

**Docket 4780**  
**Second Set of Data Requests**  
**From the Division of Public Utilities to National Grid**  
**January 8, 2018**

**Benefit-Cost Analyses**

- 2-1. Please provide a qualitative description for each of the ways that the changes to the tax code made in H.R.-1 the Tax Cuts & Jobs Act will affect the benefit-cost analyses included in the PST Books in the rate case filing. Please be specific and describe how the new law would affect:
- a. The after-tax weighted average cost of capital.
  - b. The cost of the specific project, including:
    - i. O&M costs
    - ii. capital costs
    - iii. Any other costs
  - c. The benefits of the project, including:
    - i. avoided energy costs
    - ii. avoided generation capacity costs
    - iii. avoided transmission and distribution capacity costs
    - iv. avoided O&M costs
    - v. avoided capital costs
    - vi. Any other benefits

**Response can be found in Book 1 part 1 on Bates page(s) 1-45.**

- 2-2. For each of the benefit-cost analyses included in the PST Books in the rate case filing, please recalculate the analysis to account for all the effects of the changes to the tax code made in H.R.-1 The Tax Cuts & Jobs Act. Please explain how your answers to the previous question affected each of the benefit-cost analyses. Please provide all workpapers, workbooks, and calculations in machine-readable format with formulas intact.

**Response can be found in Book 1 part 1 on Bates page(s) 46.**

## **Grid Modernization**

- 2-3. Regarding the Grid Modernization investments described in Schedule PST-1, Chapter 3, except for the AMF initiative, please describe in detail the methodology that the Company used in the best-fit/least cost assessment.

**Response can be found in Book 1 part 1 on Bates page(s) 47.**

- 2-4. Regarding the Grid Modernization investments described in Schedule PST-1, Chapter 3, except for the AMF initiative, please provide all results of the best-fit/least cost assessment. Please provide all workpapers, workbooks, and calculations in machine-readable format with formulas intact. Please provide the assessments separately for:
- a. The system data portal
  - b. Feeder monitoring sensors
  - c. Control center enhancements
  - d. operational data management
  - e. telecommunications
  - f. cybersecurity

**Response can be found in Book 1 part 1 on Bates page(s) 48-59.**

- 2-5. Regarding the Grid Modernization investments described in Schedule PST-1, Chapter 3, please describe in detail how the best-fit/least cost assessment approach is consistent with the Commission's cost-effectiveness guidelines provided in docket 4600.

**Response can be found in Book 1 part 1 on Bates page(s) 60.**

- 2-6. Regarding the Grid Modernization investments described in Schedule PST-1, Chapter 3, except for the AMF initiative, for each initiative that has both stand-alone and shared scenarios, please describe in detail any reasons why the Company might not be able to pursue the shared scenario.

**Response can be found in Book 1 part 1 on Bates page(s) 61.**

- 2-7. Regarding the Grid Modernization investments described in Schedule PST-1, Chapter 3, except for the AMF initiative, for each initiative that has both stand-alone and shared scenarios:
- a. Please provide the Company's best estimate of probability of each scenario occurring.
  - b. Please use the probabilities provided in response to (a) to estimate the expected value of the cost of the initiative.

- c. Please provide the Company's best estimate of when it will be able to determine whether the investment will be stand-alone or shared.

**Response can be found in Book 1 part 1 on Bates page(s) 62-63.**

**AMF**

2-8. Regarding the AMF investments described in Schedule PST-1, Chapter 4:

- a. Has the New York Public Service Commission approved a proposal for AMF or AMI investments by Niagara Mohawk? If so, please provide any related commission orders.
- b. Please describe how the Niagara Mohawk AMF or AMI proposal compares with, and differs from, the AMF proposal in this docket.

**Response can be found in Book 1 part 1 on Bates page(s) 64-Book 1 part 2 Bates page(s) 123.**

2-9. Regarding the AMF investments described in Schedule PST-1, Chapter 4, please describe in detail any reasons why the Company might not be able to pursue the scenario where it shares costs with Niagara Mohawk.

**Response can be found in Book 1 part 2 on Bates page(s) 124.**

2-10. Regarding the AMF investments described in Schedule PST-1, Chapter 4:

- a. Please provide the Company's best estimate of the probability of being able to share costs with Niagara Mohawk.
- b. Please use the probability provided in response to (a) to estimate the expected value of the cost of the AMF initiative.
- c. Please provide the Company's best estimate of when it will be able to determine whether it will be able to share costs with Niagara Mohawk.

**Response can be found in Book 1 part 2 on Bates page(s) 125.**

2-11. Regarding the AMF investments described in Schedule PST-1, Chapter 4, does the Company plan to collect the undepreciated costs associated with the existing meters that are removed? If so, how? If not, why not?

**Response can be found in Book 1 part 2 on Bates page(s) 126**

- 2-12. Regarding the AMF investments described in Schedule PST-1, Chapter 4, in the benefit-cost analysis, does the Company include the undepreciated costs associated with the existing meters that are removed? If so, how? If not, why not?

**Response can be found in Book 1 part 2 on Bates page(s) 127.**

- 2-13. Please provide the Company's annual number of customers with electric vehicles for each of the past five calendar years.

**Response can be found in Book 1 part 2 on Bates page(s) 128**

- 2-14. Please provide the Company's System Average Interruption Frequency Index and System Average Interruption Duration Index for the last five years in machine-readable format with formulas intact.

**Response can be found in Book 1 part 2 on Bates page(s) 129-130.**

- 2-15. Refer to Appendix 4.2, AMF BCA Methodology, and Workpaper 4.1, AMF costs.

- a. For Workpaper 4.1, please provide the full workbook in electronic format, with all formulae intact, showing the calculations of the costs and benefits, as well as how these costs and benefits were aggregated to form the tables contained in Appendix 4.2.
- b. For Workpaper 4.1 and Appendix 4.2, please provide the key assumptions used in the calculation of each benefit or cost and an explanation of how such assumptions were developed, with supporting materials.

**Response can be found in Book 1 part 2 on Bates page(s) 131.**

- 2-16. Refer to page 2 of Chapter 4 – AMF in PST-1, where it is stated that the Company's AMF proposal will allow the Company to explore "the opportunity to partner with other parties that could share in the cost and benefit from the access to a state-wide communications system." Please list the other parties that the Company has been in contact with or expects to be in contact with regarding the sharing of the cost and benefit of the state-wide communications system.

**Response can be found in Book 1 part 2 on Bates page(s) 132.**

- 2-17. Refer to page 5 of Chapter 4 – AMF in PST-1, where it is states that the AMF program includes "an analytics platform to convert raw data into intelligent information for use in decision making by customers and the Company." Please provide examples of the types of intelligent information provided via the analytics platform that will be used by customers and the Company.

**Response can be found in Book 1 part 2 on Bates page(s) 133-134.**

- 2-18. Refer to page 6 of Chapter 4 – AMF in PST-1, where it states that the “Company estimates that approximately 33% of electric meters will be installed in FY2021, followed by 67% in FY2022.” Please describe how the Company intends to decide where to deploy AMF first, both in terms of service rates and geographical regions.

**Response can be found in Book 1 part 2 on Bates page(s) 135.**

- 2-19. Refer to Appendix 4.1, Table 4-12: Assumptions to estimate savings from time varying rates:
- a. Please provide the price ratio for CPP assumed when estimating the expected CPP peak load reduction.
  - b. Please confirm that the CPP Peak Load Reduction and the TOU On-Peak Energy Reduction values are average per-customer values for residential customers.
  - c. Please provide the average peak load (kW) for a residential customer for each of the past 5 years.
  - d. Please explain why the peak load reduction assumptions for opt-in rates are reasonable.
  - e. Please explain why the peak load reduction assumptions for opt-out rates are reasonable.
  - f. Please identify whether the CPP Peak Load Reduction assumptions are incremental to the peak load reductions achieved from TOU.
  - g. Please provide the full text of source: The Brattle Group Economists (Submitted to EDI Quarterly), The Discovery of Price Responsiveness – A Survey of Experiments Involving Dynamic Pricing of Electricity, March 2012.
  - h. Please describe how the estimated 20% opt-in rate was developed, including the specific sources relied upon.
  - i. Please provide the expected annual number of days in which critical peak pricing events would be called.
  - j. Please provide the expected duration of each critical peak pricing event.

**Response can be found in Book 2 on Bates page(s) 1-239.**

- 2-20. Refer to page 7 of Chapter 4 – AMF in PST-1, where it states that after the transition to TVR, “the Company will continue to work with customers to educate them about their bills and assist them in accessing and using the tools available to understand and control their energy use.” Please provide descriptions of the programs that the Company intends to implement to assist customers in understanding their bills and the tools available to them.

**Response can be found in Book 3 on Bates page(s) 1.**

- 2-21. Refer to page 9 of Chapter 4 – AMF in PST-1 regarding joint deployment of AMF.
- a. Has the Company evaluated potential joint AMF deployment with National Grid’s Massachusetts affiliate instead of joint deployment with Niagara Mohawk? If so, please provide all workpapers, workbooks, and calculations from these evaluations in machine-readable format with formulas intact.
  - b. Has the Company evaluated potential joint deployment scenarios between Rhode Island and multiple National Grid affiliates? If so, please provide all workpapers, workbooks, and calculations from these evaluations in machine-readable format with formulas intact.
  - c. Please provide all workpapers, workbooks, and calculations in machine-readable format with formulae intact that were used in the development of Table 4-1: Estimated Costs for the Rhode Island Only Scenario and Table 4-2 Estimated Costs for the Multi-Jurisdiction Scenario.

**Response can be found in Book 3 on Bates page(s) 2.**

- 2-22. Refer to page 10 of Chapter 4 – AMF in PST-1, in which the modern grid experience is discussed as needing to address six customer needs: Reliability, Affordability, Visibility, Control, Choice, and Convenience. Please provide descriptions of how the proposed AMF deployment will address each of these customer needs.

**Response can be found in Book 3 on Bates page(s) 3-4.**

- 2-23. Please describe the features of the energy management portal that is proposed on page 11 of Chapter 4 – AMF in PST-1.

**Response can be found in Book 3 on Bates page(s) 5.**

- 2-24. Please describe the ways in which AMF can offer insight into where and when DERs can provide the most value, and how the Company proposes to evaluate and compensate DERs for their locational and temporal values.

**Response can be found in Book 3 on Bates page(s) 6.**

- 2-25. Please provide a list of third-party companies that have expressed interested in acquiring customer data through the Green Button Connect My Data functionality.

**Response can be found in Book 3 on Bates page(s) 7.**

- 2-26. Refer to page 17 of Chapter 4 – AMF in PST-1, which states: “the Company has reviewed the option to deliver time-varying rates through the existing AMR meters. [...] the Company has found that, while delivering a basic time-varying rate option is technically feasible with AMR infrastructure, there are significant operational challenges and necessary capital upgrades that when compared to investment in AMF may make this option less beneficial to customers overall.” Please provide the following in machine-readable format with formulas intact:

- a. All workpapers, workbooks, and calculations that contributed to the conclusion that delivering time-varying rates through the existing AMR meters is less beneficial to customers than through investment in the Company’s proposed AMF solution.
- b. All operational challenges and necessary capital upgrades involved in delivering a basic time-varying rate option with AMR meters.

**Response can be found in Book 3 on Bates page(s) 8-9.**

- 2-27. Refer to page 18 of Chapter 4 – AMF in PST-1, which states: “A comparison of the costs and benefits of a triple ERT approach may provide lower net benefits to customers than the proposed AMF deployment.” Has the Company or any of its consultants conducted a benefit-cost analysis of the upgrade to a triple ERT meter discussed on page 17 of Chapter 4 – AMF in PST-1? If so, please provide all workpapers, workbooks, and calculations of the analysis in machine-readable format with formulas intact.

**Response can be found in Book 3 on Bates page(s) 10-11.**

- 2-28. Refer to page 19 of Chapter 4 – AMF in PST-1, which states: “New Meter and Communications Technology—This deployment will use the latest generation meter technology, which includes new features such as load disaggregation and locational awareness.”
- a. Please define “load disaggregation” as used in this context, and provide an example.
  - b. Please define “locational awareness” as used in this context, and provide an example.

**Response can be found in Book 3 on Bates page(s) 12.**

- 2-29. Refer to page 21 of Chapter 4 – AMF in PST-1, which states: “National Grid will use advertising and other communications mechanisms in the months leading up to market activation and meter installations.” Please describe the other communications mechanisms that the Company intends to use to introduce customers to AMF technology.

**Response can be found in Book 3 on Bates page(s) 13.**

- 2-30. Please provide all workpapers, workbooks, and calculations contributing to the results shown in Table 4-6: Rhode Island Only Implementation Societal Test Benefits and Costs and Table 4-7: Rhode Island and New York Joint Implementation Societal Test Benefits and Costs on page 28 of Chapter 4 – AMF in PST-1 in machine-readable format with formulas intact.

**Response can be found in Book 3 on Bates page(s) 14.**

- 2-31. Refer to page 3 of Appendix 4.1 – AMF Technology & BCA, which states: “While we did not account for devices with these capabilities [integration with distributed generation and load control devices; improved granularity of voltage and consumption data; and location awareness and communication with other meters] in our analysis, we will be looking to procure the latest technology to maximize value for our customers.” Please provide:
- a. The rationale behind the decision to not account for devices with these capabilities.
  - b. An updated version of Tables 4-2 and 4-3 accounting for devices with these capabilities.

**Response can be found in Book 3 on Bates page(s) 15.**

- 2-32. Refer to page 4 of Appendix 4.1 – AMF Technology & BCA, which states, regarding the cost for AMF electric meter storage: “An inventory level of 2.5% is assumed and will be allocated consistent with the AMF meter deployment schedule.” Please provide the rationale behind the assumed inventory level of 2.5%.

**Response can be found in Book 3 on Bates page(s) 16.**

- 2-33. Please provide the expected number of field operations personnel that will be needed for the deployment of AMF meters.

**Response can be found in Book 3 on Bates page(s) 17.**

- 2-34. Please provide the expected number of supplemental back office and clerical personnel (that is, personnel hired to support increased workload) that will be required to support the AMF implementation.

**Response can be found in Book 3 on Bates page(s) 18.**

- 2-35. Please provide the expected number of legacy AMR meters that will need to be disposed during the deployment of AMF meters.

**Response can be found in Book 3 on Bates page(s) 19.**



- 2-36. Please provide a list of outside service vendors that the Company has spoken to, or is interested in speaking to, regarding a contract to host the proposed meter data management systems (MDMS).

**Response can be found in Book 3 on Bates page(s) 20.**

- 2-37. Please explain the rationale behind contracting an outside service vendor to host the MDMS rather than the Company hosting the MDMS.

**Response can be found in Book 3 on Bates page(s) 21.**

- 2-38. Refer to page 10 of Appendix 4.1 – AMF Technology & BCA, which states: “The Company will apply learnings and best practices from these two [customer engagement portal] programs to ensure that customers are provided with a “best in class” portal experience that leverages AMF deployment. Please list the learnings and best practices that Company will use from these two programs.

**Response can be found in Book 3 on Bates page(s) 22.**

- 2-39. Please refer to page 14 of Appendix 4.1 – AMF Technology & BCA, which states: “Cloud Computing & Data Lake – Rather than hosting these data management capabilities on servers within National Grid data centers, greater efficiency, redundancies, and security regimes can be cost effectively procured by outsourcing this function.” Please provide all workpapers, workbooks, and calculations used to make this assessment.

**Response can be found in Book 3 on Bates page(s) 23.**

- 2-40. Please provide versions of Tables 4-6 and 4-7 in which the Information Technology Infrastructure costs are excluded, to reflect the fact that the AMF allocation of these projects have been removed from the schedule of AMF costs in the total Revenue Requirement for the Plan.

**Response can be found in Book 3 on Bates page(s) 24-26.**

- 2-41. Please provide the expected number of personnel that will compose the following components of the project management team:
- a. Internal project management leadership.
  - b. Internal business support.
  - c. External support.

**Response can be found in Book 3 on Bates page(s) 27-28.**

- 2-42. Refer to page 17 of Appendix 4.1 – AMF Technology & BCA, which states: “AMF meter replacement cost recognizes that over time meters will need to be replaced for a number of reasons, including damage or failure.”

- a. Please provide the expected life (in years) of an AMF meter.
- b. Please provide the expected failure rate for AMF meters.

**Response can be found in Book 3 on Bates page(s) 29.**

- 2-43. Please refer to page 17 of Appendix 4.1 – AMF Technology & BCA, which states: “A subset of electric meters are located in rural areas with insufficient density to form a stable and consistent mesh.” Please provide the number of electric meters located in these areas.

**Response can be found in Book 3 on Bates page(s) 30.**

- 2-44. Please provide the annual number of anomalous situations that required visits to the meter for manual meter investigations in the last five calendar years.

**Response can be found in Book 3 on Bates page(s) 31-32.**

- 2-45. Please provide the annual number of connects and disconnects, by service rate, in the last five calendar years.

**Response can be found in Book 3 on Bates page(s) 33-34.**

- 2-46. Please provide the average life of an AMR meter.

**Response can be found in Book 3 on Bates page(s) 35.**

- 2-47. Refer to page 22 of Appendix 4-1 – AMF Technology & BCA, which states: “To address the potential uncertainty of the benefit estimate for the Energy Management Portal, the company has calculated a low and high benefit of one percent and three percent, respectively.” Please provide the rationale behind the use of one percent and three percent for low and high benefit scenarios, respectively.

**Response can be found in Book 3 on Bates page(s) 36-161.**

- 2-48. Refer to page 22 of Appendix 4-1 AMF Technology & BCA, which states: “The Company has evaluated an opt-out scenario where, by default, a large percentage of customers will be enrolled in time variant pricing programs, as well as an opt-in scenario, in which customers must choose to enroll on the rate.” Please provide the expected percentage of customers enrolled in time variant pricing programs for the first five calendar years of time variant pricing program offerings, by service rate, for both the opt-out and opt-in scenarios.

**Response can be found in Book 3 on Bates page(s) 162.**

- 2-49. Refer to page 23 of Appendix 4-1 AMF Technology & BCA, which states: “The level of benefits achieved will be directly related to the [...] number of enrolled customers [...] and the resulting peak and energy savings.” Please provide the expected number of customers enrolled in time variant pricing programs for the first five calendar years of time variant pricing program offerings, by service rate, for both the opt-out and opt-in scenarios.

**Response can be found in Book 3 on Bates page(s) 163.**

- 2-50. Refer to page 25 of Appendix 4-1 – AMF Technology & BCA, which states: “The estimate for the electric vehicle integration benefit assumes a certain percentage of electric vehicle charging is done during peak periods and can be displaced.” Please provide the assumed percentage of electric vehicle charging that can be displaced to off-peak periods.

**Response can be found in Book 3 on Bates page(s) 164-165.**

- 2-51. Please provide the expected reduction of greenhouse gas emissions via AMF for the first five calendar years after AMF deployment.

**Response can be found in Book 3 on Bates page(s) 166.**

- 2-52. Please provide the number of the thefts of service the Company has documented in the last five calendar years.

**Response can be found in Book 3 on Bates page(s) 167.**

- 2-53. Please provide the number of bad debt write-offs the Company has experienced in the last five calendar years.

**Response can be found in Book 3 on Bates page(s) 168-170.**

- 2-54. Refer to page 27 of Appendix 4-1 – AMF Technology & BCA, which states: “Other capabilities and use cases were also contemplated but were determined to be out of scope.” Please provide a list of these capabilities and use cases along with the rationales as to why they were determined to be out of scope.

**Response can be found in Book 3 on Bates page(s) 171.**

#### **PST Provision**

- 2-55. Regarding the PST Provision described in Schedule PST-1, Chapter 10, the text states that for “all PST Initiatives except the expansion of Grid Modernization activities, including AMF, the Company’s PST-related costs are proposed to be recovered through two cost recovery factors:” the PST Factor and the PST Reconciliation Factors (page 2 of 7).
- a. Please confirm that the Grid Modernization and AMF costs will not be recovered through the PST and PST Reconciliation Factors.

- b. If the answer to (a) is no (i.e., “not confirmed”), then please explain the meaning of the quote above.
- c. If the answer to (a) is yes (i.e., “confirmed”), then how will the Company recover the Grid Modernization and AMF costs?
- d. If the answer to (a) is yes (i.e., “confirmed”), then please explain why the subsequent paragraph states that the Company is proposing the PST Factors and PST Reconciliation Factors for Grid Modernization Expansion, including AMF, be based upon the categorization of the nature of the spending of this initiative...” (page 2 of 7).

**Response can be found in Book 3 on Bates page(s) 172-174.**

- 2-56. Regarding the PST Provision described in Schedule PST-1, Chapter 10, please describe in detail the criteria that the Company will use to determine whether an investment is a PST initiative and therefore eligible for the PST Provision.

**Response can be found in Book 3 on Bates page(s) 175.**

- 2-57. Regarding the PST Provision described in Schedule PST-1, Chapter 10, please describe in detail why the PST initiative costs should be treated differently from other costs.

**Response can be found in Book 3 on Bates page(s) 176-177.**

- 2-58. Regarding the PST Provision described in Schedule PST-1, Chapter 10, please describe in detail why the PST initiative costs should be fully reconciled.

**Response can be found in Book 3 on Bates page(s) 178-179.**

- 2-59. Regarding the PST Provision described in Schedule PST-1, Chapter 10, please describe in detail how the Company would prefer to collect these costs if the Commission rejects the Company’s proposed PST Provision.

**Response can be found in Book 3 on Bates page(s) 180.**

### **Revenue Requirements**

- 2-60. Regarding the direct testimony of Melissa Little, page 9, line 13 through page 10, line 5, the question: “What costs are included in the revenue requirements?” Please clarify whether the Company is including each of the following items in its revenue requires:
- a. The vegetation-management and inspection and management programs in the ISR Plans.

- b. Any other costs in the ISR Plans. If there are any, please describe them.
- c. Commodity costs.
- d. Energy efficiency costs.
- e. Renewable energy growth costs.
- f. Any other reconciling mechanisms. If there are any please describe them.

**Response can be found in Book 3 on Bates page(s) 181-185.**

- 2-61. Regarding the direct testimony of Melissa Little, page 9, line 13 through page 10, line 5, the question: “What costs are included in the revenue requirements?” Please clarify whether the Company is proposing a different approach to including items in the revenue requirements relative to the 2012 rate case and the practices employed since then.

**Response can be found in Book 3 on Bates page(s) 186.**

- 2-62. Regarding the direct testimony of Melissa Little, page 10, lines 3-5, please clarify whether the Company is proposing to permanently stop recovering future vegetation-management and inspection and management programs in the ISR Plans through the ISR Factors. Or, does this text describe a process of moving previously incurred costs from the ISR Factors into base rates at the time of the next rate case.

**Response can be found in Book 3 on Bates page(s) 187-188.**