2 costs;
6. non-embedded NOx costs; and
7. public health benefits.

Direct Customer Benefits involved benefits from the Energy Insights program, benefits resulting from Rhode Island Energy receiving faster notification of outages, and customer bill savings. Rhode Island Energy also estimated the benefits from reduced meter work and avoided costs of not having to install new AMR meters to replace those that are at the end-of-life.

Q. What is the baseline against which Rhode Island Energy calculated the incremental benefits from AMF implementation?

A. The Company approaches baseline in two different ways. The first reflects the technology that would be employed if the AMF meters were not installed, and that baseline is the continued use of AMR meters. The BCA is based on the benefits created by AMF meters that will not exist with AMR meters.

The second approach involves the baseline forecast used to estimate the benefits. There are two major groupings of benefits. The first group is calculated from a baseline derived from the changes in energy generation and demand that will occur to achieve Rhode Island's Climate Mandates and electrification objectives. This baseline was used to develop the VVO/CVR, Electric Vehicle TVR, and Energy Insights benefits. The second group is calculated from a baseline developed to present a more conservative estimate of savings associated with AMF meters. It was used to calculate:

1. Reduction in meter reading and field investigation costs.
2. Avoided AMR costs

3. Avoided distribution sensor costs and
4. Whole House Time-of-Use/Critical Peak Pricing.

This baseline used existing values rather than developing an extensive forecast. For example, Rhode Island Energy used the existing count of meter reading/field investigation personnel as a baseline for calculating savings. The Avoided AMR costs used the meter count as it exists today, while the Avoided Distribution Sensors used only those feeders existing today that do not already have sensors on them. Finally, the Whole House Critical peak pricing uses a static value for the residential contribution to the system peak rather than making a 20-year projection.

Q. Why did PPL use this approach to the baseline?

Comparing AMF meters to AMR meters is appropriate because those are the options that exist for utilities to use for billing purposes. If the Company does not install the AMF meters, it will need to put in new AMR meters to replace those that are at their end of life or fail early for some reason.

The baseline associated with the Climate Mandates is appropriate because it reflects the policy mandates of the state of Rhode Island. With numerous clean energy goals and incentives for electrification and DER, the Company would be remiss if it based its analysis on a "business as usual" forecast. The goals and incentives are not "business as

usual" and Rhode Island Energy is already seeing the effects of existing DER on electric system performance.

Using existing utility meters and support costs as a baseline for avoided utility costs is appropriate because forecasting those values would inflate the benefits of the program in a way that was not commensurate with the costs estimated for the program.

Q. Are there any other benefits expected from the deployment of AMF that have not been quantified?

A. Yes. There are several potential future benefits from the deployment of AMF that have not been quantified for the AMF Business Case. These include economic development benefits associated with a project of this size. Also, Rhode Island Energy did not estimate the savings from mitigation/reduction of damage claims, or AMF contributions to operational savings due to faster storm restoration or improved reliability. For operational savings, Last Gasp and Power Up positively influence the efficiency of crew dispatch for outage responses; however, the only quantified outage performance benefit from AMF in the BCA is the value created from faster outage notification. This conservative approach was taken to avoid the perceived double counting of utility benefits in the AMF Business Case and the GMP. The GMP will reflect the benefits from reliability gains. Therefore, the contribution from AMF by providing better information to inform the restoration process is a non-quantified benefit.

Q. Which sensitivities did the Company consider in developing the BCA?

A. Rhode Island Energy considered several different sensitivities in the BCA. Some were "basic" sensitivities around possible variations in different costs and benefits, while some were "issue-based" sensitivities wherein entire categories of benefits were removed. The Company considered three "issue-specific" sensitivities in the BCA: (1) consideration of the benefits from AMF in the absence of an approved GMP; (2) consideration of the avoided cost values from the AESC 2018 report rather than the AESC 2021 report; and (3) participation in the Energy Insights program. Also, Rhode Island Energy developed many sensitivities around TVR benefits as described in Section 13 of the Business Case involving participation rates and percentage peak reductions for TVR. In all cases, the B/C ratios remained strong – ranging from an overall ratio of 3.6 to 4.0 on an NPV basis, depending on the sensitivity.

Also, the Company performed cost sensitivities assuming costs would vary by +/-10%, except for System costs, which the Company assumed a variance of +/-25%. Rhode Island Energy also calculated +/- 20% on numerous benefits, including faster notification, reduced metering costs, CO2 benefits, the Energy Insights savings and the VVO/CVR savings. These were chosen either because they provided significant benefits or because the Company determined these are likely to have more variability.

Q. Please describe the sensitivity analysis of the benefits from AMF in the absence of an approved GMP?

A. The first sensitivity involved consideration of benefits from AMF in the absence of an approved GMP. In this case, the VVO/CVR benefit was removed because it cannot be optimized without other grid modernization technologies. The Company removed the Avoided Sensors benefit because without grid modernization technologies, Rhode Island Energy would still need the sensors on each of the feeders. The other AMF benefits are all applicable to this AMF Business Case, aided by ADMS Basic, which unleashes capability for outage notification. This benefit was retained in the AMF stand-alone BCA analysis because ADMS Basic will be available at TSA exit. The resulting B/C ratio was 3.0 and 3.1 for both the nominal and NPV values, respectively.

Q. Please describe the other issue-specific sensitivities that the Company performed.

A. The second issue-specific sensitivity involved consideration of the avoided cost values from the AESC 2018 report rather than the AESC 2021 report. Rhode Island Energy estimated this sensitivity by applying the percentage changes in various avoided costs from AESC 2018 to AESC 2021 and applying those percentage differences to the benefits calculated by Rhode Island Energy. These benefits included Avoided Transmission Costs, Avoided Distribution Costs, Avoided Energy Costs, Monetized CO2 benefits, Non-embedded CO2 and NOx costs, and Public Health costs. The result was a

B/C ratio of 3.7 nominal and 3.9 NPV for 2021, and 3.7 for nominal and 3.9 NPV using the 2018 AESC assumptions.

The final issue-specific sensitivity involved the percent participation in the Energy Insights program. The base assumption was that 30% of residential and 25% of commercial customers would take advantage of the more granular, near real-time data to save on their electricity bills. The Energy Insights program also involves programmatic efforts to engage customers with information designed for them, which is needed to prompt the energy savings. The sensitivity involved participation rates ranging from 10%-70% in 10% increments. The resulting B/C ratios range from 3.6-4.3 versus 3.9 for the base case.

Q. How does the AMF Business Case address TVR?

A. The ASA required the Company to include "assumptions upon which a proposal to develop time varying rates will be based" and stated, "proposals in relation to time varying rates will be subject to consideration by the PUC in a separate docket, and all interested parties will have an opportunity to participate in any process provided prior to PUC action on the Updated AMF Business Case and proposals contained therein." The AMF Business Case complies with this element of the ASA in that it does not contain a TVR proposal; however, in response to PST Advisory Group feedback, Rhode Island Energy considered a spectrum of potential TVR designs in the BCA, including both for

supply and delivery rates that could be considered in a future TVR filing. The BCA also includes cost and benefit assumptions for TVR.[23]

Q. Please elaborate on the timing and sequencing of TVR implementation.

A. AMF meters are a prerequisite to implementing a TVR structure.[24] TVR implementation will lag the AMF meter installation to provide customers sufficient time to become familiar with their new meter and to understand the new interval usage information and pricing options in the CP. Also, TVR implementation is dependent upon additional system development investment that is estimated in the "AMF Future Functionality" phase, as discussed in Section 6.4 of the Business Case, which is scheduled for after meter deployment. Finally, there is a wide range of TVR design considerations that will require time to define and obtain stakeholder input prior to submitting a filing to the PUC for review as part of a separate docket.

[23] The PUC recognized the total potential benefits from AMF, and the role of TVR, in its decision to disapprove funding for a meter pilot in the fiscal year 2019 Electric Infrastructure, Safety and Reliability Plan, finding that "the learnings from the [pilot] proposal are not critical to a future Commission decision regarding funding of a statewide advanced metering functionality roll-out." *In Re: The Narragansett Elec. Co. d/b/a National Grid's Electric Infrastructure, Safety and Reliability Plan FY 2019 Proposal*, Docket No. 4783, Report and Order No. 23349 at 19 (December 18, 2018). The PUC further found that "[o]ther functionalities, such as the implementation of time varying rates, have the potential to deliver much greater benefits." *Id.*at 20 .

[24] The PUC adopted the recommendations in the Docket 4600 Stakeholder Report regarding rate design, which included the application of TVR over the long term. *See* Report and Order No. 22851, *supra* note 17 at 10 ("[A]s the grid modernizes, consideration should be given to how distribution rate design can help the system evolve in an efficient manner and to ultimately benefit all customers. Furthermore, the Report recognized that visibility on the physical electric system will be needed to accomplish this goal.")

Q. How does TVR impact the BCA?

A. Two sensitivities were performed for TVR – one for the Whole House peak reduction benefit and one for the Electric Vehicle peak reductions. "Whole House" refers to the Critical Peak Pricing/Time of Use benefits that were calculated on the basis of the overall usage of the customer, absent the usage for Electric Vehicles. For the Whole House sensitivity, Rhode Island Energy varied both the participation rate (from 5% -90%) and the peak reduction rate (from 26% -6%), resulting in B/C ratios ranging from 3.4 to 4.0. The EV peak reduction sensitivities involved varying the participation rate (from 5%-90%) and varying the peak reductions from 130% -30% of the base values, resulting in B/C ratios varying from 3.4 to 4.0.

Q. Does the Company have any additional observations regarding the value of the proposed AMF investment as supported by the BCA?

A. The PUC approved the Docket 4600 Framework in 2017 as a new framework for assessing the cost-effectiveness of electric utility investments in Rhode Island that includes thirty-four categories of costs and benefits and fifty-three different drivers of costs or benefits. The PUC recognized that these drivers "are key factors that will affect the value of the associated cost or benefit in the context of specific plans or deployments."[25] In adopting the Docket 4600 Framework and goals in the Stakeholder Report, the PUC found that the recommendations contained therein provided "a pathway

[25] Report and Order No. 22851, *supra* note 17 at 9 (quoting the Stakeholder Report at 6).

toward a more modernized and efficient electric system."[26] Rhode Island is currently on this pathway to a more modernized and efficient electric system today. It is no longer in the future. AMF is foundational to many of the recommendations contained in the Stakeholder Report, as adopted by the PUC. Stated otherwise, the AMF proposal is no longer a potential enhancement to otherwise continuing with business-as-usual. Rather, AMF is a necessary component of future grid operations. Accordingly, the consideration of the Docket 4600 factors is an imperfect fit, as AMF is not solely an incremental investment to bring added benefits, but also a necessary investment to facilitate the continued safe and reliable distribution of electricity to Rhode Island customers.

As discussed throughout this joint testimony, AMF will deliver new functionalities that provide significant benefits to customers and the distribution system and will move the State closer to meeting the Climate Mandates. On the customer side, AMF enables benefits for customers through greater energy insights, personalized Energy Efficiency (EE), DR, TVR and remote outage notification. On the grid side, Rhode Island Energy and its customers will benefit from avoided AMR metering costs, avoided sensor costs, enhanced planning, enhanced operator visibility and control, remote meter connect/disconnects, automated outage notification and improved asset management. The Company has evaluated these benefits in the BCA, using the Docket 4600 Framework and a range of sensitivity analyses, as discussed above. The BCA results in

[26] *Id.* at 22.

all cases remain strong at well above a 1.0 B/C ratio, supporting full deployment of AMF in Rhode Island. In addition, the proposed AMF investments are consistent with and meet the PUC's stated goals for a modernized electric system. For these reasons, the PUC should find that the AMF Business Case is a cost-effective and necessary investment, and in the best interests of Rhode Island customers.

Q. How does the Company propose to recover the costs associated with the AMF proposal?

A. The Company proposes to recover the costs associated with implementation of AMF through a separate cost-recovery mechanism as described in the pre-filed direct testimony of Company witnesses Stephanie A. Briggs and Bethany L. Johnson.

VI. Customer Engagement Plan

Q. Please describe the Company's Customer Engagement Plan.

A. Customer engagement is a top priority for ensuring that the Company's AMF investments are fully leveraged and utilized by customers. The Customer Engagement Plan ("CEP") will educate customers regarding AMF capability, engage them before, during and after the AMF meter exchange, and empower customers to maximize the AMF benefits that are available to them. The CEP consists of three phases, which may overlap, based on program life cycle and how and when stakeholders are impacted: Phase 1 is global early awareness prior to the start of installation of the RF Mesh communication network and

meters; Phase 2 is network and meter installation to prepare customers, government officials and other community stakeholders for the pre-sweeps, the installation of AMF network devices and the exchange of electric meters in their respective geographic area; and Phase 3 is advanced features and services to engage customers to take advantage of new programs and service offerings. This three-phase CEP replicates what was successfully implemented in Pennsylvania and is now being used in Kentucky. Additional detail regarding each phase is provided in Section 9 of the Business Case. Customer notifications milestones are summarized in Figure 9.2 of the Business Case. Examples of brochures and communications that PPL has used to deploy AMF in its other service territories are provided as Attachment F. The Company plans to adjust the messaging to reflect specifics for Rhode Island.

Q. Can customers opt out of the AMF program?

A. Yes. Rhode Island Energy's goal is for full adoption of AMF by all customers. Rhode Island Energy will try to alleviate any concerns with AMF meters through awareness and education to enable customers to make an informed decision. Customers will be given advanced notice, via mail and email, of plans to install AMF meters and the opportunity to opt out of the AMF metering program. All customers, including those who opt out, will retain the right to purchase energy from NPPs. For landlord/renter situations, the Company will provide the planned communications with the account holder, who is typically the renter.

More detail on how customers can opt out is included in Section 9.11 of the Customer Engagement Plan.

Q. Will Company resources be on the ground to address customer questions/concerns?

A. Yes. Local Rhode Island Energy field personnel will be trained to answer customer inquiries and will be provided with printed communications to hand out to customers who have questions about the AMF deployment. These materials will be in the form of fact sheets and FAQ's and will include instructions on how customers can get more information. Various AMF project team members and Rhode Island Energy management personnel will also be on the ground in Rhode Island to handle escalated customer concerns.

Q. How will the Company reach income-eligible customers regarding AMF?

A. Rhode Island Energy will use the most current customer data available to communicate with income eligible customers. During meter deployment, a daily population file from the Rhode Island Energy Customer Information System will get sent to the deployment vendor so they have the most current information on who resides at the premise, landlord/tenant information, and any other information that may exist on the account. Rhode Island Energy will use the customer information to determine who needs to be made aware of the upcoming meter exchange. In addition, materials will be published in English as well as Spanish and Portuguese where appropriate. Rhode Island Energy will

also engage local public interest groups to better connect with income eligible customers about the AMF program. Early meetings with one of these local public interest groups indicate that these customers may be most concerned about two aspects of the AMF deployment: (i) verifying that the meter exchange personnel can be trusted, and (ii) safety of the meter exchange. Rhode Island Energy will provide local public interest groups with information on the AMF program so they can share proactively with income eligible customers and help pave the way for the upcoming meter exchange. Rhode Island Energy will utilize this strategy for other customer segments as well including immigrant communities.

VII. Data Governance

Q. How does the Company propose to address data privacy, security, and protection?

In accordance with Article II, Section C.16 of the ASA, the Company has included a Cybersecurity, Data Privacy and Data Governance Plan (referred to as the Data Governance Plan) regarding data privacy, access, security, and protection. The Data Governance Plan is included with the AMF Business Case as Attachment G. AMF brings with it many new data collection, communication, and information sharing capabilities related to energy usage. Recognizing the need to provide consumer protection by mitigating ever-changing cyber threats and addressing privacy concerns, the Company has developed pertinent policies addressing data privacy, data governance, information classification, and cyber security, and enterprise security standards. The

Data Governance Plan provides a framework of corporate policies that have been developed to ensure the management, protection, and secure availability of the Company's data and information assets is appropriate and maintained. It is based upon risk-based cybersecurity framework components that focus on principles, regular assessments and constant vigilance using an approach that tracks across people, process, and technology.

Q. Does the Company's Data Governance Plan align with the terms of the ASA?

A. Yes. The ASA requires, "[a] Data Governance Plan regarding timely customer, NPP, and third-party access to system and customer data, (e.g., elements may include, but are not limited to, customer assigned peak load contribution, energy and capacity loss factors, interval usage, or other information needed for efficient wholesale and retail market participation) in place and bill quality customer data (e.g., elements may include, but are not limited to, electric usage in kilowatt-hours containing both 'register reads' and 'interval reads') with the proper privacy and security protections."[27]

Section 10.6 in the Business Case describes the three ways in which customer data can be shared using secure, controlled, and standards-based processes. Section 5.5 of the Business Case describes how billing data is handled and options that customers have to manage their data, such as GBC. Section 5.6 addresses key design considerations

[27] Amended Settlement Agreement, Docket Nos. 4770 & 4780, Art. II, Section C.16.b.iv.

resulting in 30-45 minute "data latency" referring to the maximum time delay from when a meter or endpoint captures data to when the information is available to a customer or authorized third-party service provider in raw form and 24 hours in billing form. This information is presented in conjunction with the Data Governance Plan, included as Attachment G, to fulfill the ASA requirements.

Q. How does the Data Governance Plan address emerging security and privacy concerns?

A. To ensure emerging security and privacy risks are identified and adequately addressed, the Company will conduct an initial privacy impact assessment before deploying AMF, using NISTIR 7628 Guidelines for Smart Grid Cyber Security.[28] The assessment compares the NIST Guidelines to the Company's existing privacy policies, procedures, and the AMF implementation plan to identify existing best practices, or where further alignment is needed.

Q. How can customer energy usage data be shared with third parties?

A. There are the three ways in which customer data can be shared using secure, controlled, and standards-based processes:

[28] National Institute of Standards and Technology Interagency Report ("NISTIR") Version 7628, Guidelines for Smart Grid Cyber Security, is the Smart Grid Interoperability Panel – Cyber Security Working Group's (SGIP-CSWG's) report for individuals and organizations who will be addressing cyber security for Smart Grid systems. This includes, for example, vendors, manufacturers, utilities, system operators, researchers, and network specialists; and individuals and organizations representing the IT, telecommunications, and electric sectors.

- **NPPs** – NPP's can access the data of customers who enroll in their services in two different ways: 1) Electronic Data Exchange; 2) Supplier Portal.
- **Green Button Connect** – Customers can access their own data through the customer portal and download usage for use in Third Party analyzers. The customer has ownership of where their data goes and whether it can be shared with a Third Party.
- **Supplier Portal** – A supplier portal, modelled after the Pennsylvania Supplier Portal, will be made available in Rhode Island where NPPs can access customer data at differing levels.

VIII. Reporting Metrics

Q. Is the Company proposing any reporting metrics in the AMF Business Case?

A. Rhode Island Energy is committed to tracking and communicating its overall progress on the implementation of AMF and on customer engagement. The Company proposes to track its overall progress as part of the ongoing AMF operations across the following broad categories, which align with the most critical drivers of the Business Case:

1) **Program Implementation**: metrics focused on progress related to deployment and delivery of functionalities
2) **Customer Focused**: customer engagement metrics that target key drivers of enabled customer benefits
3) **Operations**: metrics targeting drivers of operational benefits

This suite of reporting metrics, provided in Section 14 of the Business Case, is intended to provide a transparent assessment of the Company's AMF implementation progress in key areas of interest to customers, regulators, and stakeholders. During AMF deployment, Rhode Island Energy proposes to provide an annual filing to the PUC of an AMF Program Report that is based upon these reporting metrics and a mid-year project status update.

IX. Conclusion

Q. Do you have any final observations regarding the AMF Business Case?

Yes. The AMF Business Case supports a finding that AMF is a necessary investment on its own and should move forward expeditiously. First the BCA for AMF is strong with or without the integration of the GMP. Without the GMP, the B/C ratio for AMF is 3.0 and 3.1 for nominal and NPV values respectively, which makes a compelling case to act now and move forward with full deployment of AMF. Second, because the ADMS Basic system is being made available to Rhode Island Energy through the Acquisition, the Company's AMF proposal is capable of unilaterally delivering nearly all benefits featured in the Business Case.[29] Also, the granular information that AMF provides is foundational to and enhances many grid modernization functionalities. Finally, this AMF Business Case demonstrates that full deployment of AMF is critical for the State of Rhode Island to meet its Climate Mandates. Without the investment in AMF, the State's

[29] The exception is the benefits from Volt VAR Optimization, which is co-dependent on GMP investments.

Climate Mandates will not be realized without risking significant interference with the provision of safe and reliable service. This is because the increased penetration of DERs, reinforced by the State Climate Mandates, has created additional system complexity that today's electric grid simply cannot handle. It requires adjustments to how the electric distribution grid is used and operated to achieve the State's vision for a cleaner, more efficient and modernized electric distribution system, while still serving customers safely and reliably. AMF is a bedrock technology that is necessary for this transformation to happen.

Our extensive research and analysis on the BCA for AMF coupled with PPL's experience in Pennsylvania and Kentucky leads to the same conclusion as other utilities that have already implemented AMF: the significant investment will be to the benefit of customers and all stakeholders. With the current AMR meters coming upon the end of their useful life, now is the right time to invest in AMF meters.

For these reasons, it is reasonable and prudent to move forward with AMF now. The PUC's approval of this proposal will put the State of Rhode Island and the Company on a pathway to a more modernized and efficient electric system by transforming the electric grid from the traditional business-as-usual power system to a modern-day system that is capable of successfully meeting the challenges of 21st century energy demand. Accordingly, the Company requests the PUC to find that the AMF Business

Case demonstrates substantial customer and system safety and reliability benefits that significantly exceed the projected costs (on a NPV and nominal basis), and to approve the Company's AMF proposal and associated cost-recovery mechanism as set forth in the AMF Business Case.

Q. Does this conclude your testimony?

A. Yes.