Before the
Rhode Island Public Utilities Commission

Proceeding on the Narragansett Electric Company d/b/a National Grid Proposed Tariff Changes	)))	Docket No. 4770

Direct Testimony of
Tim Woolf

On Behalf of
The Division of Public Utilities and Carriers

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1. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, title, and employer.

A. **Mr. Woolf:** My name is Tim Woolf. I am the Vice President at Synapse Energy Economics, located at 485 Massachusetts Avenue, Cambridge, MA 02139.

Q. Please describe Synapse Energy Economics.

A. Synapse Energy Economics is a research and consulting firm specializing in electricity and gas industry regulation, planning, and analysis. Our work covers a range of issues, including economic and technical assessments of demand-side and supply-side energy resources; energy efficiency policies and programs; integrated resource planning; electricity market modeling and assessment; renewable resource technologies and policies; and climate change strategies. Synapse works for a wide range of clients, including state attorneys general, offices of consumer advocates, trade associations, public utility commissions, environmental advocates, the U.S. Environmental Protection Agency, U.S. Department of Energy, U.S. Department of Justice, the Federal Trade Commission, and the National Association of Regulatory Utility Commissioners. Synapse has over 25 professional staff with extensive experience in the electricity industry.

Q. Please summarize your professional and educational experience.

A. **Mr. Woolf:** Before joining Synapse Energy Economics, I was a commissioner at the Massachusetts Department of Public Utilities (DPU) from 2007 through 2011. In that capacity, I was responsible for overseeing a substantial expansion of clean energy policies, including significantly increased ratepayer-funded energy efficiency programs;

an update of the DPU energy efficiency guidelines; the implementation of decoupled rates for electric and gas companies; the promulgation of net metering regulations; review and approval of smart grid pilot programs; and review and approval of long-term contracts for renewable power. I was also responsible for overseeing a variety of other dockets before the Commission, including several electric and gas utility rate cases.

Prior to being a commissioner at the Massachusetts DPU, I was employed as the Vice President at Synapse Energy Economics; a Manager at Tellus Institute; the Research Director at the Association for the Conservation of Energy; a Staff Economist at the Massachusetts Department of Public Utilities; and a Policy Analyst at the Massachusetts Executive Office of Energy Resources.

I hold a Masters in Business Administration from Boston University, a Diploma in Economics from the London School of Economics, a BS in Mechanical Engineering and a BA in English from Tufts University. My resume is attached as Exhibit TW/MW-1.

Q. **Have you any additional professional experience that is directly relevant to this case or your testimony in it?**

A. Yes. In 2012 and 2013 I was one of the co-facilitators of the Massachusetts Grid Modernization Collaborative sponsored by the Massachusetts Department of Public Utilities. In 2016 and 2017 I was one of the co-facilitators of the New Hampshire Grid Modernization Working Group sponsored by the New Hampshire Public Utilities Commission. In addition, in 2017 I served as a consultant expert witness to Advanced Energy Economy in its intervention in National Grid's rate case before the New York Public Service Commission. Finally, I am the author of several academic and policy

articles related to performance-based ratemaking. A list of my publications related to power sector transformation is provided in my resume.

Q. On whose behalf are you testifying in this case?

A. I am testifying on behalf of the Division of Public Utilities and Carriers (the Division).

Q. Have you previously testified before the Rhode Island Public Utilities Commission?

A. Yes. I have testified before the Rhode Island Public Utilities Commission (the Commission) on behalf of the Division in National Grid's (the Company's) Energy Efficiency and System Reliability Plans. For the last decade I have represented the Division in meetings with the Energy Efficiency Collaborative and have helped to structure the energy efficiency and system reliability and procurement performance incentive mechanisms. In addition, I participated on behalf of the Division in the Docket 4600 Working Group, and I assisted the Division with the Rhode Island Power Sector Transformation report recently submitted to Governor Raimondo. I also recently testified before the Commission on behalf of the Division in Docket 4783 on National Grid's proposed AMF pilot.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present an overview of the Division's case, to identify policy objectives that shape a long-term vision for continuing the transformation of Rhode Island's power sector, and to outline a rate plan proposal that offers the Company and ratepayers key protections during a period of rapid changes to the technologies and services of the electric distribution utility.

2. OVERVIEW OF THE CASE

Q. Does the Division agree that the Company is entitled to the rate relief being requested in this case?

A. No. The Division does not agree with the rate request made by the Company in this case, even after its original request was lowered on March 2, 1018.

Q. Please provide a brief summary of how and why the Company's request for rate relief changed after the initial filing.

A. The Company's original filing, prior to the change in the federal tax laws, requested a total combined increase of approximately $71.6 million – $41.3 million for the electric distribution business and $31 million for the gas distribution business. After the corporate tax rate was reduced to 21%, the Company revised its revenue requirement to reduce the combined total request by approximately $19.3 million. The Division, early on in this case, also found an error made by the Company in the calculation of deferred taxes of approximately $6.7 million. On March 2, the Company then filed with the Commission a new revenue requirement reducing its request for a rate increase to take into account the change in tax rate and the deferred tax error. As a result, the Company's revised request was reduced to approximately $45.6 million – $27.2 million for electric and $18.4 million for the gas business.

Q. Does the Division agree that the Company is entitled to rate increases in the amounts reflected in its adjusted request?

A. No. The Division has done a thorough review of the Company's case, issuing hundreds of data requests probing the justification put forth by the Company for its rate request.

To date, as reflected in the Division's calculation of the revenue requirement for the rate year, the Division believes the Company's adjusted request should be substantially reduced even further. Specifically, after making numerous adjustments, the Division is recommending a reduction in the rate request, as reflected in its March 2 revenue requirement, by a combined total of $34.5 million – lowering the request on the electric side by approximately $18.5 million and the request on the gas side by approximately $16 million. As a result, the Division believes the Company at this time should not be allowed to increase its electric and gas distribution rates by more than $8.9 million for the electric business and $2.4 million for the gas business – or by no more than combined total of $11.3 million, representing a cut in the combined rate request of 75% from the revised filing on March 2, 2018.

Q. What is the Company requesting for its allowed return on equity?

A. The Company is requesting a return on equity of 10.1% for both the electric and gas businesses.

Q. Does the Division agree with this request?

A. No. The Division believes this request is excessive and, instead, recommends a return on equity of 8.5% for the electric business and 9% for the gas business. The Division's calculation of the revenue requirement reflects these reduced returns.

Q. Please describe very briefly other matters and issues the Division is addressing in this case, other than the revenue requirement.

A. In addition to addressing the request for a distribution rate increase, the Division believes it is extremely important for the Commission in this rate case to take the first significant

steps to address the changing landscape of the electric distribution business. As I will explain more fully in this testimony, there is a need to modernize the grid and make it ready for significant change. The Company needs to be implementing new initiatives as an integral part of its distribution business, not as stand-alone projects. For reasons I will explain in depth, the Division is recommending that many of the initiatives being proposed under the umbrella of "Power Sector Transformation" in Docket 4780 need to be addressed in this overall rate case, including the means through which the Company recovers its costs. For that reason, the Division is recommending the Commission take important steps to align the electric business with the related ratemaking process for the future by addressing some of the foundational matters in an integral way in this case and establishing a roadmap for future planning at the same time.

Q. Please list some of the more significant ratemaking issues the Division is recommending the Commission address.

A. There are many. Broadly speaking, however, these are some of the key points:

- Establishing a ratemaking framework that utilizes multi-year rate plans as the means for integral long-term planning,
- Addressing the Company's requests for cost recovery for its grid modernization and Power Sector Transformation projects through base distribution rates, rather than a fully reconciling rate mechanism such as the "PST Tracker" proposed by the Company for its grid modernization and related activities,

- Creating a capital efficiency mechanism that integrates capital planning under the ISR with multi-year rate plans, including an incentive mechanism that encourages cost control discipline,
- Establishing a new set of performance-based incentive mechanisms (PIMs) that send clear financial signals to the Company to accomplish targeted goals that lower peak electricity usage, lower greenhouse gas emissions, stabilize costs, and meet other important long-term objectives relating to the integration of distributed energy resources, and
- Recognizing the need to have PIMs established at the same time as the Company's return on equity is set in the rate case, and adjusting the Company's earnings sharing mechanism to take these related components into account to encourage efficient business practices while at the same time protecting ratepayers from excessive utility earnings.

Q. What are some of the initiatives the Division is recommending move forward now?

A. One of the most important initiatives is for the Company to move forward with a study that provides the pathway leading to the potential deployment of Advanced Metering Infrastructure (AMI). This should take place in conjunction with parallel activities taking place in New York with the Company's affiliate, and Rhode Island's fair share of the costs amortized and included in base distribution rates. In addition, the Division is recommending the Company commence immediately the proposed enhancements to the GIS system in conjunction with New York and the costs included in base distribution rates. The Division also is recommending that the Company move forward with the System Data Portal, and the adjusted costs included in base distribution rates. The

Division also believes it is critical that a directive be given to the Company to perform a comprehensive Grid Modernization study and produce a plan that is filed with the Commission around the same time that the AMI Study is produced and filed. The Company also should commence the steps necessary to implement a new DSCADA system, the costs of which would eventually be recovered in base distribution rates. Finally, the Commission should direct the Company to file a multi-year rate plan no later than early 2020, to set new rates three years after the rates from this rate case go into effect. With these steps, the foundation for the future operation of the distribution business, aligned with integrated planning and ratemaking, will be established.

For the reasons that will be described in my testimony, the Division believes the negotiation of a multi-year rate plan in this case would be very desirable. However, even if that cannot be achieved, there are important steps the Commission can take in this case, and principles that can be established, that directionally set multi-year rate planning as an important long-range planning and ratemaking tool for the future.

Q. Please identify the Division's witnesses, and the matters each of them will address in this rate case.

A. The Division's case is comprised of ten witnesses on the following subjects:

(1) Overview and Policy Vision – Tim Woolf: This my testimony here, which presents a policy vision for how this rate case fits into the ongoing transformation of the electric power sector and how the structure of a multi-year rate plan, rather than the Company's proposed tracker mechanism, is best suited to protect Rhode Island ratepayers during a period of technology change;

(2) Revenue Requirement – Michael Ballaban and David Effron: The Division's adjustments to the Company's proposed revenue requirement for the rate year is provided by Michael Ballaban and David Effron;

(3) Review of Gas Business Enablement – Tina Bennett: Ms. Bennett addresses the Company's transformative gas business initiative;

(4) Reviewing Foundational Electric Distribution Initiatives – Greg Booth: Mr. Greg Booth's testimony provides an evaluation of the foundational distribution initiatives that need to be addressed in this rate case, that were also included in the Company's original PST filing that was transferred to Docket 4780;

(5) Return on Equity – Matt Kahal: The Division's recommendation for a return on equity for the Company's electric and gas distribution businesses is addressed by Mr. Matt Kahal;

(6) Benefit/Cost Ratios, PIMS, and Earnings Sharing – Tim Woolf and Melissa Whited: I join in a panel with Melissa Whited to address the benefit cost analysis used for evaluating new transformative projects. We also propose a series of new performance-based mechanisms that are designed to work in tandem with the Company's return on equity and earnings sharing mechanism;

(7) Depreciation – Roxie McCullar: The Company's depreciation study is evaluated by Ms. Roxie McCullar;

(8) Income Eligible Discount A-60 Rates – Roger Colton: The Division's recommendation for an enhanced low income discount is addressed by Mr. Roger Colton;

(9) Electric Rate Design – John Athas: The Company's allocated cost of service study and rate design for electric rates is evaluated by Mr. John Athas; and

(10) Gas Rate Design – Bruce Oliver: The Company's allocated cost of service study and rate design for gas rates is evaluated by Mr. Bruce Oliver.

3. POLICY OBJECTIVES AND VISION

Q. Please summarize what is under consideration in Docket 4770.

A. This docket, 4770, includes a proposal from Narragansett Electric Company for new rates to recover costs for the operating and capital expenses related to their basic function as a distribution company. In its filing, the Company seeks to enumerate and recover costs related to its core function.

Q. Please describe how trends in the electric distribution industry affect issues under consideration in this docket.

A. Since the Company's last general rate case in 2012 there are at least two major trends that have affected the functions of electric distribution utilities in all regions of the United States: first, the decline in costs for a renewable energy resources, including distributed photovoltaic, grid scale photovoltaic, onshore and offshore wind turbines and other distributed energy resources; and second, the decline in cost and increase in capability of a range of control technologies including sensors, communications, and software applications to provide near-real time remote visibility and automated control of the electric distribution system.

Q. How do these two trends relate to a distribution utility, such as Narragansett Electric Company?

A. These technology developments have changed the expectations among regulators and some customers of the kind of services the distribution utility may provide and the ways in which it can provide value to ratepayers. In Rhode Island, as in states across the United States, electric distribution utilities are now expected to integrate renewable energy resources and use information from customers and the distribution system to maintain reliability and manage system costs. That expectation is evidenced in Docket 4600 Stakeholder Report.[1] In particular, the report from stakeholders as well as the Guidance Document issued by the Commission identifies a series of attributes for the future electric system.

Q. Please describe recent legislative developments in Rhode Island that provide context for review of the Company's proposals in Docket 4770 and other dockets.

A. As the Commission is well aware, over the past fifteen years, Rhode Island has enacted energy policies that seek to increase fuel diversity, reduce costs, and promote clean energy. These measures include the 2006 Least-Cost Procurement Statute, which required the distribution utility to procure a range of cost-effective demand-side resources; the Long-Term Contracting Standard for Renewable Energy and the Renewable Energy Growth Program, which authorized the use of ratepayer funds to support and compensate the distribution utility for procurement of renewable energy resources; and the 2014

[1] *Report of Stakeholders in Docket 4600 to Rhode Island Public Utilities Commission.*

Resilient Rhode Island Act, which set economy-wide greenhouse gas emissions reduction targets to guide policy and regulatory decision-making.

Q. Please describe recent regulatory developments in Rhode Island that provide a context for review of the Company's proposal.

A. Building upon the legislative mandate of R.I. Gen. Laws § 39-26.6, the Commission convened stakeholders in Docket 4600 to inform an investigation into the changing electric distribution system. Together, stakeholders submitted to this Commission a report with goals to guide development of the future electric distribution system and the outlines of a Framework to guide cost-benefit analyses. Together, these regulatory and legislative changes represent over a decade of transformation of Rhode Island's power sector, as described in the November 2017 report Power Sector Transformation.

Q. How do these statutes and regulatory developments affect evaluation of the electric distribution utility?

A. Taken as a whole, Rhode Island's recent statutory changes present clear policy priorities: least-cost procurement, greenhouse gas emissions reduction, incorporation of clean energy, and resource diversification. Each of these priorities implicates a critical role for the electric distribution grid — through the need to manage an increasingly flexible set of demand resources; the need to electrify the thermal and transportation sectors; and the need to integrate growing numbers of diverse distributed energy resources (DER).

Q. In what way does this industry, legislative and regulatory context shape the Division's testimony in this Docket?

A. The utility has looked to existing legislative and regulatory direction to identify functions that are a part of the distribution utility's core business and which, therefore, necessarily fall within a review of the distribution utility's application for revised rates in this docket. This includes certain matters that are currently included in Docket 4780. In particular, the Division will include testimony related to the Company's rate of return that includes a proposal for revenue derived from performance incentive mechanisms. It is not in the interest of ratepayers to consider the underlying rate of return separately from a suite of proposed performance incentive mechanisms. Similarly, the Division will present testimony addressing the proposed advanced metering functionality study as it pertains to metering which is a core distribution business. Finally, the Division will present testimony related to a series of "grid modernization" proposals as they should not be considered separately from the distribution utility's core business. In contrast, there are other matters which the Division recognizes as significant components of transformation of Rhode Island's power sector that can be addressed either in this case or in Docket 4780.

Q. What is Power Sector Transformation and what is the Division's vision for how it should play out in Rhode Island?

A. As the Commission is well aware, Power Sector Transformation (PST) refers to a significant initiative to transform the electric distribution business that is regulated by the Commission in Rhode Island. The policy initiative is comprehensively set forth in a report to Governor Raimondo that has been posted through the Commission and

Division's website. It is entitled, *Rhode Island Power Sector Transformation - Phase One Report to Governor Gina M. Raimondo - November 2017* (PST Report). Rather than attaching the entire document to the testimony as an exhibit for a record that is already swimming in paper and PDF files, this is the link to the report:

http://www.ripuc.org/utilityinfo/electric/PST%20Report_Nov_8.pdf

Instead of paraphrasing the reasons for Power Sector Transformation, we quote the first paragraph of the Executive Summary here:

> "The demands on Rhode Island's electric distribution system are rapidly evolving, driven by consumer choice, technological advancement and transformative information. The state's electric utility and regulatory framework were developed in an era in which demand for electricity consistently increased, technology changed incrementally, customers exerted little control over their electricity demand, electricity flowed one-way from the utility to customers, and the risks of climate change were unknown. Today, none of those factors is true: demand for electricity has plateaued; many customers generate their own power; electricity flows to and from customers; technologies are being introduced at rapid pace; and the need to mitigate and adapt to climate change is real. In these new circumstances, the traditional regulatory framework will not continue to serve the public interest. It will continue to push consumer prices upward without a corresponding increase in value for customers. This report presents recommendations to transform the power sector for these new circumstances and help control long term costs for consumers."[2]

Q. What are the goals of Power Sector Transformation?

A. The Power Sector Transformation initiative is ambitious. Consistent with Docket 4600, it has three overarching goals that are addressed in the PST Report: (1) control the long-

[2] PST Report, p. 7..

term costs of the electric system; (2) give customers more energy choices and information; and (3) build a flexible grid to integrate more clean energy generation.

Q. What are the general categories of actions that are recommended for action to accomplish the goals?

A. The general categories of actions are summarized on pages 9 through 12 of the PST Report. They are (1) modernize the utility business model; (2) build a connected distribution grid; (3) leverage distribution system information to increase system efficiency; and (4) advance electrification that is beneficial to system efficiency and greenhouse gas emission reductions. The PST Report also summarizes on those pages numerous underlying actions. When reviewing the underlying actions, it is very clear that they are relevant to this rate case. For example, modernizing the utility business model includes such actions as creating multi-year rate plans, implementing performance-based ratemaking mechanisms, and addressing the issues associated with the tendency of utilities to favor rate base growth over other alternatives, among others. These are matters appropriate for consideration in the rate case. Similarly, the goal of building a connected distribution grid includes initiatives such as deploying advanced meters and focusing on capabilities to avoid technological obsolescence. The goal of leveraging distribution system information to increase efficiency also identifies the need to better align and integrate all the disjointed planning and cost recovery processes. This cannot be accomplished very effectively outside of the rate case. Finally, there are actions needed to address rate design, an area of ratemaking which occurs almost exclusively through rate cases.

Q. Is there an overarching principle implicit in advancing PST that is important to the Division?

A. Yes. In order for the utility business model to be truly transformed, new ways of managing and operating the distribution business as contemplated under Power Sector Transformation must become embedded within the business. PST should not be addressed, managed, and planned as if it is a special activity arising outside of the overarching management of the electric distribution system. It needs to be fully integrated into the core of the distribution business.

Q. What is the timeframe contemplated for accomplishing all of the PST goals?

A. The PST Report recognizes the degree of its own ambition when it states on page 12: "Transforming the power sector will not occur overnight." It is important to recognize because we are only at the beginning of a transformational process. It likely will take between three to six years to complete the transformation. But it will take even longer if we do not start in this rate case. It also could become problematic if the only means for the Company recovering the costs of the PST initiatives is a regulatory default to cost trackers. For reasons we will explain further, the Division believes it is extremely important that most, if not all, of the costs of the PST initiatives be recovered through base distribution rates as the initiatives unfold. Moreover, integration of grid modernization into the everyday business of the distribution utility will be slow in coming if it is not addressed in an integrated manner from a ratemaking perspective. This rate case is the critical first step in accomplishing the mission in a timely manner.

Q. Didn't the Commission separate the Power Sector Transformation initiatives from the rate case by establishing a companion Docket 4780?

A. Procedurally, there was a split. However, it has always been recognized that there is an unavoidable overlap between what is taking place to address the going-forward costs of the distribution business in the rate case with many of the initiatives that were proposed by the Company in its initial PST proposal which actually was filed with its general rate case. Even the Company recognized this in its response to Division Data Request 34-3, stating:

> "As a fundamental concept, Power Sector Transformation is arising as a focal point because of the need to make investments in the distribution system to meet changing requirements for electric service. Therefore, Power Sector Transformation is not an initiative that is unconnected to the provision of electric distribution service. Certain initiatives identified within Power Sector Transformation as necessary to enable modernization will directly, inevitably, and purposely be important to the provision of electric service over the next three years and beyond."

In fact, all the data requests and responses also have been filed in Docket 4780 have been filed in Docket 4770 as well. While it is appropriate for stakeholder engagement to continue in order to address the long-term vision of Power Sector Transformation, it is nevertheless essential to address some of the foundational initiatives in this rate case that will set base distribution rates for the Company to recover its costs of doing business for the rate year that spans from September 2018 through August 2019. While the single rate year establishes base rates for the distribution business using only a single year of projected costs, those rates will remain unchanged until the filing of the next rate case. For that reason, foundational PST planning should be integrated with and into the

revenue requirement of the rate case in order to open the pathway to achieve the long-term goals of Power Sector Transformation that were detailed in the PST Report.

Q. Which features of the Power Sector Transformation program reflected in the PST Report does the Division believe will be important to address in this rate case?

A. There are at least four. They relate to performance-based incentives (PIMs), multi-year rate plans, certain foundational initiatives that need to commence now, and the AMI study needed to fully evaluate an AMI deployment.

Q. What does the Division see as important about the PIMs?

A. The Division believes performance-based incentive mechanisms should be a part of the outcome of this case. In order to transform the utility business model, more of the Company's profit potential should be put at risk and reward. To do this effectively, earnings sharing and other parameters should be established around the allowed return when the return on equity is being set in the rate case. The Division is proposing not only a new set of PIMs, but also an earnings-sharing mechanism that takes into account the financial rewards arising out of other pre-existing incentives such as the energy efficiency program. A more detailed description of the Division's proposal and reasoning is provided in the panel testimony sponsored by Melissa Whited and me elsewhere.

Q. What about multi-year rate plans?

The Division believes it is desirable for a multi-year rate plan to be negotiated for approval in this rate case. But even if one is not forthcoming, the Commission's order should set the stage for the next rate case filing to be a multi-year plan. I will provide a deeper explanation of this in Section 5 of the testimony.

Q. What about the specific initiatives?

There are a number of the initiatives set forth in the Company's PST filing that the Division strongly believes should commence during the rate year and the costs included in the rate year revenue requirement in this case or in subsequent years of a multi-year plan. The most prominent initiatives relate to implementing the foundational GIS Enhancements during the rate year, expanding the System Data Portal project beyond the funding provided under the SRP, and commencing the DSCADA project sooner rather than later. We also will address this further in Section 5 of the testimony.

Q. What is the Division proposing regarding AMI?

Regarding AMI, the Division strongly believes the Commission should direct the Company to commence the AMI study as soon as possible and Rhode Island's fair share of the cost be included in the rate year revenue requirement as determined by Division witness Michael Ballaban. This too will be addressed in Section 5 of the testimony.

4. REGULATORY REVIEW AND COST RECOVERY

Q. Which proposals pending before the Commission in Docket 4780 are relevant to the rate case and recovery of the costs of the distribution business?

A. For reasons that we will explain, many of the proposals contained in the Company's original PST filing relate to the distribution business in a very fundamental and foundational way. As we already have mentioned, the Company also included a cost recovery mechanism that absolutely should be addressed in the context of this rate case. Further, the Division believes that some of the initiatives described by the Company as PST are not even properly categorized as Grid Modernization and should be a part of the

distribution business that is reviewed in the context of the rate case on an integrated basis and the costs included in base distribution rates. In addition, the Division believes that the core Grid Modernization initiatives should become a part of the rate case review going forward. Unless the Commission addresses these issues in this docket, the opportunity would be lost to establish the right planning and cost recovery rules to effectively advance and change the way the distribution company conducts its business to take into account the fast-changing world of the electric utility industry and effectively meet the ambitious goals of Power Sector Transformation.

Q. Please summarize what the Company is asking the Commission to approve in Docket 4780, with regard to its power sector transformation initiatives.

A. In Docket 4780, the Company is asking the Commission to approve the following:[3]

- Approval of its proposed Power Sector Transformation Provisions. This includes (a) the methodology for calculating PST Factors and Reconciliation Factors; (b) the methodology for recovering PST performance incentives; and (c) the process for submitting annual PST Plans for review and approval by the Commission.

- Approval of $2 million for incremental costs for AMF design work in FY2019, Approval of a GIS Data Enhancement Project under a multi-jurisdictional scenario in light of the New York PSC's recent approval of the Company's affiliate's new rate plan in New York.[4]

[3] Direct testimony of the National Grid Power Sector Transformation Panel, RIPUC Docket No. 4780, pp. 3-4.
[4] See the response to Division Data Request 32-23 in this Docket 4770.

- Approval of new PST performance incentive mechanisms.
- Findings regarding whether each proposed category of PST Plan investment is consistent with Rhode Island law, the Commission's Docket 4600 Guidance Document, and state regulatory policy, and whether such investments are appropriate for reimbursement as part of Power Sector Transformation.
- Findings regarding whether the proposed Power Sector Transformation incentive mechanism is consistent with Rhode Island law, the Commission's Docket 4600 Guidance Document, and state regulatory policy

Q. Please describe the changes that National Grid is recommending to the regulatory framework as it relates to the power sector transformation proposals.

A. National Grid is proposing that the Commission treat new PST-related investments differently from traditional, i.e., conventional, distribution system investments. The Company originally proposed the PST program in this docket. The Commission then asked the Company to refile in a separate docket 4780. But regardless of the procedural technicalities, the Company's proposal separates important distribution business activities from the rest of its integrated utility operations, moving away from an integrated long-term approach to running the distribution business to a stream of separate and siloed activities, the costs of which are recovered through a largely riskless rate recovery mechanism.

Q. How would cost recovery be altered by the Company's PST proposal?

Each rate case would set base distribution rates using a future, one-year test year, and those base rates would remain in place until the Company decides to file a new rate case.

In addition, the Infrastructure, Safety, and Reliability (ISR) process would continue to be used to recover the costs of relevant, conventional capital investments. The Company would file an ISR Plan each year for review and approval by the Commission for the next year's investments.

PST investments which may or may not be eligible for review under the ISR would be addressed on a multi-year basis with annual cost recovery filings.[5] The Company would file with the Commission an annual PST Plan that includes several years' worth of investments to reflect longer-term PST planning priorities, separately from the rest of its distribution business. The Commission would approve (a) the overall category of PST investments; (b) the proposed multi-year PST initiatives within each category; and (c) the actual PST investments for the forthcoming year for each of those initiatives.

PST investments would also be subject to a different cost recovery mechanism than applies to the base distribution business. National Grid proposes to establish a set of PST Factors to recover the forecasted capital costs and operations and maintenance (O&M) expenses for the forthcoming PST Plan Year. The Company would also establish a set of PST Reconciliation Factors to recover or credit any under- or over-recovery of the actual PST investments relative to the planned PST investments.[6] For purposes of the testimony, we refer to this mechanism as the proposed "PST Tracker."

During the annual review under the PST Tracker, the Commission would review historical PST investments to make sure the costs actually incurred were reasonable and

[5] Direct testimony of the PST Panel, p. 11, line 29.
[6] Schedule PST-1, Chapter 10, p. 186.

prudent for cost recovery. The Commission would also review the forecasted PST investments for the forthcoming year. In that manner, the annual review under the PST Tracker would be very similar to the ISR process.

Q. Is the Company asking the Commission to pre-approve PST investments?

A. Yes. National Grid states that the PST Tracker would be the mechanism through which the Company seeks and obtains approval to make a particular investment.[7] Again, this essentially mirrors what is taking place under the ISR.

Q. What reasons does the Company provide for treating PST investments differently from conventional distribution system investments?

A. There are several reasons that the Company provides for its proposed regulatory framework. First, the Company asks for a fair opportunity to recover prudently-incurred cost, as well as revenue stability. The Company claims that without timely cost recovery it would not be able to meet the Commission's PST objectives.[8]

Second, the Company notes that there are statutory and other limitations regarding other potential funding mechanisms, such as the ISR, the energy efficiency (EE), and the system reliability planning (SRP) mechanisms.[9]

Third, the Company claims that stakeholder input regarding PST investments is critical, and that a general rate case does not allow for this type of input. National Grid claims that if it were to "move forward with these investments without critical feedback and input of

[7] Direct testimony of PST Panel, p.5, lines10-11.
[8] Direct Testimony of PST Panel, p.11, lines 29-32.
[9] Direct Testimony of PST Panel, p. 17, lines 3-18.

all interested participants, it would not be certain that its investments were appropriately meeting the needs of the state and its customers."[10]

Fourth, National Grid claims that, relative to recovery of costs through rate cases, its annual stakeholder process for reviewing PST investments "will provide concurrence and certainty about Power Sector Transformation investments before-hand, as opposed to after-the-fact, and result in more efficient and quicker progress to the next generation electric grid."[11]

Q. Do you have any concerns about the Company's proposed regulatory framework for PST investments?

A. Yes. There are very significant problems with the Company's approach that would have detrimental effects on the ability of the Division and the Commission to evaluate the distribution business activities of the Company on a logical, integrated basis. The cost recovery proposal shifts cost risks to ratepayers with little or no risk to the Company. It also would result in a spending/cost recovery cycle that would be difficult for the Division and the Commission to evaluate and control. Spending would lack needed discipline, with a very ineffective process to assure prudency.

Q. Please elaborate further on your concerns.

First, the Company's approach exacerbates the already fractured process for planning, reviewing, and approving utility investments.

[10] PST Panel Direct Testimony, p. 18, lines 8-11.
[11] PST Panel Direct Testimony, p. 18, lines 11-14.

Second, the PST Tracker allows full reconciliation of the Company's PST initiative costs. This provides little incentive for the Company to contain those costs. In fact, what the Company is essentially proposing is the near equivalent to a new Commission-approved ISR process that pertains to the PST initiatives. While it is understandable from a utility shareholder point of view why the Company would want ISR-like tracker that provides recovery of all expenditures, this mechanism is not in the interest of ratepayers in the context of Power Sector Transformation.

Q. Are you implicitly suggesting that there also is a problem with the ISR mechanism?

A. No. Up to this point in the history of the ISR, the mechanism has worked effectively. With a few exceptions that the Division accepted and supported for unique reasons, the ISR process has typically been narrowly tailored to address the need for the utility to invest in the core utility system to assure the reliability and safety of the system. Because the ISR removes all regulatory lag between the time of investing and the time the costs are recovered for those investments, the mechanism encourages investment in an aging system and removes the tendency of the utility to defer needed investments in between rate cases because of short-term profit objectives.

The safeguard for ratepayers in the case of the ISR is that the Division plays a significant role in reviewing and agreeing to the capital spending plan up front. It is a very time-consuming process, but it has yielded benefits to ratepayers through the targeted investments. The Division has been comfortable with the process to date because the Division is an active participant in the capital planning approval process before the investment plan is filed. Because the ISR investments have tended to revolve

around asset management of the traditional components of the distribution system, the program has been manageable and workable.

Q. Given recent success with the ISR, what is the problem with creating a similar mechanism through the PST Tracker?

Having acknowledged recent success of the ISR, however, it is still very important to point out that there are limits. To the extent the scope of a fully reconciling cost recovery mechanism expands to more and more business activities, the benefits begin to be outweighed by the detriments. First and foremost, a process that allows recovery of controllable costs through a tracker causes a shift of thinking in the utility. We believe it can cause the utility to pay much less attention to cost control, to the detriment of ratepayers who are ultimately paying for the whole program. The risks to the utility's shareholders are substantially reduced. As a consequence, the utility may develop the tendency to make investments even when there may be other alternatives because the risk of cost recovery being denied are minimal and the process allows a smooth path to growth in the rate base, an outcome which is not always in the ratepayers' best interest.

Q. Isn't there a safeguard built into the process that allows after-the-fact review of the project expenditures?

A. Theoretically, yes. But the reality is that the utility is in the driver's seat. In Rhode Island, the Division is simply not staffed or funded to do a deep dive review of every project to assure that all the ratepayer dollars were prudently spent. For that reason, only in cases where the negligent management of a project is readily apparent does the after-the-fact review provide a practical means of recourse. When the scope of the projects is narrow and straightforward, like the typical projects that are reviewed in the ISR, the

process is manageable. But once the scope expands to projects that are highly complex, with very sophisticated IT and other systems involved, the protections to ratepayers become more theoretical than real. Trying to perform a *post hoc* review of project management and expenditure planning on complex systems projects is extremely challenging, especially for a jurisdiction like Rhode Island where personnel resources are constrained.

Q. Are you suggesting the Commission try to alter the ISR?

A. No. The ISR is a statutory mechanism. Because it is statutory, it limits the Commission's authority to alter it. The Division still believes that the ISR continues to provide benefits in a process that has worked effectively. We are only using the ISR as an example to illustrate the risks to ratepayers if a similar mechanism is adopted for parts of the distribution business that do not fall neatly into the eligibility categories for the ISR. That is one of the core problems with the Company's PST Tracker proposal.

Q. In light of the problems you have identified with the PST planning and PST Tracker, what is the Division proposing in its place?

A. The Division believes it is inappropriate and detrimental to ratepayers for most of the initiatives set forth in the Company's PST proposal to be reviewed and addressed outside of a rate case. We will elaborate further in the testimony on this point when we discuss the need for multi-year rate plans, through which a comprehensive, integrated multi-year business plan can be fully evaluated. Further, as explained in the testimony of Division witness Greg Booth, the Company has chosen how to define activities that are grid modernization for inclusion in its proposed PST cost tracker. In that context, the Company has defined it too broadly. Specifically, there are at least two significant

initiatives that are not Grid Modernization at all. They are initiatives that the Company should be undertaking as a regular part of its distribution business.

Q. Is there other information that supports the premise that cost recovery for initiatives that modernize the grid should occur through base rates?

A. Yes. The practices of National Grid across jurisdictions is a good example. In Division Data Request 24-12, the Division asked the Company the following data request:

> "Has any of National Grid's electric distribution affiliates in Massachusetts and New York undertaken or completed any significant initiatives or projects over the last five years to modernize the distribution system (other than the Worcester pilot and Clifton Park demonstration projects)? If so, please identify and describe the initiatives or projects undertaken over that period."

In response, the Company identified numerous projects. After seeing the list, the Division asked a follow-up data request as follows in Division 32-53:

> "Referring to the response to DIV 24-12, for each of the initiatives identified in the response, please indicate whether there were any special rate recovery mechanisms (outside of base distribution rates) used to recover the costs of the initiative, describe how the special rate recovery mechanism operates, and indicate whether it is a fully reconciling tracker similar to the one proposed in Docket 4780 that allows recovery of O&M and capital costs whether the they exceed original estimates or not."

Q. Did the Company's answer reveal anything important?

A. Yes. Of the 20 initiatives identified, only 2 projects actually had costs recovered from a two-way tracker. One was a demand response initiative, the costs of which apparently flow through an applicable energy efficiency program tracker. The only other related to utility-owned solar projects in Massachusetts. No other projects operated like the PST

Tracker proposed in Rhode Island. The response identifies only 4 other projects where costs are tracked. But these projects arose in the context of the New York REV proceeding, which deferred cost recovery and capped total expenditures at $44 million for a selection of REV activities. It appears that the Company's affiliate has the right to file a petition to request higher recovery if the utility exceeds the budget, but it is not guaranteed. All of the 14 remaining projects on the list were not recovered through a tracker at all, with 11 of those projects specifically recovered through base distribution rates.

Q. Do any of the projects being recovered through base distribution rates address activities similar to what the Company proposed in Docket 4780?

A. Yes. The System Data Portal project, an Advanced Data Analytics project, a Hosting Capacity Analysis relating to distributed generation interconnections, a Remote Terminal Unit (RTU) project, a Data Management System (DMS) pilot project, an energy storage demonstration project, automating field devices, installing feeder monitoring sensors, and implementing some telecommunications upgrades relating to reclosers on the distribution system.

Q. Does the Company explain why inclusion of these projects in base distribution rates was possible?

A. Yes. The Company points out that there was a three-year multi-year rate plan, stating: "Note that base distribution rates for Niagara Mohawk Power Corporation (NMPC), the Company's affiliate in upstate New York, are based on a three-year forward looking rate case, so proposed revenue requirements are approved in addition to historic additions to rate base, O&M costs are adjusted to include known and measurable impacts to the test

year O&M." Ironically, this is the type of ratemaking the Division is advocating in this rate case for addressing the recovery of costs in the future over several years, rather than setting rates for one year at a time or adopting the fully reconciling PST Tracker proposed by the Company in Docket 4780.

Q. Which initiatives has Mr. Booth identified as ones that should be undertaken by the Company as a part of its traditional distribution business?

A. As Mr. Booth explains, the GIS Enhancements and the DSCADA program, each of which is discussed in Chapter 3 of PST-1 that was originally filed in this docket, are initiatives that the Company should be implementing as a part of its prudent operation of the distribution business. For that reason, the Division proposes the Company move forward immediately with the GIS Enhancements and begin to take steps for DSCADA implementation. Division witness Michael Ballaban will address the Division's proposal on how the costs of the GIS Enhancements should be reflected in the revenue requirement for the rate year. It is not clear whether the DSCADA program is ready for advancement in the rate year, but the Division believes the Company should be undertaking the project without delay by no later than calendar year 2020. The Company should then seek recovery of the costs of the DSCADA by filing for rate relief through the rate case process, but the Division does not believe it is appropriate to establish a special cost tracker for the cost recovery outside of a rate case.

Q. What about the Company's proposal for the System Data Portal?

A. The Division supports the implementation of the System Data Portal project. The project has already been partially funded through the SRP. But the Company has not proposed to move forward more completely yet. Like its other PST projects, the Company proposes

the additional costs of the System Data Portal project be recovered through its proposed PST Tracker. The Division, of course, opposes that means of recovery. Instead, the Division recommends that the annual costs associated with moving forward with the System Data Portal project be included in the rate year revenue requirement. There are no incremental capital costs and even the Company has conceded that there is no practical impediment to recovery of the costs through base rates in this rate case. (See the response to Division 27-11.) According to the Company, the going forward costs are only operation and maintenance costs associated with time spent by engineers on the portal.

Q. Does the Division agree with the Company's annual cost estimate for the System Data Portal?

A. No. As Division witness Greg Booth testifies, the proposal to fund three engineers appears excessive. For that reason, the Division proposes to reduce the request by one third. The Division's revenue requirement witness, Michael Ballaban, has reduced the annual cost by 30 percent in the rate year revenue requirement.

Q. What about the Company's proposal to perform an AMI study?

A. The Division believes the Company should perform the study. We will discuss the reasons further in the testimony elsewhere in separate testimony sponsored by Melissa Whited and me. However, the Division disagrees with the Company's estimate and allocation of the cost of the AMI study chargeable to Rhode Island, as described in the testimony of Division witness Michael Ballaban. The Division proposes that the study go forward, subject to the cost recovery adjustments recommended by Mr. Ballaban for the rate year. As Mr. Ballaban explains, the Company estimated a cost to Rhode Island for a combined study with New York at $2 million. However, for the reasons explained by

Mr. Ballaban, the Division believes the Company's estimate is not reasonable and lacks a defensible foundation. Mr. Ballaban explains why the rate allowance funded by Rhode Island should be $1 million, which should be amortized over three years.

Q. Are there any other actions the Company should be taking in connection with grid modernization?

A. Yes. Consistent with the testimony of Division witness Greg Booth, the Division recommends that the Company be directed to complete a comprehensive grid modernization plan (GMP) that is developed in sync with the AMI Study. The plan should be developed with stakeholder input and could take place under the umbrella of Docket 4780 or in a separate Docket. But the GMP should be filed with the Commission around the same time as the AMI Study, to allow AMI deployment and the GMP to be considered together.

Q. How do performance incentive mechanisms fit into the Division's proposed regulatory framework?

A. The Division is proposing a set of PIMs that are an important element in the regulatory framework. These PIMs provide additional sources of revenues and thus utility management incentives to implement some of the PST initiatives and achieve some of the PST goals. These performance incentive mechanisms are directly connected with consideration of the company's rate of return in this docket. These PIMs are discussed in more detail in separate testimony sponsored by me and Melissa Whited.

5. MULTI-YEAR RATE PLANS

Q. Why does the Division support the concept of multi-year rate plans?

A. One of the most important reasons is that a multi-year plan requires and facilitates planning over a multi-year horizon on a fully integrated basis. In the context of Power Sector Transformation, planning needs to take place with multiple years in view, relating the activities to the core distribution business. For that reason alone, implementing a multi-year plan is highly preferable. But there also is another important benefit. The multi-year rate plan not only provides the most effective way to advance the very important multi-year transformative initiatives, it also addresses in a balanced manner the tension relating to cost recovery that often exists between the competing interests of ratepayers and shareholders.

Q. What are the ratepayer interests in this context?

A. The most important is the obvious interest in protecting ratepayers from unreasonable rates, including rate stability. In addition, there is the interest of advancing important public policies that need the utility to make significant investments with cost discipline. This interest is now becoming more important than ever as policymakers look to advance important transformational initiatives relating to climate change, an evolving distribution system, and accommodation of a distribution system with distributed resources.

Q. What is the interest of the utility in this context?

A. The interest of the utility is straightforward and not surprising. In providing service to consumers, utilities incur costs. In past decades, costs could be more easily recovered by sales growth and other factors that increased usage which, in turn, increased revenues to

cover on-going costs and investments. In recent years usage on the electric side of the business is either flat or declining. Revenue decoupling helps stabilize the revenue stream for the distribution utility, but it does not provide additional revenue in between rate cases to provide the necessary financial signals for the utility to invest. In fact, we believe this is the primary reason for the passage of the statute establishing the ISR. It also is self-evident from the fact that it is embedded in the revenue decoupling section of the law. The electric system was aging, yet the Company did not have the revenue stream to invest without depleting its earnings in between rate cases. By creating the ISR at the same time as implementing decoupling, conventional investments were facilitated and service quality vastly improved while energy efficiency goals were being achieved. There may have been other ways to address this issue, but Rhode Island policymakers chose the ISR mechanism.

If we were on a path of business as usual, there might not be a need for a change. But that is not the state of the industry. As mentioned earlier, policymakers acting on behalf of customers desire transformational changes in the utility business to advance important goals. But these initiatives require a longer-term investment vision that utilizes multi-year investment plans. Phasing-in of significant projects is likely to become more important over the next decade. The "one-year-at-a-time" ISR is not adequate, even if the investments are eligible under the statute. The Company in this case acknowledges that a large infusion of investments is needed to transform the power industry. But it is reluctant to advance the programs unless it has assurance of cost recovery without any regulatory lag or significant risk.

Q. Couldn't the Commission simply order the Company to implement the initiatives and address cost recovery in their next rate case?

A. Yes. The Commission, like other state commissions across the country, always has the option to issue mandates for utilities to take certain actions or implement initiatives, while addressing cost recovery in subsequent rate cases. It may be that the Commission would need to resort to such action in Rhode Island. However, while the Commission could assert its authority aggressively to simply order the Company to implement programs without addressing how the costs will be recovered until the next rate case, taking such action means the utility implements under regulatory duress. On the surface it may appear effective, but too often risk averse, financially-influenced inertia can slow or halt real progress behind the scenes. Many regulatory mandates can be effective and are necessary. But the types of initiatives being contemplated here are intended to be transformational. In order for the transformation to be effectively accomplished, it is preferable to address it in a manner that works for all parties concerned.

Q. How has the Company proposed to address its interest to recover the costs in a timely manner?

A. The Company has proposed a fully reconciling PST Tracker. The tracker would undoubtedly address the Company's interest in the most ideal manner from the Company's perspective. In such case, the Company would obtain up-front approval. The approval would allow it to spend money on the initiative with no concerns about earnings impacts because the Company would be virtually guaranteed to get all its money back from the spending, with a formulaic return on its investment.

Q. But would that be a balanced approach that is fair to ratepayers?

A. No. The Company's proposal does not address the interests of ratepayers who should be assured that the utility is operating efficiently at reasonable cost. From the ratepayers' perspective, there needs to be some financial pressure created to assure the utility experiences real consequences for any lack of discipline in spending.

Q. What about the Company's claim that without timely cost recovery it would not be able to meet the Commission's PST objectives?

A. This claim assumes that the Company's capability to implement an initiative is obstructed unless the Company gets its money first or at least a guarantee for later. In the history of ratemaking, this has never been the general rule. In fact, it has typically been the opposite. Rates have been set for one year and the Company exercises its duty to maintain safe and reliable service with the revenue obtained by the rates in effect. The reconciliation of some of the ordinary business expenses and cost of capital is the exception. Currently, only 15% of annual electric distribution-related revenue is recovered through reconciling mechanisms. (See the response to PUC 3-9, Attachment 3-9, page 1 of 2, line 3) The idea that absent a fully reconciling cost recovery mechanism the Company cannot do its job or run the business not only lacks credibility, but flies in the face of ordinary principles of ratemaking. Timely recovery undoubtedly makes it much easier for the Company to maintain higher earnings while carrying out its responsibilities. However, while factors such as regulatory lag or lack of dollar-for-dollar precision between revenues and costs may cause some earnings instability, they would not, as a practical matter, prevent the Company from meeting the PST objectives.

Q. What is the Division's proposal for a balanced and effective solution?

A. The balanced and most effective solution that is consistent with the Division's vision for advancing the "utility of the future" is the concept of multi-year rate plans. There is nothing new in the industry about such plans. They have been implemented in many places. But in recent years, they have not been utilized in Rhode Island. Given the needs and interests already identified, it is the most balanced answer that is fair to all participants.

Q. What are the key features of a multi-year rate plan?

A. First, the Company should be required to file a multi-year business plan with granular and reliable forecasts of costs for each year of the plan, including any forecasted costs relating to grid modernization and AMI. This would allow all parties to examine the direction in which the utility is planning to move. It also would allow for significant stakeholders and regulatory input in a comprehensive and integrated way. Most of the utility's distribution business activities that are funded on the delivery side of the bill would be available for comprehensive review. To the extent there is a need to advance transformational, multi-year initiatives that can only be accomplished by phasing in investments across several years, the multi-year rate plan is ideal. A budget for the activities can be established, the base distribution rates can be set to match the budget, and the utility can be launched to achieve the goals. But unlike a mechanism that reconciles costs, this type of planning and cost recovery provides better signals to the utility. Instead of the utility falling into financially-neutral spending patterns because it is ratepayer money it is using under a reconciliation, the utility will experience the budget as its own money at risk. That is, if the utility achieves the objectives under budget, the

utility is rewarded. Conversely, if the utility mismanages and exceeds the budget, the utility's earnings suffer.

Q. Why is this fair to all participants?

A. If it is properly designed, the multi-year rate plan is fair to ratepayers because it caps targeted spending at pre-determined reasonable levels. It also should be desirable to policymakers because it advances the desired initiatives. Finally, it is fair to the utility because it provides a reasonable opportunity for the utility to recover all of its costs of the initiatives in a timely manner, while achieving a reasonable return for its shareholders. Surely, the Company should have no legitimate complaint if it has a realistic opportunity to recover its prudently-incurred costs, but has to accept the ordinary risks of running the utility business along the way, including budget discipline.

Q. What about allowing time for stakeholder input?

A. Stakeholder input will continue to be important. Rhode Island has already recognized this when it launched its Power Sector Transformation initiative. Numerous technical sessions have been held. Other sessions have been held in the context of the companion docket to this rate case, Docket 4780. But this is only the first step. A multi-year rate plan requirement does not preclude further stakeholder sessions.

Q. The Company maintains that a PST Tracker is needed because of stakeholder input. What is your view?

A. One of the main reasons given by the Company for a PST Tracker is that they want stakeholder input that could affect costs. But stakeholder input and planning are not dependent upon the Company getting fully-reconciled cost recovery. Reconciliations

should be the exception, not the rule. Effective stakeholder input is achieved through engagement, not assurances of cost recovery with no regulatory lag. It is the Company's role and responsibility to invest in the initiatives that are prudent and support their request for recovery with results.

Q. How long should the multi-year rate plan be?

A. The number of years should be at least three. This gives the utility two years of operating under the budgets before it needs to file for another multi-year plan. During year three, it operates under the third year's budget while the next plan is negotiated or litigated. It is possible that a plan that runs five years could work. But when there are new initiatives never experienced before, three years is a better place to start. Otherwise, technology and the industry can advance ahead, leaving policymakers and the Company behind.

Q. What is needed in the filing for financial data?

A. It is critical that the Company file a comprehensive revenue requirement for each year of the Rate Plan. This needs to be for more than just one rate year. It should reflect a real plan of spending that can be justified in a granular manner, not mere inflationary adjustments off the first year of projected costs. The filing should also include projections for three years of capital spending for capital projects that are both eligible and not eligible under the ISR. This would allow the Division, the Commission, and other intervenors to evaluate the overall plan on an integrated basis.

Q. What about projects and costs associated with "grid modernization"?

A. The three-year business plan should also provide an integrated plan to advance the goals of modernizing the grid. The objectives should be clear and there should be a transparent way to evaluate how well multiple initiatives relate to each other.

Q. Why would a capital plan for the three years be important, given the existence of the ISR?

A. The ISR provides review of plans that proceed one year at a time. While the Company has provided multi-year forecasts, the focus is on the upcoming year. This can result in skewed, short-term vision. The full plan of capital spending on the conventional investments eligible for the ISR should be included along with the other investments and spending for the transformational programs that need multi-year schedules. Annual cost recovery for ISR-eligible projects would continue to be addressed in the annual ISR process. The ISR planning process would be effectively embedded within and function in parallel with the multi-year plan. However, all capital projects that are not otherwise eligible for ISR treatment would be addressed in a parallel capital budget. In this way, all capital spending over the three-year period would be addressed together.

Q. Given the fact that the ISR is fully reconciling, how would the multi-year rate plan address the concern that it does not result in a binding spending budget?

A. This can be resolved through a capital efficiency incentive. There may be several different ways to design an incentive that works in tandem with the ISR and the multi-year plan. But the Division is considering a specific framework that would create spending discipline.

Q. How would the capital spending efficiency incentive operate?

A. First, the Company would provide a three-year capital spending plan for all ISR eligible projects for which it anticipates seeking approval under the ISR. This would be reviewed and provisionally approved by the Commission. The spending budget would then be tracked for the three years of the plan. The Division envisions a cumulative spending budget in the aggregate. At the end of the three years, the three-year spending as it actually occurred under the ISR is compared to the budget approved by the Commission when approving the multi-year plan. To the extent the Company has achieved its objective under the aggregate budget, savings can be kept or shared with ratepayers. However, if the Company has exceeded the aggregate budget in circumstances where no approved exceptions apply, the Company would be required to refund customers an amount equal to the incremental increase in the revenue requirement during the rate plan that was caused by the overspend.

Q. How does it affect the Company's cost recovery after the plan is over?

A. The Company would still be able to include the capital costs in rate base in the future, provided that the spending was prudent, but it will have suffered the equivalent of a one-year regulatory lag in partial cost recovery for missing the aggregate three-year budget target, as measured at the end of the plan. This achieves a result which creates a virtual budget for the three years, yet it does not affect the operation of the ISR under the statute. There is no prohibition against exceeding the budget. Rather, it is simply an incentive mechanism with a reward or penalty determined at the end of the rate plan period. As a result, it provides spending discipline that does not currently exist without the multi-year plan. It does not preclude the Company from doing what it needs to do to provide safe

and reliable service. The penalty would be financially analogous to creating a one or two-year regulatory lag on a portion of the Company's capital cost recovery that exceeds the budget. It would be similar to what happens across the country for utilities that make investments in one year, but do not obtain additional rate relief until the next rate case after the projects are in service.

Q. What about the PST initiatives?

A. As explained earlier, the rate case filing would contain spending forecasts for any proposed PST initiatives. A budget would be created for each year of the plan, including allowances to cover approved expenses for the initiatives. The Company would then need to implement the initiative within the approved budget. Incentives also could be included, but the basic effect is to require the Company to operate with spending discipline, knowing that excess costs will not be fully reconcilable. Some modifications and exceptions could be included for more complex initiatives, but the basic objective of creating a budget and spending discipline would be addressed. In effect, the goal would be to have the costs of the PST initiatives recovered through base distribution rates rather than a tracker.

Q. Are there any other features that would be included in a multi-year rate plan?

A. We would expect so if a plan is negotiated in this rate case. For example, a multi-year rate plan is flexible enough to incorporate any consensus items that may emerge from discussion among parties in Docket 4780 over the next three months, such as electric transportation, electric heat and energy storage. In addition, we anticipate that a multi-year rate plan negotiated as a part of this docket could have an explicit re-opener for AMI investments that we recommend the Commission address following submittal of the

Company's proposed AMI study. What we have explained here may not be the only way to achieve the balance of interests. But it illustrates the parameters of how it can be done. In the end, the Division is adamant that the proposed PST Tracker is not in customers interests and should not be approved by the Commission.

Q. Is it possible for a multi-year rate plan to be implemented as a result of this case?

A. Yes. But the Division believes the only practical way that an effective multi-year rate plan can emerge from this rate case is through a negotiated settlement. The reason is because the Company filed its case under the old set of assumptions about one-year ratemaking. While the Company initially included its PST proposals and provided some multi-year data, the current state of the case makes it very difficult for the Commission to order an effective three-year rate-setting outcome. The best result would be a negotiated solution that involves the Company working with the Division and others to address the many complexities. The Division believes this is possible, even with some of the shortcomings present in the Company's current filings. It could be an important first step toward a future ratemaking process.

6. RATEMAKING RECOMMENDATION FOR THIS DOCKET IF THERE IS NO MULTI-YEAR RATE PLAN

Q. How should the Commission treat PST and other investments in this docket if there is no multi-year rate plan settlement?

A. To the extent a multi-year rate plan settlement cannot be negotiated and filed with the Commission for approval, the Commission is left with a one-year rate case that sets rates for the rate year only. This case, however, still presents an opportunity to set a course for

the future, beginning with clear and unequivocal directives that the Commission should give to the Company in this case, combined with approval of some of the initiatives that can be carved out of the Company's PST proposal and embedded into the rate year revenue requirement. The Commission also should establish new performance-based incentive mechanisms to begin sending effective financial signals to the Company as we move into the transformation of the industry. We will discuss the Division's PIMs proposal in the separate testimony of Melissa Whited and me.

Q. How should the Commission proceed if there is no multi-year plan?

A. First, in the absence of a multi-year rate plan, the Commission should set rates for the rate year, without a new PST Tracker as proposed by the Company. In doing so, the Commission should make it clear to the Company that recovery of non-eligible ISR costs relating to all the PST initiatives is not favored. The Commission should establish the principle that recovery of the costs of most PST initiatives should typically be addressed in rate cases that set forth an integrated, multi-year plan. The Commission should leave room to make exceptions as it deems sensible. But the initiatives should not be addressed in special rate reconciliation processes that isolate those programs from the rest of the distribution business. This would not preclude technical sessions related to major initiatives that would benefit from Commission review and stakeholder participation, but such technical processes should not be a process for obtaining rate recovery through special mechanisms. They should be an evaluation of the details, benefits, and desirability of integrated initiatives.

Second, the Commission should require the Company to move forward with the GIS Enhancements, the AMI Study, and the System Data Portal commencing in the rate year, with the costs recommended by the Division included in the revenue requirement.

Third, the Commission should establish new performance based ratemaking incentives that work in tandem with the Company's return on equity allowance. As mentioned, we will address this proposal in greater detail in the direct testimony sponsored by me and Ms. Whited.

Finally, the Company should be directed to develop a comprehensive, integrated plan for Grid Modernization that builds upon the initiatives that are recommended by witness Greg Booth for the rate year. This plan, in turn, should be filed with the Commission as a part of a multi-year rate case that includes an integrated business plan with three years of revenue requirement data that allows a complete and thorough review of the costs forecasted for each year of the plan, including all of the costs of the distribution business not otherwise governed by statutory requirements, such as the ISR. As a component of the plan, new initiatives can be included that provide the opportunity to the Company for recovery of the costs through base rates in each year of the plan. The Commission should place a deadline on the Company for the filing of the multi-year plan no later than the first half of 2020 for new rates to take effect no later than the first quarter of 2021. This schedule will allow enough time for planning and continued stakeholder input on the PST and Grid Modernization initiatives, including AMI.

Once the first multi-year rate plan is in place, the Company can be placed on a three-year schedule going forward. During the interim, however, the Commission must be clear that

the company should be undertaking any projects it believes are prudent and cost-effective, whether conventional or PST.

Q. Does the Division believe the Commission has the authority to require a multi-year rate plan by a specified date?

Yes. Absolutely. While the Company traditionally has been left with the discretion to commence rate cases on its own schedule, this has been by default or regulatory tradition. There are no statutory provisions or other legal requirements of which we have been made aware that create a limitation or requirement that precludes such an action. The Division believes the Commission has broad supervisory authority over the rates of the utility that permits it to investigate rates and require rate filings relating to the costs of the business.

Q. How should the Commission address AMI?

A. The Commission should direct the Company to complete the AMI study and file it with the Commission for review prior to implementation. As described elsewhere in the testimony, the costs of the study should be addressed in the rate year of this rate case, as recommended by the Division in the testimony of Mr. Ballaban. If deployment is ultimately approved by the Commission, the costs of deployment should be included in base rates as a part of the multi-year rate plan filing made during the first half of 2020. But implementation should not be delayed in order for the means of cost recovery to be engraved in regulatory stone before the Company advances prudent programs. As the Division's witness Ballaban testifies, National Grid did not wait for all regulatory cost approvals to be in place before launching the Gas Business Enablement program that achieved higher proportional benefits to New York than Rhode Island. The program was

launched and the costs allocated to all jurisdictions. Likewise, it should not wait for favorable cost recovery to be approved in all other jurisdictions to be in place before beginning the process in Rhode Island, should the Commission find deployment of AMI appropriate and prudent.

Q. Are there any particular components that the Division considers important to include in the AMI study?

A. Yes. The Division has identified two distinct opportunities to significantly reduce the potential cost of AMI deployment for ratepayers: alternative ownership models for meter infrastructure and shared communications systems. While deployment of AMI without either of these innovative approaches may still provide ratepayers greater benefits than costs, the Division argues the AMI study should examine each of them. In addition, the Division will request that it be involved in regular monthly meetings on the study process.

Q. Does the Division's case in this docket address the Company's proposed electric transportation, electric heat or energy storage initiatives?

A. No. However, as described in the November 2017 Power Sector Transformation Phase I Report, the Division understands that electric transportation, electric heat and energy storage are important components of a transformed power system and advance key attributes of the electric power system codified in Docket 4600, such as addressing climate change. Because of the decision to separate Docket 4770 and 4780, these topics are currently under review in Docket 4780. The Division anticipates submitting its testimony on these matters in Docket 4780 in two weeks. The Division further anticipates that a settlement among parties in this docket may include versions of the electric

transportation, electric heat and energy storage programs currently proposed in Docket 4780.

Q. Does this conclude your testimony?

A. Yes.

AFFIDAVIT OF TIM WOOLF

Tim Woolf, does hereby depose and say as follows:

I, Tim Woolf, on behalf of the Rhode Island Division of Public Utilities and Carriers, certify that testimony that bears my name was prepared by me or under my supervision and is true and accurate to the best of my knowledge and belief.

Signed under the penalties of perjury this the 6th day of April, 2018.

Tim Woolf (Apr 5, 2018)

Tim Woolf

Tim Woolf, Vice President

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PROFESSIONAL EXPERIENCE

Synapse Energy Economics Inc., Cambridge, MA. *Vice President*, 2011 – present.

Provides expert consulting on the economic, regulatory, consumer, environmental, and public policy implications of the electricity and gas industries. The primary focus of work includes technical and economic analyses, electric power system planning, climate change strategies, energy efficiency programs and policies, renewable resources and related policies, power plant performance and economics, air quality, and many related aspects of consumer and environmental protection.

Massachusetts Department of Public Utilities, Boston, MA. *Commissioner*, 2007 – 2011.

Oversaw a significant expansion of clean energy policies as a consequence of the Massachusetts Green Communities Act, including an aggressive expansion of ratepayer-funded energy efficiency programs; the implementation of decoupled rates for electric and gas companies; an update of the DPU energy efficiency guidelines; the promulgation of net metering regulations; review of smart grid pilot programs; and review of long-term contracts for renewable power. Oversaw six rate case proceedings for Massachusetts electric and gas companies. Played an influential role in the development of price responsive demand proposals for the New England wholesale energy market. Served as President of the New England Conference of Public Utility Commissioners from 2009-2010. Served as board member on the Energy Facilities Siting Board from 2007-2010. Served as co-chair of the Steering Committee for the Northeast Energy Efficiency Partnership's Regional Evaluation, Measurement and Verification Forum.

Synapse Energy Economics Inc., Cambridge, MA. *Vice President*, 1997 – 2007.

Tellus Institute, Boston, MA. *Senior Scientist, Manager of Electricity Program*, 1992 – 1997.

Association for the Conservation of Energy, London, England. *Research Director*, 1991 – 1992.

Massachusetts Department of Public Utilities, Boston, MA. *Staff Economist*, 1989 – 1990.

Massachusetts Office of Energy Resources, Boston, MA. *Policy Analyst*, 1987 – 1989.

Energy Systems Research Group, Boston, MA. *Research Associate*, 1983 – 1987.

Union of Concerned Scientists, Cambridge, MA. *Energy Analyst*, 1982-1983.

EDUCATION

Boston University, Boston, MA
Master of Business Administration, 1993

London School of Economics, London, England
Diploma, Economics, 1991

Tufts University, Medford, MA
Bachelor of Science in Mechanical Engineering, 1982

Tufts University, Medford, MA
Bachelor of Arts in English, 1982

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White, D., K. Takahashi, A. Napoleon, T. Woolf. 2018. *Value of Energy Efficiency in New York: Assessment of the Range of Benefits of Energy Efficiency Programs*. Prepared by Synapse Energy Economics for Natural Resources Defense Council.

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Whited, M., A. Horowitz, T. Vitolo, W. Ong, T. Woolf. 2017. *Distributed Solar in the District of Columbia: Policy Options, Potential, Value of Solar, and Cost-Shifting*. Synapse Energy Economics for the Office of the People's Counsel for the District of Columbia.

Raab Associates and Synapse Energy Economics. 2017. *Grid Modernization in New Hampshire: Report to the New Hampshire Public Utilities Commission*. Prepared by the New Hampshire Grid Modernization Working Group. March 20, 2017.

Woolf, T. 2016. *Expert Report: Rate Mechanism, Reconciliation of Provisional Rates, Energy Efficiency Rider*. Prepared for Puerto Rico Energy Commission regarding Matter No. CEPR-AP-2015-0001, November 21, 2016.

Woolf, T., M. Whited, P. Knight, T. Vitolo, K. Takahashi. 2016. *Show Me the Numbers: A Framework for Balanced Distributed Solar Policies*. Synapse Energy Economics for Consumers Union.

Fisher, J., A. Horowitz, J. Migden-Ostrander, T. Woolf. 2016. *Puerto Rico Electric Power Authority's 2015 Integrated Resource Plan*. Prepared for Puerto Rico Energy Commission.

Woolf, T., A. Napoleon, P. Luckow, W. Ong, K. Takahashi. 2016. *Aiming Higher: Realizing the Full Potential of Cost-Effective Energy Efficiency in New York.* Synapse Energy Economics for Natural

Resources Defense Council, E4TheFuture, CLEAResult, Lime Energy, Association for Energy Affordability, and Alliance for Clean Energy New York.

Lowry, M. N., T. Woolf, M. Whited, M. Makos. 2016. *Performance-Based Regulation in a High Distributed Energy Resources Future*. Pacific Economics Group Research and Synapse Energy Economics for Lawrence Berkley National Laboratory.

Woolf, T., M. Whited, A. Napoleon. 2015-2016. *Comments and Reply Comments in the New York Public Service Commission Case 14-M-0101: Reforming the Energy Vision*. Comments related to Staff's (a) a benefit-costs analysis framework white paper, (b) ratemaking and utility business models white paper, and (c) Distributed System Implementation Plan guide. Prepared by Synapse Energy Economics on behalf of Natural Resources Defense Council and Pace Energy and Climate Center. August 21, 2015, September 10, 2015, October 26, 2015, November 23, 2015, December 7, 2015, and January 6, 2016.

Kallay, J., K. Takahashi, A. Napoleon, T. Woolf. 2015. *Fair, Abundant, and Low-Cost: A Handbook for Using Energy Efficiency in Clean Power Plan Compliance.* Synapse Energy Economics for the Energy Foundation.

Woolf, T., K. Takahashi, E. Malone, A. Napoleon, J. Kallay. 2015. *Ontario Gas Demand-Side Management 2016-2020 Plan Review.* Synapse Energy Economics for the Ontario Energy Board.

Whited, M., T. Woolf, A. Napoleon. 2015. *Utility Performance Incentive Mechanisms: A Handbook for Regulators*. Synapse Energy Economics for the Western Interstate Energy Board.

Woolf, T., E. Malone, F. Ackerman. 2014. *Cost-Effectiveness Screening Principles and Guidelines for Alignment with Policy Goals, Non-Energy Impacts, Discount Rates, and Environmental Compliance Costs.* Synapse Energy Economics for Northeast Energy Efficiency Partnerships (NEEP) Regional Evaluation, Measurement and Verification Forum.

Woolf, T., E. Malone, C. Neme. 2014. *Regulatory Policies to Support Energy Efficiency in Virginia*. Synapse Energy Economics and Energy Futures Group for the Virginia Energy Efficiency Council.

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Woolf, T., E. Malone, J. Kallay. 2014. *Rate and Bill Impacts of Vermont Energy Efficiency Programs.* Synapse Energy Economics for the Vermont Public Service Department.

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Malone, E., T. Woolf, K. Takahashi, S. Fields. 2013. "Appendix D: Energy Efficiency Cost-Effectiveness Tests." *Readying Michigan to Make Good Energy Decisions: Energy Efficiency*. Synapse Energy Economics for the Council of Michigan Foundations.

Stanton, E. A., S. Jackson, G. Keith, E. Malone, D. White, T. Woolf. 2013. *A Clean Energy Standard for Massachusetts.* Synapse Energy Economics for the Massachusetts Clean Energy Center and the Massachusetts Departments of Energy Resources, Environmental Protection, and Public Utilities.

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Woolf, T., E. Malone, J. Kallay, K. Takahashi. 2013. *Energy Efficiency Cost-Effectiveness Screening in the Northeast and Mid-Atlantic States.* Synapse Energy Economics for Northeast Energy Efficiency Partnerships, Inc. (NEEP).

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Jackson, S., P. Peterson, D. Hurley, T. Woolf. 2013. *Forecasting Distributed Generation Resources in New England: Distributed Generation Must Be Properly Accounted for in Regional System Planning.* Synapse Energy Economics for E4 Group.

Woolf, T., E. Malone, L. Schwartz, J. Shenot. 2013. *A Framework for Evaluating the Cost-Effectiveness of Demand Response.* Synapse Energy Economics and Regulatory Assistance Project for the National Forum on the National Action Plan on Demand Response: Cost-effectiveness Working Group.

Woolf, T., W. Steinhurst, E. Malone, K. Takahashi. 2012. *Energy Efficiency Cost-Effectiveness Screening: How to Properly Account for 'Other Program Impacts' and Environmental Compliance Costs.* Synapse Energy Economics for Regulatory Assistance Project and Vermont Housing Conservation Board.

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Keith, G., T. Woolf, K. Takahashi. 2012. *A Clean Electricity Vision for Long Island: Supplying 100% of Long Island's Electricity Needs with Renewable Power.* Synapse Energy Economics for Renewable Energy Long Island.

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Woolf, T., J. Kallay, E. Malone, T. Comings, M. Schultz, J. Conyers. 2012. *Commercial & Industrial Customer Perspectives on Massachusetts Energy Efficiency Programs.* Synapse Energy Economics for the Massachusetts Energy Efficiency Advisory Council.

Woolf, T., M. Wittenstein, R. Fagan. 2011. *Indian Point Energy Center Nuclear Plant Retirement Analysis.* Synapse Energy Economics for Natural Resources Defense Council (NRDC) and Riverkeeper.

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Woolf, T. 2007. *Cape Light Compact Energy Efficiency Plan 2007-2012: Providing Comprehensive Energy Efficiency Services to Communities on Cape Cod and Martha's Vineyard*. Synapse Energy Economics for the Cape Light Compact.

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Woolf, T., K. Takahashi, G. Keith, A. Rochelle, P. Lyons. 2005. *Feasibility Study of Alternative Energy and Advanced Energy Efficiency Technologies for Low-Income Housing in Massachusetts.* Synapse Energy Economics and Zapotec Energy for the Low-Income Affordability Network, Action for Boston Community Development, and Action Inc.

Woolf, T. 2005. *The Cape Light Compact Energy Efficiency Plan: Phase III 2005-2007: Providing Comprehensive Energy Efficiency Services to Communities on Cape Cod and Martha's Vineyard*. Synapse Energy Economics for the Cape Light Compact.

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Woolf, T. 2004. *A Balanced Energy Plan for the Interior West*. Synapse Energy Economics, West Resource Advocates, and Tellus Institute for the Hewlett Foundation Energy Series.

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Biewald, B., T. Woolf, A. Rochelle, W. Steinhurst. 2003. *Portfolio Management: How to Procure Electricity Resources to Provide Reliable, Low-Cost, and Efficient Electricity Services to All Retail Customers*. Synapse Energy Economics for Regulatory Assistance Project and Energy Foundation.

Woolf, T., G. Keith, D. White, M. Drunsic, M. Ramiro, J. Ramey, J. Levy, P. Kinney, S. Greco, K. Knowlton, B. Ketcham, C. Komanoff, D. Gutman. 2003. *Air Quality in Queens: Cleaning Up the Air in Queens County and Neighboring Regions*. Synapse Energy Economics, Konheim & Ketcham, and Komanoff Energy Associates for Natural Resources Defense Council (NRDC), Keyspan Energy, and the Coalition Helping to Organize a Kleaner Environment.

Chen, C., D. White, T. Woolf, L. Johnston. 2003. *The Maryland Renewable Portfolio Standard: An Assessment of Potential Cost Impacts*. Synapse Energy Economics for the Maryland Public Interest Research Group.

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Woolf, T. 2002. *Green Power and Energy Efficiency Opportunities for Municipalities in Massachusetts: Promoting Community Involvement in Energy and Environmental Decisions*. Synapse Energy Economics for the Massachusetts Energy Consumers Alliance.

Woolf, T. 2002. *The Energy Efficiency Potential in Williamson County, Tennessee: Opportunities for Reducing the Need for Transmission Expansion*. Synapse Energy Economics for the Harpeth River Watershed Association and the Southern Alliance for Clean Energy.

Woolf, T. 2002. *Electricity Restructuring Activities in the US: A Survey of Selected States*. Synapse Energy Economics for Arizona Corporation Commission Utilities Division Staff.

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Johnston, L., G. Keith, T. Woolf, B. Biewald, E. Gonin. 2002. *Survey of Clean Power and Energy Efficiency Programs*. Synapse Energy Economics for the Ozone Transport Commission.

Woolf, T. 2001. *Proposal for a Renewable Portfolio Standard for New Brunswick.* Synapse Energy Economics for the Conservation Council of New Brunswick, presented to the New Brunswick Market Design Committee.

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Woolf, T. 2000. *The Cape Light Compact Energy Efficiency Plan: Providing Comprehensive Energy Efficiency Services to Communities on Cape Cod and Martha's Vineyard*. Synapse Energy Economics for the Cape Light Compact.

Woolf, T., B. Biewald. 1999. *Market Distortions Associated With Inconsistent Air Quality Regulations*. Synapse Energy Economics for the Project for a Sustainable FERC Energy Policy.

Woolf, T., B. Biewald, D. Glover. 1998. *Competition and Market Power in the Northern Maine Electricity Market*. Synapse Energy Economics and Failure Exponent Analysis for the Maine Public Utilities Commission.

Woolf, T. 1998. *New England Tracking System.* Synapse Energy Economics for the New England Governors' Conference, with Environmental Futures and Tellus Institute.

Woolf, T., D. White, B. Biewald, W. Moomaw. 1998. *The Role of Ozone Transport in Reaching Attainment in the Northeast: Opportunities, Equity and Economics*. Synapse Energy Economics and the Global Development and Environment Institute for the Northeast States for Coordinated Air Use Management.

Biewald, B., D. White, T. Woolf, F. Ackerman, W. Moomaw. 1998. *Grandfathering and Environmental Comparability: An Economic Analysis of Air Emission Regulations and Electricity Market Distortions*. Synapse Energy Economics and the Global Development and Environment Institute for the National Association of Regulatory Utility Commissioners.

Biewald, B., T. Woolf, P. Bradford, P. Chernick, S. Geller, J. Oppenheim. 1997. *Performance-Based Regulation in a Restructured Electric Industry*. Synapse Energy Economics, Resource Insight, and the National Consumer Law Center for the National Association of Regulatory Utility Commissioners.

Biewald, B., T. Woolf, M. Breslow. 1997. *Massachusetts Electric Utility Stranded Costs: Potential Magnitude, Public Policy Options, and Impacts on the Massachusetts Economy*. Synapse Energy Economics for the Union of Concerned Scientists, MASSPIRG, and Public Citizen.

Woolf, T. 1997. *The Delaware Public Service Commission Staff's Report on Restructuring the Electricity Industry in Delaware.* Tellus Institute for The Delaware Public Service Commission Staff. Tellus Study No. 96-99.

Woolf, T. 1997. *Preserving Public Interest Obligations Through Customer Aggregation: A Summary of Options for Aggregating Customers in a Restructured Electricity Industry*. Tellus Institute for The Colorado Office of Energy Conservation. Tellus Study No. 96-130.

Woolf, T. 1997. *Zero Carbon Electricity: the Essential Role of Efficiency and Renewables in New England's Electricity Mix*. Tellus Institute for The Boston Edison Settlement Board. Tellus Study No. 94-273.

Woolf, T. 1997. *Regulatory and Legislative Policies to Promote Renewable Resources in a Competitive Electricity Industry*. Tellus Institute for The Colorado Governor's Office of Energy Conservation. Tellus Study No. 96-130-A5.

Woolf, T. 1996. *Can We Get There From Here? The Challenge of Restructuring the Electricity Industry So That All Can Benefit*. Tellus Institute for The California Utility Consumers' Action Network. Tellus Study No. 95-208.

Woolf, T. 1995. *Promoting Environmental Quality in a Restructured Electric Industry.* Tellus Institute for The National Association of Regulatory Utility Commissioners. Tellus Study No. 95-056.

Woolf, T. 1995. *Systems Benefits Funding Options*. Tellus Institute for Wisconsin Environmental Decade. Tellus Study No. 95-248.

Woolf, T. 1995. *Non-Price Benefits of BECO Demand-Side Management Programs*. Tellus Institute for Boston Edison Settlement Board. Tellus Study No. 93-174.

Woolf, T., B. Biewald. 1995. *Electric Resource Planning for Sustainability*. Tellus Institute for the Texas Sustainable Energy Development Council. Tellus Study No. 94-114.

TESTIMONY

Rhode Island Public Utilities Commission (Docket No. 4783): Direct testimony of Tim Woolf and Melissa Whited regarding National Grid's Advanced Metering Functionality Pilot. On behalf of the Rhode Island Division of Public Utilities and Carriers. February 22, 2018.

New York Public Service Commission (Case 17-E-0459): Direct testimony of Tim Woolf regarding Energy Efficiency Earnings Adjustment Mechanisms proposed by Central Hudson Gas & Electric Company. On behalf of Natural Resources Defense Council. November 21, 2017.

New York Public Service Commission (Case 17-E-0238): Direct and rebuttal testimony of Tim Woolf and Melissa Whited regarding Earnings Adjustment Mechanisms proposed by National Grid. On behalf of Advanced Energy Economy Institute. August 25 and September 15, 2017.

Utah Public Service Commission (Docket No. 14-035-114): Direct and rebuttal testimony of Tim Woolf regarding the Pacificorp's analysis of the benefits and costs associated with distributed generation resources. On behalf of Utah Clean Energy. June 8, 2017 and July 25, 2017.

Massachusetts Department of Public Utilities (D.P.U. 17-05): Direct and surrebuttal testimony of Tim Woolf and Melissa Whited regarding performance-based regulation, the monthly minimum reliability

contribution, storage pilots, and rate design in Eversource's petition for approval of rate increases and a performance-based ratemaking mechanism. On behalf of Sunrun and the Energy Freedom Coalition of America, LLC. April 28, 2017 and May 26, 2017.

Massachusetts Department of Public Utilities (D.P.U. 15-120, D.P.U. 15-121, D.P.U. 15-122/15-123): Direct testimony of Tim Woolf and Ariel Horowitz, PhD, regarding the petitions by National Grid, Unitil, NSTAR, and Eversource Energy for approval of their grid modernization plans. On behalf of Conservation Law Foundation. March 10, 2017.

Massachusetts Department of Public (D.P.U. 16-169): Direct testimony of Tim Woolf and Erin Malone regarding Nation Grid's petition for ruling regarding the provision of gas energy efficiency services. On behalf of the Cape Light Compact. November 2, 2016.

New Jersey Board of Public Utilities (Docket No. ER16060524): Direct testimony regarding Rockland Electric Company's proposed advanced metering program. On behalf of the New Jersey Division of Rate Counsel. September 9, 2016.

Colorado Public Utilities Commission (Proceeding No. 16AL-0048E): Answer testimony regarding Public Service Company of Colorado's rate design proposal. On behalf of Energy Outreach Colorado. June 6, 2016.

Georgia Public Service Commission (Docket No. 40161 and Docket No. 40162): Direct testimony regarding the demand-side management programs proposed by Georgia Power Company in its Certification, Decertification, and Amended Demand-Side Management Plan and its 2016 Integrated Resource Plan. On behalf of Sierra Club. May 3, 2016.

Massachusetts Department of Public Utilities (Docket No. 15-155): Joint direct and rebuttal testimony with M. Whited regarding National Grid's rate design proposal. On behalf of Energy Freedom Coalition of America, LLC. March 18, 2016 and April 28, 2016.

Maine Public Utilities Commission (Docket No. 2015-00175): Direct testimony on Efficiency Maine Trust's petition for approval of the Triennial Plan for Fiscal Years 2017-2019. On behalf of the Natural Resources Council of Maine and the Conservation Law Foundation. February 17, 2016.

Nevada Public Utilities Commission (Docket Nos. 15-07041 and 15-07042): Direct testimony on NV Energy's application for approval of a cost of service study and net metering tariffs. On behalf of The Alliance for Solar Choice. October 27, 2015.

New Jersey Board of Public Utilities (Docket No. ER14030250): Direct testimony on Rockland Electric Company's petition for investments in advanced metering infrastructure. On behalf of the New Jersey Division of Rate Counsel. September 4, 2015.

Utah Public Service Commission (Docket No. 14-035-114): Direct, rebuttal, and surrebuttal testimony on the benefit-cost framework for net energy metering. On behalf of Utah Clean Energy, the Alliance for Solar Choice, and Sierra Club. July 30, 2015, September 9, 2015, and September 29, 2015.

Nova Scotia Utility and Review Board (Matter No. M06733): Direct testimony on EfficiencyOne's 2016-2018 demand-side management plan. On behalf of the Nova Scotia Utility and Review Board. June 2, 2015.

Missouri Public Service Commission (Case No. ER-2014-0370): Direct and surrebuttal testimony on the topic of Kansas City Power and Light's rate design proposal. On behalf of Sierra Club. April 16, 2015 and June 5, 2015.

Missouri Public Service Commission (File No. EO-2015-0055): Rebuttal and surrebuttal testimony on the topic of Ameren Missouri's 2016-2018 Energy Efficiency Plan. On behalf of Sierra Club. March 20, 2015 and April 27, 2015.

Florida Public Service Commission (Dockets No. 130199-EI et al.): Direct testimony on the topic of setting goals for increasing the efficiency of energy consumption and increasing the development of demand-side renewable energy systems. On behalf of the Sierra Club. May 19, 2014.

Massachusetts Department of Public Utilities (Docket No. DPU 14-86): Direct and rebuttal Testimony regarding the cost of compliance with the Global Warming Solution Act. On behalf of the Massachusetts Department of Energy Resources and the Department of Environmental Protection. May 16, 2014.

Kentucky Public Service Commission (Case No. 2014-00003): Direct testimony regarding Louisville Gas and Electric Company and Kentucky Utilities Company's proposed 2015-2018 demand-side management and energy efficiency program plan. On behalf of Wallace McMullen and the Sierra Club. April 14, 2014.

Maine Public Utilities Commission (Docket No. 2013-168): Direct and surrebuttal testimony regarding policy issues raised by Central Maine Power's 2014 Alternative Rate Plan, including recovery of capital costs, a Revenue Index Mechanism proposal, and decoupling. On behalf of the Maine Public Advocate Office. December 12, 2013 and March 21, 2014.

Colorado Public Utilities Commission (Docket No. 13A-0686EG): Answer and surrebuttal testimony regarding Public Service Company of Colorado's proposed energy savings goals. On behalf of the Sierra Club. October 16, 2013 and January 21, 2014.

Kentucky Public Service Commission (Case No. 2012-00578): Direct testimony regarding Kentucky Power Company's economic analysis of the Mitchell Generating Station purchase. On behalf of the Sierra Club. April 1, 2013.

Nova Scotia Utility and Review Board (Matter No. M04819): Direct testimony regarding Efficiency Nova Scotia Corporation's Electricity Demand Side Management Plan for 2013 – 2015. On behalf of the Counsel to Nova Scotia Utility and Review Board. May 22, 2012.

Missouri Office of Public Counsel (Docket No. EO-2011-0271): Rebuttal testimony regarding IRP rule compliance. On behalf of the Missouri Office of the Public Counsel. October 28, 2011.

Nova Scotia Utility and Review Board (Matter No. M03669): Direct testimony regarding Efficiency Nova Scotia Corporation's Electricity Demand Side Management Plan for 2012. On behalf of the Counsel to Nova Scotia Utility and Review Board. April 8, 2011.

Rhode Island Public Utilities Commission (Docket No. 3790): Direct testimony regarding National Grid's Gas Energy Efficiency Programs. On behalf of the Division of Public Utilities and Carriers. April 2, 2007.

North Carolina Utilities Commission (Docket E-100, Sub 110): Filed comments with Anna Sommer regarding the Potential for Energy Efficiency Resources to Meet the Demand for Electricity in North Carolina. Synapse Energy Economics on behalf of the Southern Alliance for Clean Energy. February 2007.

Rhode Island Public Utilities Commission (Docket No. 3765): Direct and Surrebuttal testimony regarding National Grid's Renewable Energy Standard Procurement Plan. On behalf of the Division of Public Utilities and Carriers. January 17, 2007 and February 20, 2007.

Minnesota Public Utilities Commission (Docket Nos. CN-05-619 and TR-05-1275): Direct testimony regarding the potential for energy efficiency as an alternative to the proposed Big Stone II coal project. On behalf of the Minnesota Center for Environmental Advocacy, Fresh Energy, Izaak Walton League of America, Wind on the Wires and the Union of Concerned Scientists. November 29, 2006.

Rhode Island Public Utilities Commission (Docket No. 3779): Oral testimony regarding the settlement of Narragansett Electric Company's 2007 Demand-Side Management Programs. On behalf of the Division of Public Utilities and Carriers. November 24, 2006.

Nevada Public Utilities Commission (Docket Nos. 06-04002 & 06-04005): Direct testimony regarding Nevada Power Company's and Sierra Pacific Power Company's Renewable Portfolio Standard Annual Report. On behalf of the Nevada Bureau of Consumer Protection. October 26, 2006

Nevada Public Utilities Commission (Docket No. 06-06051): Direct testimony regarding Nevada Power Company's Demand-Side Management Plan in the 2006 Integrated Resource Plan. On behalf of the Nevada Bureau of Consumer Protection. September 13, 2006.

Nevada Public Utilities Commission (Docket Nos. 06-03038 & 06-04018): Direct testimony regarding the Nevada Power Company's and Sierra Pacific Power Company's Demand-Side Management Plans. On behalf of the Nevada Bureau of Consumer Protection. June 20, 2006.

Nevada Public Utilities Commission (Docket No. 05-10021): Direct testimony regarding the Sierra Pacific Power Company's Gas Demand-Side Management Plan. On behalf of the Nevada Bureau of Consumer Protection. February 22, 2006.

South Dakota Public Utilities Commission (Docket No. EL04-016): Direct testimony regarding the avoided costs of the Java Wind Project. On behalf of the South Dakota Public Utilities Commission Staff. February 18, 2005.

Rhode Island Public Utilities Commission (Docket No. 3635): Oral testimony regarding the settlement of Narragansett Electric Company's 2005 Demand-Side Management Programs. On behalf of the Division of Public Utilities and Carriers. November 29, 2004.

British Columbia Utilities Commission. Direct testimony regarding the Power Smart programs contained in BC Hydro's Revenue Requirement Application 2004/05 and 2005/06. On behalf of the Sierra Club of Canada, BC Chapter. April 20, 2004.

Maryland Public Utilities Commission (Case No. 8973): Oral testimony regarding proposals for the PJM Generation Attributes Tracking System. On behalf of the Maryland Office of People's Counsel. December 3, 2003.

Rhode Island Public Utilities Commission (Docket No. 3463): Oral testimony regarding the settlement of Narragansett Electric Company's 2004 Demand-Side Management Programs. On behalf of the Division of Public Utilities and Carriers. November 21, 2003.

California Public Utilities Commission (Rulemaking 01-10-024): Direct testimony regarding the market price benchmark for the California renewable portfolio standard. On behalf of the Union of Concerned Scientists. April 1, 2003.

Québec Régie de l'énergie (Docket R-3473-01): Direct testimony with Philp Raphals regarding Hydro-Québec's Energy Efficiency Plan: 2003-2006. On behalf of Regroupment national des Conseils régionaux de l'environnement du Québec. February 5, 2003.

Connecticut Department of Public Utility Control (Docket No. 01-10-10): Direct testimony regarding the United Illuminating Company's service quality performance standards in their performance-based ratemaking mechanism. On behalf of the Connecticut Office of Consumer Counsel. April 2, 2002.

Nevada Public Utilities Commission (Docket No. 01-7016): Direct testimony regarding the Nevada Power Company's Demand-Side Management Plan. On behalf of the Bureau of Consumer Protection, Office of the Attorney General. September 26, 2001.

United States Department of Energy (Docket Number-EE-RM-500): Comments with Bruce Biewald, Daniel Allen, David White, and Lucy Johnston of Synapse Energy Economics regarding the Department of Energy's proposed rules for efficiency standards for central air conditioners and heat pumps. On behalf of the Appliance Standards Awareness Project. December 2000.

US Department of Energy (Docket EE-RM-500): Oral testimony at a public hearing on marginal price assumptions for assessing new appliance efficiency standards. On behalf of the Appliance Standards Awareness Project. November 2000.

Connecticut Department of Public Utility Control (Docket No. 99-09-03 Phase II): Direct testimony regarding Connecticut Natural Gas Company's proposed performance-based ratemaking mechanism. On behalf of the Connecticut Office of Consumer Counsel. September 25, 2000.

Mississippi Public Service Commission (Docket No. 96-UA-389): Oral testimony regarding generation pricing and performance-based ratemaking. On behalf of the Mississippi Attorney General. February 16, 2000.

Delaware Public Service Commission (Docket No. 99-328): Direct testimony regarding maintaining electric system reliability. On behalf of Delaware Public Service Commission Staff. February 2, 2000.

Delaware Public Service Commission (Docket No. 99-328): Filed expert report ("Investigation into the July 1999 Outages and General Service Reliability of Delmarva Power & Light Company," jointly authored with J. Duncan Glover and Alexander Kusko). Synapse Energy Economics and Exponent Failure Analysis Associates on behalf the Delaware Public Service Commission Staff. February 1, 2000.

New Hampshire Public Service Commission (Docket No. 99-099 Phase II): Oral testimony regarding standard offer services. On behalf of the Campaign for Ratepayers Rights. January 14, 2000.

West Virginia Public Service Commission (Case No. 98-0452-E-GI): Rebuttal testimony regarding codes of conduct. On behalf of the West Virginia Consumer Advocate Division. July 15, 1999.

West Virginia Public Service Commission (Case No. 98-0452-E-GI): Direct testimony regarding codes of conduct and other measures to protect consumers in a restructured electricity industry. On behalf of the West Virginia Consumer Advocate Division. June 15, 1999.

Public Service Commission of West Virginia (Case No. 98-0452-E-GI): Filed expert report ("Measures to Ensure Fair Competition and Protect Consumers in a Restructured Electricity Industry in West Virginia," jointly authored with Jean Ann Ramey and Theo MacGregor) in the matter of the General Investigation to determine whether West Virginia should adopt a plan for open access to the electric power supply market and for the development of a deregulation plan. Synapse Energy Economics and MacGregor Energy Consultancy on behalf of the West Virginia Consumer Advocate Division. June 1999.

Massachusetts Department of Telecommunications and Energy (DPU/DTE 97-111): Direct testimony regarding Commonwealth Electric Company's energy efficiency plan, and the role of municipal aggregators in delivering demand-side management programs. On behalf of Cape and Islands Self-Reliance Corporation. January 1998.

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Colorado Public Utilities Commission (5R-071E): Oral testimony on the Commission's integrated resource planning rules. On behalf of the Colorado Office of Energy Conservation. July 1995.

Colorado Public Utilities Commission (3I-098E): Direct testimony on the Public Service Company of Colorado's DSM programs and integrated resource plans. On behalf of the Colorado Office of Energy Conservation. April 1994.

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State of Vermont Public Service Board (Docket No. 5854): Filed expert report (Tellus Institute Study No. 95-308) regarding the Investigation into the Restructuring of the Electric Utility Industry in Vermont. On behalf of the Vermont Department of Public Service. March 1996.

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