Division 32-1

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to the response to DIV 24-10(b), the question intended to ask what the incremental revenue requirement for the System Data Portal project would be for Rate Years 1, 2, and 3 if the System Data Portal project commenced in Rate Year 1 and continued in years 2 and 3. The response indicated that there would be "no change to the revenue requirements filed by the Company because the Company has assumed a half-year convention on all the capital revenue requirements in the year of investment."

a. (NOTE: The question may not have been written clearly enough or it may have been misunderstood when the response was prepared.) To be clear, was the response intended to suggest that there are incremental capital costs associated with the System Data Portal that would be incurred in any of the Rate Years? If yes, please provide an estimate of the capital investments and revenue requirement associated with those capital investments that would be made in Rate Years 1, 2, and 3 for the System Data Portal project and explain why these capital investments were not identified on Bates page 46 of PST-1 that appears to summarize all the costs of the System Data Portal project by year.

b. For clarity, please state the estimated revenue requirement of the System Data Portal project for Rate Years 1, 2, and 3, assuming the Company commenced the System Data Portal project with the increased scope proposed in the PST plan during Rate Year 1 and continued the project as proposed in the PST plan in Rate Years 2 and 3.

Response:

a. No. There are no incremental capital costs associated with the System Data Portal that would be incurred in the Rate Year (*i.e.*, September 1, 2018 through August 31, 2019), Data Year 1 (*i.e.*, September 1, 2019 through August 31, 2020), or Data Year 2 (*i.e.*, September 1, 2020 through August 31, 2021).

b. The estimated revenue requirement of the System Data Portal project for the Rate Year, Data Year 1, and Data Year 2 would be $700,000 for each twelve-month period.

(This response is identical to the Company's response to Division 10-1 in Docket No. 4780.)

Prepared by or under the supervision of: Robert Sheridan

Division 32-2

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to the response to DIV 24-11, for each of the initiatives identified in the response (other than the general reference to "Physical Grid Infrastructure"):

a. Please indicate whether the costs of the initiative are recovered in base distribution rates or recovered through a different cost recovery mechanism. If a different mechanism than base distribution rates, please identify.

b. Please indicate when the initiative commenced.

c. Please provide an estimate of the annual costs incurred by the Company and charged to ratepayers since the inception of the initiative.

Response:
The table below contains information regarding each project's (1) cost recovery mechanism, including if it is recovered in base distribution rates or recovered through a different cost recovery mechanism; (2) start date when the initiative commenced; and (3) estimate of the annual costs incurred by the Company and charged to customers since the inception of the initiative.

Project Category	Project/ Initiative Name	Project Description	Cost Recovery Mechanism	Start Date	Annual Costs, $1000s
Customer DER Programs	Tiverton and Little Compton Non-Wires Alternative (NWA) Pilot Projects	Pilot was initiated to create one megawatt of peak load relief on two feeders serving the area to avoid the need for construction of a third feeder.	System Reliability Procurement (SRP)	April 2012	OPEX: $300-400 (Average)
	Connected Solutions Direct Load Control (DLC) Program	Direct load control (DLC) pilot for commercial and industrial (C&I) and residential customers, which uses Whisker Lab's demand response platform to help the Company control participating thermostats during times of electrical system peak.	Energy Efficiency Program Provision	January 2016	OPEX: $227 (2016) $444 (2017)

Prepared by or under the supervision of: Robert Sheridan

Project Category	Project/ Initiative Name	Project Description	Cost Recovery Mechanism	Start Date	Annual Costs, $1000s
Volt-var Management	Volt-var Optimization (VVO) Pilot Projects	Pilots have been completed through the Infrastructure, Safety, and Reliability (ISR) plan, which utilize distribution field devices to provide energy savings to customers and peak load reductions through active real-time voltage control. In addition to the overall improved coordination of field device operation, the local devices themselves included upgrades to their locally situated control boxes (see Automated Field Devices below).	Infrastructure, Safety, and Reliability (ISR)	April 2014	CAPEX $2,007 (Average) OPEX: $325 (Average)
Fault Analysis and Power Flow Analysis	Siemens PSS®E software Eaton CYME software	Radial distribution analysis, networked sub-transmission and transmission analysis, fault current, and arc flash software packages are continually reviewed for the latest version and functionality required by National Grid.	Base Distribution Rates	PSS®E: 2009 CYME: 2010	OPEX: PSS®E: $5 CYME: $7
Outage Management System (OMS) and Supervisory Control and Data Acquisition (SCADA)	ABB Network Manager OMS and EMS/SCADA Upgrades in New England	These upgrades allowed the Company to better manage the significant data collection necessary for remote monitoring and distribution automation.	Base Distribution Rates	2009 (2015 In-Service)	CAPEX: $16,292 (Total)
DER and Load Forecasting	New England Electric Peak (MW) Forecast	The Company is developing new software tools and analytics to generate more granular forecasts of the electrical system including various load, generation and energy storage technologies. Forecasts in Rhode Island are currently based on top-down approaches and include load reductions due to projections for energy efficiency improvements. These forecasts have been recently updated to also include load reductions due to projections for photovoltaic-based distributed generation throughout the service territory.	Base Distribution Rates	November 2015	These costs are not tracked as a project

Project Category	Project/ Initiative Name	Project Description	Cost Recovery Mechanism	Start Date	Annual Costs, $1000s
Automated Field Devices	Recloser Communica-tion Program	Program is nearing completion to replace cellular radios that have become obsolete. Additionally, recloser, capacitor, and regulator controller standards are now microprocessor based, allowing future programmable functionality. For distribution capacitors, these upgrades allow for enhanced local operation, permitting for decisions based on local conditions, rather than standard time-of-day actuation. For new installations of both capacitors and regulators, the control boxes are upgraded to allow for remote connectivity, via a radio, to the Company SCADA system, as well as visibility at the control room of the operating status of these devices.	ISR	April 2017	CAPEX: $610
Sensing and Measurement	Rhode Island Zero Sequence Overvoltage (3V0) Protection Program	Reclosers and regulators are designed with bi-directional sensing and control. The Company is initiating the programmatic installation of transmission ground fault detection system termed 3V0.	ISR	September 2017	CAPEX: $200

(This response is identical to the Company's response to Division 10-2 in Docket No. 4780.)

Prepared by or under the supervision of: Robert Sheridan

Division 32-3

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

If the Rhode Island Commission directed the Company to implement the Operational Data Management projects for grid modernization set forth in Section 3.5 of PST-1, Bates pages 56-60, for the benefit of Rhode Island, and the Company implemented these projects, would the projects benefit the Company's distribution affiliates in Massachusetts or New York when implemented? If yes, please identify which affiliates will benefit and how each of the projects would benefit those affiliates. If no, please explain why not.

Response:

If the Public Utilities Commission directed the Company to implement the Operational Data Management projects for grid modernization and the Company implemented the projects in Rhode Island, but no other jurisdictions approved their respective grid modernization Operational Data Management projects (*i.e.*, Rhode Island Only deployment scenario), then the Rhode Island Operational Data Management projects would not benefit the Company's affiliates in Massachusetts or New York. The Operational Data Management projects in Rhode Island have been scoped to account for necessary capabilities and infrastructure in a Rhode Island Only Scenario and do not seek to account for a concurrent initiative in New York or Massachusetts. If other jurisdictions approved their respective grid modernization Operational Data Management projects (*i.e.*, Multi-Jurisdiction deployment scenario), then all jurisdictions, including Rhode Island, would benefit from sharing fixed costs for certain elements. The tables in Section 3.5 of Schedule PST-1, Bates Pages 56-60 of PST Book 1 (*i.e.*, Table 3-10 through Table 3-17), illustrate the potential project cost savings, which would result in National Grid USA Service Company, Inc. rental expense savings, due to sharing Operational Data Management fixed costs with the Company's affiliate in New York. In addition, there is the potential benefit of reduced equipment cost due to quantity discounts.

(This response is identical to the Company's response to Division 10-3 in Docket No. 4780.)

Prepared by or under the supervision of: Robert Sheridan

Division 32-4

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

If the Rhode Island Commission directed the Company to implement the Telecommunications initiative for grid modernization set forth in Section 3.6 of PST-1, Bates pages 60-61, for the benefit of Rhode Island, and the Company implemented these projects, would the projects benefit the Company's distribution affiliates in Massachusetts or New York when implemented? If yes, please identify which affiliates will benefit and how each of the projects would benefit those affiliates. If no, please explain why not.

Response:

If the Public Utilities Commission directed the Company to implement the Telecommunications project for grid modernization and the Company implemented the project in Rhode Island, but no other jurisdictions approved their respective grid modernization Telecommunications projects (*i.e.*, Rhode Island Only deployment scenario), then the Rhode Island Telecommunications project would not benefit the Company's affiliates in Massachusetts or New York. The Telecommunications project in Rhode Island has been scoped to account for necessary capabilities and infrastructure in a Rhode Island Only Scenario and does not seek to account for a concurrent initiative in New York or Massachusetts. If other jurisdictions approved their respective grid modernization Telecommunications projects (*i.e.*, Multi-Jurisdiction deployment scenario), then all jurisdictions, including Rhode Island, would benefit from sharing fixed costs for certain elements like a combined network operations center; network management system software products the Company and its affiliates would use to monitor and run the network; and bandwidth increases or new connectivity to data centers, facilities, or cloud service providers. Table 3-18 and Table 3-19 in Section 3.6 of Schedule PST-1, Bates Pages 60-61 of PST Book 1, illustrate the potential project cost savings, which would result in National Grid USA Service Company, Inc. rental expense savings, due to sharing Telecommunications fixed costs with the Company's affiliate in New York. In addition, there is the potential benefit of reduced equipment cost due to quantity discounts.

(This response is identical to the Company's response to Division 10-4 in Docket No. 4780.)

Division 32-5

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to project costs for the electric transportation initiative set forth in Table 5-4 in PST-1, Bates page 115, please provide greater detail that shows how these costs were estimated, including more granular information that identifies the underlying costs for the estimates shown. Please also specify whether the costs include adding employees. Please also indicate how many charging stations are assumed in the cost estimate and the capital cost associated with those charging stations.

Response:

Please refer to the Company's response to Division 10-4 part a. and the corresponding attachments, which supplied detail on all of the costs for the Electric Transportation Initiative.

The costs include the following incremental labor costs:

- 0.5 FTE Off-Peak Charging Rebate Pilot Program Manager to develop and manage the proposed 500-customer pilot over the three-year period, including selection and management of technology vendor(s), recruitment of participating customers, processing of rebates, and analysis of participant data to achieve the pilot objectives.

- 4 FTE for Charging Station Demonstration Program, consisting of one Charging Demonstration Program Manager, two Senior Project Managers, and one Account Manager, responsible for recruitment, development, and management of the charging sites for Consumer Vehicle segments (34 sites) and Fleet and Transit Operator segments (14 sites).

- 0.25 FTE for Transportation Education and Outreach, to plan and implement a targeted consumer awareness campaign aimed at increasing consideration of EVs and understanding of EV charging and rates.

The number of charging stations assumed in the cost estimates are shown in Table 5-2 of Schedule PST-1, Chapter 5 as originally filed.

The capital costs associated with the charging stations are provided in the third tab of Attachment Division 10-4-1.

(This response is identical to the Company's response to Division 10-5 in Docket No. 4780.)

Prepared by or under the supervision of: Carlos Nouel

Division 32-6

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to the Transportation Education and Outreach description in Section 2.4 of PST-1, Bates pages 109-110, please explain why it is reasonable for ratepayers to pay for the costs of informing the public about anything more than the rates, availability, and location of EV charging stations around the service area.

Response:

Through its experience in energy efficiency marketing, the Company has a demonstrated ability to influence its customers' awareness of new technologies and help transform product markets consistent with state policy goals. With regard to electric transportation, the Rhode Island Power Sector Transformation (PST) Phase One Report described customer education and outreach as "important in early years" and "potentially a key role for the utility" (page 58). During the PST stakeholder process on the topic of Beneficial Electrification, stakeholders emphasized the importance of the utility educating consumers on electric vehicles (EVs), including their financial value and usability (for example, page 7 of the Beneficial Electrification Principles and Recommendations, October 13, 2017 draft, included here as Attachment DIV 32-6).

Any information provided by the Company on rates and charging availability alone would be substantially less useful to customers, without the Company also providing necessary information for them to understand and act on that information, including but not limited to: electric vehicle technologies and products, vehicle charging technologies and products, available state and federal incentives for both vehicles and charging, prospective cost savings from electric vehicles, and other benefits of EV ownership.

It is reasonable for the Company's electric customers to pay for the costs of informing the public in Rhode Island[1] about the full breadth of topics above, because all electric customers in Rhode Island will benefit from this information, and because the information helps advance the State's greenhouse gas and zero emission vehicle policy goals. As consumers, all electric customers will obtain an improved understanding of new technologies and their societal benefits, and those electric customers who operate vehicles will be able to use information provided by the Company to directly access the lower costs and other benefits of an electrified vehicle. In addition, over the longer term, widespread transportation electrification will provide the Company's electric customers with improved local air quality and other environmental benefits.

(This response is identical to the Company's response to Division 10-6 in Docket No. 4780.)

[1] The public in Rhode Island generally consists of, but is not strictly limited to, the Company's electric customers.

Rhode Island Power Sector Transformation

Beneficial Electrification Principles and Recommendations

October 13, 1017

DRAFT FOR STAKEHOLDER COMMENT

Introduction

Rhode Island recognizes that its electric sector is undergoing significant changes.[1] Due to the interplay of technology innovation, public policy, and market forces, the nation's electric grid is getting cleaner and more distributed, and customers are consuming, saving, and producing energy in many new ways.

"Beneficial electrification" is one of the significant changes underway. It is a term that describes the electrification of end-uses, like light-duty transportation and space and water heating, in order to reduce costs and greenhouse gas and other air emissions of these products that historically have been powered by fossil fuels.

Beneficial electrification offers promising ways to manage demand and to avoid unnecessary stress on the system that could increase costs and air emissions. With the growth of intermittent resources (e.g., wind and solar), balancing grid systems is a very different task today than in the past. Grid operators recognize that managing demand through a combination of policies, pricing options, and program offerings can make the system more flexible and lower its overall costs. Electrification of both transportation and heating could allow the shifting of load in time, and would thereby meet the growing need for flexible resources to better manage the grid and help integrate renewable energy.

Beneficial electrification is possible due to significant increases in the efficiency of end-use equipment (e.g., heat pumps and batteries), technological advances in other sectors (e.g., electric vehicles), and declining electric sector emission rates. The opportunity exists to reduce electric sector emissions and electric system costs while lowering individual Rhode Islanders' energy burden. Electrification is also an emerging business opportunity for utilities to allow entities, in some cases including the utility itself, to develop new and innovative services for customers.

For these reasons and given Rhode Island state policy, it is appropriate to consider proposals from electric distribution utilities to advance the adoption of beneficial electrification. Such electrification proposals for Rhode Island must demonstrate that they will produce the aforementioned and other net benefits,[2] and that they are consistent with relevant state policy goals. To ensure this outcome, utility proposals should incorporate these goals, and proponents should be prepared to demonstrate how proposals will help meet them.

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[1] The Public Utilities Commission opened Docket No. 4600 to address issues related to the changing electric distribution system (*see* www.ripuc.org/eventsactions/docket/4600page.html). The Office of Energy Resources, the Energy Efficiency and Resource Management Council, the Distributed Generation Board, and National Grid convened a working group known as the Systems Integration Rhode Island or SIRI, to make recommendations on important issues related to developing Rhode Island's future electric grid, and to achieve the state's policy goals related to modernizing the energy sector. *See* www.energy.ri.gov/electric-gas/future-grid/systems-integration-ri.php. Additionally, Governor Gina Raimondo has asked state agencies to address a wide range of issues developing on the system, which was a direct cause of the work presented in this document. *See* www.ripuc.ri.gov/utilityinfo/electric/GridMod_ltr.pdf.

[2] Costs and benefits are defined by the Rhode Island Benefit Cost Framework and Test adopted for application to energy efficiency program review in the PUC's Standards for Least Cost Procurement in Docket No. 4684 and for broader program assessment in Docket No. 4600.

Fortunately, we expect there are many different program designs that would achieve net benefits and further state policy goals. While different in scope and design, all proposals should adhere to some basic principles. Since successful electrification depends on innovation and market transformation, state policies and the utility's role will need to allow for experimentation, be adaptive, and co-evolve with technologies and markets. Program goals must be clearly articulated, and each program design element must be clearly tied to program goals. To this end, proposals should be designed with appropriate metrics to demonstrate progress and to enable mid-course corrections if necessary. Furthermore, any electrification program proposal should provide a platform for technology innovation, meaning that it should establish equipment performance objectives such as improving system flexibility and visibility, rather than specifying particular technologies.

This draft whitepaper outlines important goals and basic principles the Draft Project Team, comprising Public Utilities Commission (PUC) staff, Division of Public Utilities and Carriers (DPUC), and Office of Energy Resources (OER), have developed based on stakeholder input, interagency deliberation, and research. The principles cover four key issues that emerge when considering a regulatory perspective on efficient electrification of the transportation system by increasing use of plug-in electric and plug-in hybrid electric vehicles (EVs) to meet state policy goals: Goals and Benefits of Electrification, the Utility Role, Cost Recovery, and Implementation Design and Adaptive Learning.[3] Highlights of stakeholder comments related to each issue can be found in the Appendix below. We seek further input from stakeholders on these principles and identification of program design preferences. A future draft – to be completed by DPUC and OER without collaboration of the PUC or its staff – may include further policy determinations and refinements on program design preferences based on stakeholder responses.

1. Goals and Benefits of Electrification

On June 14, 2017, the PUC, DPUC, and OER issued a Notice of Inquiry and Request for Stakeholder Comment Regarding a Utility's Role in Deploying Beneficial Electrification with Focus on Plug-in Electric Vehicles (Notice). The Notice included the following list of beneficial electrification program goals:

- Provide reliable, safe, clean and affordable energy to Rhode Island customers over the long term (this applies to all energy use, not just regulated fuels);
- Strengthen the Rhode Island economy, support economic competitiveness, retain and create jobs by optimizing the benefits of a modern grid and attaining appropriate rate design structures;
- Address the challenge of climate change and other forms of pollution;
- Align distribution utility, customer, and policy objectives and interests through the regulatory framework, including rate design, cost recovery, and incentives.

[3] Electrification of heating is part of Rhode Island's power sector transformation strategy, but is progressing on a different schedule from EVs in the Power Sector Transformation project. This is in part because National Grid currently has existing and proposed programs as part of its Energy Efficiency and System Reliability Procurement Plans.

- Prioritize and facilitate increasing customer investment in their facilities (efficiency, distributed generation, storage, responsive demand, and the electrification of vehicles and heating) where that investment provides recognizable net benefits;
- Appropriately compensate distributed energy resources for the value they provide to the electricity system, customers, and society;
- Appropriately charge customers for the cost they impose on the grid; and
- Appropriately compensate the distribution utility for the services it provides.

The Draft Project Team notes that standards for goals and net benefits have been developed in other PUC processes.[4] The Notice also included Rhode Island's EV deployment goals, including:

- The Rhode Island Zero Emission Vehicle Plan goal of 43,000 electric vehicles by 2025.
- The Executive Climate Change Coordinating Council (EC4) greenhouse gas emissions reduction scenario targeting the electrification of 34% of on-road vehicle miles travelled by 2035 and 76% by 2050.

Commenters on the Notice generally affirmed the goals presented. Key additional goals proposed by commenters included: educate customers about the benefits of electric vehicles, accelerate and scale the electric vehicle market, address key market failures, and ensure fairness.

2. Utility Role

Commenters noted, and Draft Project Team agrees, that the utility, as manager of the electric grid, will play a key role in transportation electrification. Moreover, it was agreed that the utility in fact has multiple roles, some of which will likely change over time. In the early years of any electrification proposal, the utility should consider how Rhode Island's transportation market must transform to meet state greenhouse gas emission goals. The transportation sector is the second largest consumer of energy in the United States (behind electric power generation) and yet 92% of the energy consumed in transportation today comes from petroleum.[5] Electrification promises to transform the current transportation market, enabling utilities to capture revenues currently spent on fossil fuels, enhance their ability to manage the grid, and provide their consumers with new products and services. As the market transforms, utilities must provide nondiscriminatory service and ensure that incremental electrification load is incorporated in a safe, reliable, and efficient manner. An electrification proposal should explain how the utility's role would support the program, achieve net benefits, and help ensure the achievement of state goals.

More specifically, a proposal should articulate what the utility expects to own, operate, execute, measure, and enable, as well as explain how the utility's role relates to the potential roles of other participants in the market. For example, customer education and outreach – potentially a key role for the utility – will be important in early years, and the utility would be expected to provide a plan setting out how it expects to conduct those efforts. Proposals should also outline how other entities (for example the Department of Transportation, auto dealers, or appliance manufacturers) might

[4] *See* footnote 3 *supra*.

[5] Based US Energy Information Administration data. *See* www.eia.gov/totalenergy/data/monthly/pdf/sec2_11.pdf.

share that role. As another example, a proposal that includes the utility owning EV supply equipment should be supported by a demonstration of benefits this model achieves over other ownership models and the context in which the utility seeks this outcome. The utility may seek to develop and own EV supply equipment in areas where, absent utility intervention, market barriers might exist to deployment.

3. Cost Recovery

Commenters submitted numerous suggestions for cost recovery mechanisms and articulated various points regarding the types of investments that should be eligible for cost recovery. Several commenters also made the case for combining and leveraging ratepayer funds with other sources and made several suggestions as to what those sources might be.

The Draft Project Team expects that recovery of electrification program costs should be subject to the same considerations as other ratepayer-funded utility projects. In particular, such cost recovery mechanisms should be consistent with least-cost procurement policy and considerations of the relative risks borne by each party. Proponents of using ratepayer funding to support an electrification program would also be expected to justify the degree to which the proposal leverages other program spending, private investment, government funding, and any other sources of capital.

4. Implementation Design and Adaptive Learning

The Draft Project Team agrees with many commenters that a beneficial electrification proposal should be designed to encourage experimentation, adaptive learning, and innovation. Such approach requires that proposals include outcome-based metrics (rather than picking any specific technologies) and commit to providing regulators with sufficiently meaningful data to demonstrate performance and enable meaningful regulatory review. Use of outcome-based metrics will allow sponsors of electrification proposals to engage meaningfully in periodic program reviews by all stakeholders, with opportunities for mid-course corrections.

A research element is another acceptable component to include in a proposal. A research project may allow adaptive learning and can include pilot projects designed to test ideas and inform broader programmatic decision-making.

Highlights from Pilots in other States. Numerous pilot projects are underway around the country. The pilots range widely in terms of scope, intent, and outcomes. A number of projects simply fund EV supply equipment or distribution system "make-ready" work to learn about costs and utilization of the infrastructure. Other projects put in place consumer rebates to test their efficacy and uptake. Still others examine the efficacy of time-of-use rates and other cost recovery mechanisms in maximizing the benefits and minimizing the costs to the grid of EV expansion, and in allocating costs and benefits to customers. To the extent practical, Rhode Island will learn from and share with other states, and National Grid will do the same with other utilities, to ensure that each proposed pilot project is value added.

An EV proposal should present a set of metrics to measure the efficacy of the program. Stakeholders suggested numerous useful metrics. The Draft Project Team agrees that proposals should be accompanied by performance metrics that will help measure the proposals' achievement

of relevant goals.[6] As noted, these metrics should be outcome-focused. They also should be relevant to consumers and public policy objectives, quantifiable, and verifiable. In some cases, metrics should be related to activities the utility can affect or control through its investments and its management. If methodologies for these metrics do not exist or are not in use in Rhode Island, a methodology and justification should be included with a proposal or responses to a proposal.

It is important to understand the degree to which an electrification proposal will affect existing state and utility programs, such as energy efficiency programs or distribution system investment plans. Additionally, proposals should address training and workforce development. There are also factors beyond the purview of the PUC that could influence the success of an electrification proposal and should be considered, and so should be considered in a proposal, such as building codes and zoning requirements.

The scope of any electrification program will also be an important consideration. Proponents should address questions like: what types of customers will be directly affected? how many customers are expected to participate? what types of transportation are included? An EV proposal, for example, will necessarily have to address issues such as how targeting different end-users can affect the efficacy of the program (e.g., single-vehicle versus fleet ownership); and reasons to include or exclude other forms of transportation (e.g., industrial, train, maritime, etc.).

Rates associated with beneficial electrification proposals, like other utility programs, should be just and reasonable. Rates, such as time-of-use rates, could be designed to maximize system benefits through, for example, smart charging and could promote other benefits as well. But, given likely limits on which customers can participate in, directly benefit from, and are affected by a proposal, among other limiting conditions, rates must be implemented in a way that is equitable for all classes of electricity users.

5. Beneficial Electrification of Heating Systems

Many commenters supported including electrification of heating as part of Rhode Island's Power Sector Transformation. National Grid has energy efficiency programs to lower the barrier to replacing inefficient heating systems with efficient electric heating systems, although currently the programs do not actively promote fuel switching (such as from oil to electric heat pumps). Nation Grid has proposed updates to these programs as part of its 2018-2020 Energy Efficiency and System Reliability Procurement Plans in PUC Docket No. 4684.[7] Those plans will be reviewed in the context of the PUC's Least Cost Procurement Standards,[8] which are generally consistent with the principles outlined in this document. Should National Grid propose a program to encourage beneficial electrification of heating outside of any Energy Efficiency and System Reliability Procurement Plan, that proposal should also be consistent with the principles described above in a manner that is analogous to heating systems and the heating sector.

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[6] *See* discussion of electrification and EV deployment goals in Section II *supra*.

[7] Docket material can be found at www.ripuc.org/eventsactions/docket/4684page.html.

[8] The Least Cost Procurement Standards can be found at www.ripuc.org/eventsactions/docket/4684-LCP-Standards_7-27-17.pdf

APPENDIX: HIGHLIGHTS OF STAKEHOLDER RESPONSES TO THE NOTICE OF INQUIRY

Commenter Highlights on Key Goals and Benefits:

1. Broad goals:
    a. Optimize utility investments for a future with a smarter, cleaner and more distributed grid; optimize benefits of a modern grid
    b. Strategic electrification –i.e., powering end-uses with electricity instead of fossil fuels in a way that increases energy efficiency and reduces pollution, while lowering costs to customers and society, as part of an integrated approach to deep decarbonization
    c. Enable the widespread adoption of car-sharing and autonomous vehicles
    d. Ensure fairness, treat EV charging like other potential load, providing nondiscriminatory electric service when and where requested
    e. Lower transportation emissions
    f. Avoid stranded assets
    g. Increase affordability, reduce cost to ratepayers
    h. Incentivize clean alternatives
2. EV and EV supply equipment goals
    a. Increase charging availability, reduce barriers to EV charging, address range anxiety
    b. Educate consumers on EVs (including financial value and usability), promote customer awareness of electric vehicles
    c. Accelerate and "scale" the market, support competition and choice, attract private investment, address key market failures – e.g., in multi-unit dwellings and public infrastructure, encourage interoperability
    d. Increase demand for electric vehicles
    e. Effectively manage the EV load, efficiently utilize EV supply equipment and distribution system infrastructure, capture the benefits of load control and ultimately vehicle-to-grid technology

Commenter Highlights on Analyzing Net Benefits:

1. PUCs should NOT examine the ownership and operation model based on charging for charging, but should instead examine the market for selling charging software and hardware in the absence versus the presence of the utility role or program
2. Investment in EVs themselves (by consumers and fleet operators) should be included by Rhode Island and its stakeholders when considering the total costs of transportation electrification
3. Alternatives to traditional rate structures which specifically take into account EV load, should be evaluated across all use cases, along with the grid and societal benefits associated with transportation electrification

4. When considering whether to expand the role for utilities on the customer side of the meter and into the competitive market, it is important to consider Rhode Island's market today and how it is growing into the future. The private sector is actively selling EV charging stations around the state.

Commenter Highlights on the Utility Role:

1. Overall utility role
    a. There are several roles for utilities in accelerating EV deployment and managing EV load
    b. Transformation of the EV market in Rhode Island requires a scale of planning, coordination, and investment that may not be possible if left to unregulated private sector actors alone
        i. Need a strong utility role in growing and helping scale transportation electrification in Rhode Island
        ii. A strong utility role may be the key to growing EV adoption and scaling the market for EV charging hardware and software in line with the state's goals
    c. Utilities are ideally suited to ensure that the associated new load is incorporated in a safe, reliable, and efficient manner
        i. As the grid manager, the utility will need to manage charging to better integrate it with grid capabilities and needs
        ii. Effectively manage the new EV load either through price signals to drivers or through programs that enable direct load management by the utility to reduce stress on the electrical grid and facilitate the integration of variable renewables
        iii. Develop processes for capturing the benefits of load control and ultimately vehicle-to-grid technology
    d. The utility will treat EV charging like other potential load, providing nondiscriminatory electric service when and where requested
    e. Providing flexibility for the utility to self-select its role(s) is essential for the utility to be excited about its involvement
    f. Avoid stranded assets through hardware/software interoperability to facilitate competition and future investment
    g. Administer a rate structure that sends appropriate price signals for EV charging
2. The utility's role may evolve over time
    a. The most critical role for the utility to play in the near term is as a market accelerator
    b. A deeper role for a utility in growing EV adoption and EV supply equipment deployment is a strong positive for the market, with EV charging software and hardware sellers benefiting from utility procurement or procurement facilitation in the near term, and benefitting from a more robust market over time
    c. A utility program could represent a relatively larger percentage of a given market in the near term, with a diminishing role over time, while begetting a much stronger market over time
    d. Facilitate the buildout of EV supply equipment, especially for stations that would be publicly available
3. Rhode Island should prioritize fostering the continued growth of the competitive EV charging market

   a. Utility investments in and programs related to EVs and EV charging that support third-party markets benefit ratepayers and consumers, and will help to accelerate growth in the market
   b. The utility's entry into the market as a procurer or facilitator can create opportunities
   c. Replicate current models in energy efficiency and renewable energy program administration to encourage EV businesses and efficient markets
4. Utility ownership of EV supply equipment
   a. Make-ready
      i. Rhode Island should direct EV supply equipment investment using a make-ready model and/or direct utility ownership
      ii. Rhode Island should support a make-ready model
   b. The utility should continue to serve as operator of public and private EV supply equipment, through the installation, ownership, and maintenance of EV supply equipment and associated electrical equipment on both the distribution system and behind customers' meters
   c. The utility should generally not be engaged in the business of vehicle charging, whether providing charging equipment or the charging service
   d. The role utilities should play is that of distribution system ownership, operation, and planning, integration, and optimization up until the point of charging stations
   e. At this stage, utility ownership and operation of EV supply equipment (including charging stations) is appropriate and possibly necessary to accelerate the market, support competition and choice, and attract private investment
   f. In the near to medium term, allowing the utility to operate EV supply equipment that is not being sufficiently developed by competitive charging business operators or individual site hosts, could help achieve the state's Zero Emission Vehicles and greenhouse gas goals
5. Education and outreach to customers. National Grid is likely one of the few organizations in the State that has everyone's contact details, leverage this list to communicate the benefits of these programs to help kick start the program
   a. Utility should execute marketing strategy to facilitate EV adoption by communicating incentives, financial value, and usability
6. Utilities should develop incentives towards EV adoption

Commenter Highlights on Cost Recovery:

1. Cost Recovery mechanisms
   a. EV program costs would best be recovered through a traditional cost of service approach, with a return on the capital portion of the total cost
   b. Under revenue decoupling, the Utility cannot retain any revenue increase from higher sales from end-use electrification, so addressing the evolution of decoupling is important
   c. Consider National Grid's proposal in MA for a tariff for concurrent cost recovery through distribution rates
   d. Consider EVs as a non-wires alternative in reliability planning
   e. Utility cost-recovery and compensation should be tied to achieving measurable outcomes and performance benchmarks, tied to the goals and factors discussed above
2. What should utilities achieve cost recovery for?

a. Utility customer funding is most appropriate for investments (1) that enhance distribution system reliability; (2) that generate broad system and public benefits that are shared across customers, and are not provided already through competitive markets; and (3) where the utility has a unique strategic role
b. Utility investments should focus on sites that enable EV ownership and that are presently underserved by private sector investment; at this early stage, the PUC should avoid encouraging substantial utility investment in sites that are not routinely visited by individual drivers such as shopping malls or restaurants
c. Important to have EV supply equipment in disadvantaged communities
d. The PUC should require that a significant percentage of the utility investment be directed to promoting electrification and EV access in low-income and disadvantaged communities
e. Utility investment should be in the public interest, meet a need for advancing EVs, and not hinder the development of the competitive EV charging market
f. Ratepayer-funded investments are not inherently aligned or misaligned with statewide transportation electrification or broader power sector goals; alignment is driven more by how those investments are made and whether they lead to the creation of widespread grid benefits
g. Consider prioritizing efforts in environmental justice areas
h. Need EV purchase incentives and electrification of medium and heavy duty fleets and associated infrastructure
i. Utility programs should target those use cases for EV supply equipment deployment that face higher barriers than others; Rhode Island should increase access to charging outside of the personal, light-duty vehicle market

3. Leveraging other investment
    a. The most efficient and effective way to deploy EV supply equipment where it needs to be is to leverage private funds
    b. Utility investments should be paired with economic incentives for EV purchases through funds from the VW settlement and through limiting, pricing, and reducing carbon pollution from transportation sector, as considered by House Bill 5369 and the State's participation in the Transportation and Climate Initiative
    c. One potential source is market-based transportation climate policy, such as cap-and-invest; could be modeled after the Regional Greenhouse Gas Initiative; another is the VW settlement funds
    d. Regional Greenhouse Gas Initiative is a potential funding source
    e. Consider how to cost-effectively use the Energy Efficiency Program Charge EVs pay
    f. Sometimes it may make sense to complement private investment with other sources of funding – e.g., in multi-unit dwellings, environmental justice communities, or in underserved markets
    g. Site hosts that make a financial contribution are far more likely to actively support the successful installation and ongoing preventive maintenance of the EV supply equipment because they have "skin in the game
    h. Programs should require private matching payments to stretch the value of public investments, efficiently site equipment, and maintain healthy competition

i. Property owners could be offered matching incentives for dollars they put towards installing and maintaining EV supply equipment

Commenter Highlights on Implementation Design:

1. Principles: Stakeholders from across the auto, utility, EV charging, and nonprofit sectors signed onto a series of Guiding Principles for Electric Vehicles and Charging Infrastructure[9] which were signed by nearly 50 industry members including 18 utilities
2. Process:
    a. The PUC should order utilities to propose EV infrastructure plans comparable to those recently submitted by National Grid and Eversource in Massachusetts
    b. It may be better for the PUC to develop a strawman proposal to solicit public input before the utility files a specific docket of its own and triggers all the accompanying rules of engagement.
    c. Develop charging station location strategy overall in order to optimize EV adoption and utilization and grid management
    d. Utility should work with Department of Transportation and agencies or non-governmental organizations to collect data and plan for distribution system upgrades to enable EV supply equipment
    e. Utility should assist in developing budgets for funding system upgrades to enable mass charging
3. Data and metrics:
    a. Utilities should be required to collect EV supply equipment data (Acadia)
    b. Utility should track deficiencies in product capability and provide information to manufacturers, distributors, and developers (Newport Solar)
    c. Utility should track metrics of success (Newport Solar)

[9] *See* https://energy.gov/eere/electricvehicles/articles/guiding-principles-promote-electric-vehicles-and-charging

4. Complementary policies
    a. Some of the most impactful policies are unrelated to energy policy. For example, building codes can decrease barriers to EV supply equipment deployment by including "EV Ready" requirements
    b. EV-friendly building codes are key
5. Clarifying the regulatory status of third-party providers of EV supply equipment and services helps to provide the regulatory certainty necessary for a competitive charging market and private investment; Rhode Island should determine that the provision of EV charging services is not the generation, transmission, distribution, or sale of electricity to EV drivers
6. Supporting the electrification of public transportation and rapidly shifting forms of mobility (e.g., ride-sharing and ride-hailing fleets) will support equitable access to clean transportation
7. Training and workforce development are necessary investments to complement other EV goals

Commenter Highlights on Potential Program Effectiveness Metrics:

1. Station deployment; number of chargers built; number of installations
2. Station reliability and availability
3. EV supply equipment utilization
4. EV rate or program enrollment
5. MWh of off-peak charging
6. Customer savings
7. Customer conversion to EVs
8. Number of registered EVs in service territory
9. Estimated emissions impact
10. Favorable shift in demand
11. Increased EV purchases in multi-unit dwellings
12. Installation and upgrades of distribution assets to encourage EV charging
13. Percentage of incentives consumed
14. The extent to which utility programs support the competitive EV charging market
15. The ratio of PEV to EV supply equipment by application category
16. Indicators of social equity; EV supply equipment deployed by geographic footprint and demographic profile
17. Effect on the efficient usage of the distribution system and avoidance of load-growth driven infrastructure upgrades

Commenter Highlights on Rates for Charging:

1. Time of use or time-varying rates are essential
2. Public education must also include public education with respect to rate design
3. Attain appropriate rate structures; the utility should prioritize smart rate structures; the rate structure should send appropriate price signals for EV charging
4. Alternatives to traditional rate structures should be evaluated
5. Avoid demand charges
6. Fast-charging stations will require individualized rate design treatment, as demand charges are not a workable rate structure for them

Commenter Highlights on Equipment Decisions:

1. EV charging site hosts should be allowed to choose equipment and services to meet the site's specific needs to support ongoing innovation in equipment and services in the competitive EV charging market
2. EV supply equipment requirements are key
    a. Agencies should consider promulgating guidance relating to Level 2 charging stations, station networking capabilities, interoperability, demand response capability, and other potential requirements
    b. As much as practicable, advanced metering functionality (AMF) should be required at customer sites with EV supply equipment
    c. The capabilities offered will help to both create grid benefits and give the utility and regulators visibility into consumption patterns and other relevant factors
    d. Access to DC fast charging stations will be important to increase range confidence; this may require more upfront cost and lower initial usage, but it will be important to prioritize as a way to seed early adoption

Commenter Highlights on Electrification of Heat:

1. Further information on air-source heat pumps.
    a. NEEP worked with regional stakeholders to develop a Regional Air Source Heat Pump Market Transformation Strategy Report that provides a collection of priority strategies to drive adoption of air source heat pumps and achieve long-term market transformation
    b. Strategy areas include consumer/installer education, cost reduction, research, improved performance metrics, integrated controls, and state/local policies
    c. Rhode Island stakeholders, including program administrators can continue to stay engaged with the regional effort and leverage resources
    d. NEEP's Cold-climate ASHP Specification can be used to identify efficient air source heat pumps that maintain efficiency even during cold temperatures and to size air source heat pumps effectively.
    e. NEEP Installer Guides can help improve the sizing, selection and installation of air source heat pumps in cold climates
    f. NEEP's Regional Working Group will continue to be a useful forum for regional stakeholder to discuss and coordinate effective market intervention strategies
2. Utility should be involved to stimulate the replacement of inefficient electric or oil heating systems with high efficiency heat pumps

Division 32-7

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to the Transportation Education and Outreach description in Section 2.4 of PST-1, Bates pages 109-110, if the Education and Outreach was limited to the location and availability of charging stations and the rates for using the charging stations, how much would this reduce the cost of this component of the proposed program?

Response:

The Company has not estimated this scenario for its Education and Outreach Program. The program is designed to work in conjunction with the other components of the Electric Transportation Initiative to meaningfully accelerate transportation electrification in Rhode Island. As filed, the Company's program represents a targeted campaign to help advance the State's transportation and greenhouse gas goals, with a cost of $499,397 over three years, or $166,466 per year.

Given its early stage of maturity, the electric transportation market in Rhode Island requires dedicated, sustained investment in awareness-building and consumer education. The Company considers its proposed program a small contribution toward the level of overall investment required, and a demonstration of new utility approaches that can amplify the parallel electric vehicle market development efforts of other essential stakeholders, including national automakers and Rhode Island dealers, Rhode Island state agencies, Electrify America, and environmental advocacy groups, among others.

(This response is identical to the Company's response to Division 10-7 in Docket No. 4780.)

Prepared by or under the supervision of: Carlos Nouel

Division 32-8

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to PST-1, Bates page 116, please explain why there is a higher O&M cost for electric vehicles, compared to non-electric vehicles of the same type that are typically used by the Company in its fleet. Please also provide the comparative cost and O&M for non-electric vehicles of the same type used by the Company in its fleet.

Response:

On Bates Page116 of Schedule PST-1, Chapter 5 – Electric Transportation (PST Book 1), the Company forecasted costs for incremental repairs, maintenance, and spare parts for the electrified Class 7-8 trucks the Company proposes to add to its fleet. The Company assumes, based on currently-available information, that the proposed additions to the fleet will be custom-upfitted, partially-electrified trucks (*i.e.*, not fully electric), which will require additional repairs, maintenance, and spare parts associated with the electric propulsion and electrically-powered auxiliary components. The electric propulsion systems would not replace, but rather would supplement the diesel propulsion. This assumption is based on preliminary experience of the Company's affiliates with custom-upfitted, partially-electrified trucks, and the Company's knowledge of currently-available vehicle models on the market.

The average acquisition cost of RI diesel-powered Class 7-8 trucks is $177,515 and a partially-electrified upfit, as previously indicated in Schedule PST-1, Chapter 5, is approximately $80,000 more, or $257,515. Because the Company has less than a year of experience with partially-electrified trucks, it does not yet have O&M data for these vehicles that would allow for the requested comparison.

(This response is identical to the Company's response to Division 10-8 in Docket No. 4780.)

Prepared by or under the supervision of: Carlos Nouel

Division 32-9

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to the section 2.5 of PST-1, Bates page 110, does the Company believe it is important for it to begin phasing in electrified vehicles into its fleet? If yes, please explain why it has not done so in the ordinary course of business and simply included the cost in its historical test year and rate year revenue requirement. If no, please explain why not and further explain why the Company is now proposing it as a separate initiative.

Response:

The Company believes it is important for utilities to play a strong role in advancing the State of Rhode Island's policy goals to reduce greenhouse gas emissions and increase zero-emission vehicles on the roads, and to support the development of medium-and-heavy duty electric vehicle options from the market.

To date, the Company's fleet department has undertaken some initial procurement of partially-electrified vehicles whose cost will be recovered as part of its routine cost of service. At this point in time, however, the Company has not found these vehicles to be competitive, on a cost or performance basis, with the Company's standard diesel-powered vehicles.

The Company has proposed the Company Fleet Expansion in its Power Sector Transformation (PST) Plan, because it wishes to accelerate the pace of its fleet electrification beyond what would be justified by the business today. By including the Company Fleet Expansion in the PST Plan, the Company will connect its internal fleet electrification activity to its proposed customer-facing programs, in a way that enhances the overall market development impact. For example, some of the Company's plug-in fleet have experienced challenges with vehicle performance and manufacturer support. By applying its expertise to identify and resolve issues with these emerging technologies, and by expanding the number and type of electrified vehicles it is demonstrating in its fleet, the Company will be better positioned to serve as an advocate and advisor for its customers considering medium and/or heavy-duty vehicle electrification into the future.

The inclusion of the Company's proposed Company Fleet Expansion in the PST Plan does not preclude the Company from separately adding electrified vehicles into its ongoing routine fleet operations and including those costs in its historical test year and rate year revenue requirements.

(This response is identical to the Company's response to Division 10-9 in Docket No. 4780.)

Prepared by or under the supervision of: Carlos Nouel

Division 32-10

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to PST-1, Bates page 117, please recalculate the BCA ratio assuming that the costs associated with "Transportation Education and Outreach" is reduced by 80% and the Company Fleet Expansion is removed.

Response:

As shown in the table below, these modifications would show a slight increase in the Societal Cost Test (SCT) ratio from 1.03 to 1.08.

	Electric Vehicles -- Total		
Benefit	Forward Commitment: Capacity Value	$	(1,016,847)
	Energy Supply & Transmission Operating Value of Energy Provided or Saved	$	(2,005,010)
	Avoided Renewable Energy Credit (REC) Cost	$	(199,162)
	Greenhouse Gas (GHG) Externality Costs	$	4,189,624
	Criteria Air Pollutant and Other Environmental Costs	$	999,129
	Non-Electric Avoided Fuel Cost	$	13,567,821
	Economic Development	$	-
		$	-
	Total	**$**	**15,535,555**
Cost	Total Program Administration Costs	$	8,763,962
	Incremental Purchase and Maintenance Cost	$	5,647,327
		$	-
	Total	**$**	**14,411,289**
	BCA Ratio		**1.08**

To perform this recalculation, the Company first reduced the Transportation Education and Outreach (TE&O) costs by 80 percent, and then removed all the costs and all the benefits (negative costs) associated with the Company Fleet Expansion. The net difference in the Total Cost is $680,582, accounting for the removal of 80 percent of TE&O costs, and the removal of $340,984 of total (net) cost from the Company Fleet Expansion.

Prepared by or under the supervision of: Carlos Nouel

The Company notes this slight increase in the SCT ratio may not reflect the actual expected outcome for the Electric Transportation Initiative, as it accounts for no reduction in the level of electric vehicle (EV) adoption resulting from the initiative if the TE&O program is dramatically reduced in scope and scale. The Company considers the TE&O a necessary contributor to the increased level of EV adoption assumed within its BCA and to the utilization of the charging stations proposed within the initiative. If the level of EV adoption resulting from the initiative was assumed to be lower because of a substantially smaller scope and scale of TE&O, the effect of this assumption could be to lower the SCT BCA ratio, rather than increase it.

(This response is identical to the Company's response to Division 10-10 in Docket No. 4780.)

Division 32-11

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to PST-2, Appendix 10.6, Bates page 241, please provide a recalculation of the annual revenue requirement assuming the "Transportation Education and Outreach" is reduced by 80% and the Company Fleet Expansion is removed.

Response:

Please refer to Attachment DIV 32-11 for the recalculation of the Electric Transportation Initiative annual revenue requirement, which was updated to reduce the transportation education and outreach by 80 percent and to remove costs associated with the Company fleet expansion.

(This response is identical to the Company's response to Division 10-11 in Docket No. 4780.)

Prepared by or under the supervision of: Melissa Little

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.6 - Electric Transportation

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Electric Transportation Initiative
Annual Revenue Requirement Summary

Line No.			Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Operation and Maintenance (O&M) Expenses:				
1	PMO Labor and Other O&M		$192,563	$228,382	$318,270
2	EVSE Rebate Cost for Make-Ready Sites		72,500	181,250	471,250
3	Station O&M for Utility-Operated Sites		$10,780	$37,730	$107,800
4	Charging Demonstration Marketing		$113,000	$93,000	$111,000
5	Education and Outreach		$22,794	$32,992	$44,094
6	Total O&M costs	Sum of Lines 1 through 5	$411,637	$573,354	$1,052,414
7	Other O&M Expenses and Program Administration Costs:				
8	Program Administration Costs - NG Heavy Duty Fleet Lease and O&M		$0	$0	$0
9	Program Administration Costs - Off-Peak Rebate		$178,745	$244,420	$332,567
10	Program Administration Costs - Commercial Rate Discount		$103,622	$170,650	$264,488
11	Program Administration Costs - Evaluation		$30,000	$30,000	$30,000
12	Total Other O&M Expenses and Program Administration Costs	Sum of Lines 8 through 11	$312,367	$445,070	$627,055
13	**Total O&M Costs, Other O&M Costs and Program Administration Costs**	Line 6 + Line 12	**$724,004**	**$1,018,424**	**$1,679,469**
14	Participation Payment Offset		($40,000)	($100,000)	($260,000)
15	**Total Net O&M Expense Component of Revenue Requirement**	Line 13 + Line 14	**$684,004**	**$918,424**	**$1,419,469**
16	Capital Investment:				
17	Estimated Revenue Requirement on Rate Year Capital investment		$63,170	$153,815	$146,021
18	Estimated Revenue Requirement on Data Year 1 Capital investment			$122,477	$295,340
19	Estimated Revenue Requirement on Data Year 2 Capital investment				$294,856
20	**Total Capital Investment Component of Revenue Requirement**	Sum of Lines 17 through 19	**$63,170**	**$276,292**	**$736,217**
21	**Total Revenue Requirement**	Line 15 + Line 20	**$747,174**	**$1,194,715**	**$2,155,685**

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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2020
Electric Transportation Initiative

Line No.			Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Estimated Capital Investment				
1	EDC Costs (Make-Ready & Utility-Operated)		$147,899	$0	$0
2	Premise Work Costs (Make-Ready & Utility-Operated)		$352,617	$0	$0
3	EVSE Costs (Utility-Operated Charging Program Sites, and Company Fleet EVSE)		$122,633	$0	$0
4	Total Capitalized Labor & Tool Costs		$365,321	$0	$0
5	Total Estimated Capital Investment	Sum of Lines 1 through 4	$988,470	$0	$0
	Depreciable Net Capital Included in Rate Base				
6	Total Allowed Capital Included in Rate Base in Current Year	Line 5	$988,470	$0	$0
7	Retirements	Line 4 * 0%	$0	$0	$0
8	Net Depreciable Capital Included in Rate Base	Column (a) = Line 6 - Line 7; Column (b) = Prior Year Line 6	$988,470	$988,470	$988,470
	Change in Net Capital Included in Rate Base				
9	Capital Included in Rate Base	Line 5	$988,470	$0	$0
10	Cost of Removal		$0	$0	$0
11	**Total Net Plant in Service Including Cost of Removal**	**Line 8 + Line 10**	**$988,470**	**$988,470**	**$988,470**
	Tax Depreciation				
12	Vintage Year Tax Depreciation:				
13	2020 Spend	Page 3 of 10, Line 21	$197,694	$316,311	$189,786
14	Cumulative Tax Depreciation	Previous Year Line 14 + Current Year Line 13	$197,694	$514,005	$703,791
	Book Depreciation				
15	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	2.50%	2.50%	2.50%
16	Book Depreciation	Column (a) = Line 1 * Line 15 * 50% ; Column (b) = Line 1 * Line 15	$1,849	$3,697	$3,697
17	Cumulative Book Depreciation	Previous Year Line 17 + Current Year Line 16	$1,849	$5,546	$9,244
18	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	5.00%	5.00%	5.00%
19	Book Depreciation	Column (a) = Line 2 * Line 18 * 50% ; Column (b) = Line 2 * Line 18	$8,815	$17,631	$17,631
20	Cumulative Book Depreciation	Previous Year Line 20 + Current Year Line 19	$8,815	$26,446	$44,077
21	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	10.00%	10.00%	10.00%
22	Book Depreciation	Column (a) = Line 3 * Line 21 * 50% ; Column (b) = Line 3 * Line 21	$6,132	$12,263	$12,263
23	Cumulative Book Depreciation	Previous Year Line 23 + Current Year Line 22	$6,132	$18,395	$30,658
24	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	2.50%	2.50%	2.50%
25	Book Depreciation	Column (a) = Line 4 * Line 24 * 50% ; Column (b) = Line 4 * Line 24	$4,567	$9,133	$9,133
26	Cumulative Book Depreciation	Previous Year Line 26 + Current Year Line 25	$4,567	$13,700	$22,833
27	Total Cumulative Book Depreciation	Line 17 + Line 20 + Line 23 + Line 26	$21,362	$64,087	$106,812
	Deferred Tax Calculation:				
28	Cumulative Book / Tax Timer	Line 14 - Line 27	$176,332	$449,918	$596,979
29	Effective Tax Rate		21.00%	21.00%	21.00%
30	Deferred Tax Reserve	Line 28 * Line 29	$37,030	$94,483	$125,366
31	Less: FY 2020 Federal NOL		$0	$0	$0
32	Less: Proration Adjustment	Col (a) = Page 8 of 10, Line 40; Col (b) = , Line 40; Col (c) = , Line 40	($20,104)	($31,193)	($16,767)
33	Net Deferred Tax Reserve	Sum of Lines 30 through 32	$16,925	$63,290	$108,599
	Rate Base Calculation:				
34	Cumulative Incremental Capital Included in Rate Base	Line 11	$988,470	$988,470	$988,470
35	Accumulated Depreciation	- Line 27	($21,362)	($64,087)	($106,812)
36	Deferred Tax Reserve	- Line 33	($16,925)	($63,290)	($108,599)
37	Year End Rate Base	Sum of Lines 34 through 36	$950,183	$861,093	$773,060
	Revenue Requirement Calculation:				
38	Average Rate Base	Column (a) = Current Year Line 37 ÷ 2; Column (b & c) = (Prior Year Line 26 + Current Year Line 26) ÷ 2	$475,091	$905,638	$817,077
39	Pre-Tax ROR		1/ 8.80%	8.80%	8.80%
40	Return and Taxes	Line 38 * Line 39	$41,808	$79,696	$71,903
41	Book Depreciation	Line 16 + Line 19 + Line 22 + Line 25	$21,362	$42,725	$42,725
42	Property Taxes	Tax Rate 3.176% MAL-7 - Columns (b & c) Line 8 * 3.176%	$0	$31,394	$31,394
43	**Annual Revenue Requirement**	**Line 40 through Line 42**	**$63,170**	**$153,815**	**$146,021**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2020 Capital Investments
Electric Transportation Initiative

Line No.			Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Capital Repairs Deduction				
1	Plant Additions	Page 2 of 10, Line 5	$988,470		
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%		
3	Capital Repairs Deduction	Line 1 * Line 2	$0		
	Bonus Depreciation				
4	Plant Additions	Line 1	$988,470		
5	Less Capital Repairs Deduction	Line 3	$0		
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$988,470		
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%		
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$988,470		
9	Bonus Depreciation Rate (April 2019 - December 2019)	1 * 75% * 0%	0.00%		
10	Bonus Depreciation Rate (January 2020 - Mar 2020)	1 * 25% * 0%	0.00%		
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%		
12	Bonus Depreciation	Line 8 * Line 11	$0		
	Remaining Tax Depreciation				
13	Plant Additions	Line 1	$988,470		
14	Less Capital Repairs Deduction	Line 3	$0		
15	Less Bonus Depreciation	Line 12	$0		
16	Remaining Plant Additions Subject to 20 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$988,470	$988,470	$988,470
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.00%	32.00%	19.20%
18	Remaining Tax Depreciation	Line 16 * Line 17	$197,694	$316,311	$189,786
19	FY20 Loss incurred due to retirements	Per Tax Department	$0		
20	Cost of Removal	Page 2 of 10, Line 10	$0		
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, 19, and 20	$197,694	$316,311	$189,786

THE NARRAGANSETT ELECTRIC COMPANY
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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2021
Electric Transportation Initiative

Line No.			Fiscal Year Ending March 31, 2021 (a)	Fiscal Year Ending March 31, 2022 (b)
	Estimated Capital Investment			
1	EDC Costs (Make-Ready & Utility-Operated)		$369,748	
2	Premise Work Costs (Make-Ready & Utility-Operated		$881,543	
3	EVSE Costs (Utility-Operated Only)		$306,583	
4	Total Capitalized Labor & Tool Costs		$270,627	
5	Total Estimated Capital Investment	Line 1 + Line 4	$1,828,501	$0
	Depreciable Net Capital Included in Rate Base			
6	Total Allowed Capital Included in Rate Base in Current Year	Line 5	$1,828,501	$0
7	Retirements	Line 4 * 0%	$0	$0
8	Net Depreciable Capital Included in Rate Base	Column (a) = Line 4 - Line 5; Column (b) = Prior Year Line 6	$1,828,501	$1,828,501
	Change in Net Capital Included in Rate Base			
9	Capital Included in Rate Base	Line 5	$1,828,501	$0
10	Cost of Removal	Section 2, Page 27 of 27, Chart 11	$0	$0
11	**Total Net Plant in Service Including Cost of Removal**	**Line 8 + Line 10**	**$1,828,501**	**$1,828,501**
	Tax Depreciation			
12	Vintage Year Tax Depreciation:			
13	2021 Spend	Page 5 of 10, Line 21	$365,700	$585,120
14	Cumulative Tax Depreciation	Previous Year Line 14 + Current Year Line 13	$365,700	$950,820
	Book Depreciation			
15	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	2.50%	2.50%
16	Book Depreciation	Column (a) = Line 1 * Line 15 * 50% ; Column (b) = Line 1 * Line 15	$4,622	$9,244
17	Cumulative Book Depreciation	Previous Year Line 17 + Current Year Line 16	$4,622	$13,866
18	Composite Book Depreciation Rate	As approved per R.I.P.U.C. Docket No. 4770	5.00%	5.00%
19	Book Depreciation	Column (a) = Line 2 * Line 18 * 50% ; Column (b) = Line 2 * Line 18	$22,039	$44,077
20	Cumulative Book Depreciation	Previous Year Line 20 + Current Year Line 19	$22,039	$66,116
21	Composite Book Depreciation Rate	As approved per R.I.P.U.C. Docket No. 4770	10.00%	10.00%
22	Book Depreciation	Column (a) = Line 3 * Line 21 * 50% ; Column (b) = Line 3 * Line 21	$15,329	$30,658
23	Cumulative Book Depreciation	Previous Year Line 23 + Current Year Line 22	$15,329	$45,987
24	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	2.50%	2.50%
25	Book Depreciation	Column (a) = Line 4 * Line 26 * 50% ; Column (b) = Line 4 * Line 26	$3,383	$6,766
26	Cumulative Book Depreciation	Previous Year Line 26 + Current Year Line 25	$3,383	$10,149
27	Total Cumulative Book Depreciation	Line 17 + Line 20 + Line 23 + Line 26	$45,372	$136,117
	Deferred Tax Calculation:			
28	Cumulative Book / Tax Timer	Line 14 - Line 17	$320,328	$814,703
29	Effective Tax Rate		21.00%	21.00%
30	Deferred Tax Reserve	Line 28 * Line 29	$67,269	$171,088
31	Less: FY 2021 Federal NOL		$0	$0
32	Less: Proration Adjustment	Col (a) = Page 8 of 10, Line 40; Col (b) = Page 9 of 10, Line 40	($36,522)	($56,366)
33	Net Deferred Tax Reserve	Sum of Lines 30 through 3	$30,747	$114,722
	Rate Base Calculation:			
34	Cumulative Incremental Capital Included in Rate Base	Line 11	$1,828,501	$ 1,828,501
35	Accumulated Depreciation	- Line 27	($45,372)	($136,117)
36	Deferred Tax Reserve	- Line 33	($30,747)	($114,722)
37	Year End Rate Base	Sum of Lines 34 through 3	$1,752,381	$1,577,662
	Revenue Requirement Calculation:			
38	Average Rate Base	Column (a) = Current Year Line 37 ÷ 2; Column (b) = (Prior Year Line 37 + Current Year Line 37) ÷ 2	$876,190.73	$1,665,022
39	Pre-Tax ROR	1/	8.80%	8.80%
40	Return and Taxes	Line 38 * Line 39	$77,105	$146,522
41	Book Depreciation	Line 16 + Line 19 + Line 22 + Line 25	$45,372	$90,745
42	Property Taxes	Tax Rate 3.176% MAL-7 - Columns (b) Line 8 * 3.176%	$0	$58,073
43	**Annual Revenue Requirement**	**Line 38 through Line 42**	**$122,477**	**$295,340**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2021 Capital Investments
Electric Transportation Initiative

Line No.			Fiscal Year Ending March 31, 2021 (a)	Fiscal Year Ending March 31, 2022 (b)
	Capital Repairs Deduction			
1	Plant Additions	Page 4 of 10, Line 5	$1,828,501	
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%	
3	Capital Repairs Deduction	Line 1 * Line 2	$0	
	Bonus Depreciation			
4	Plant Additions	Line 1	$1,828,501	
5	Less Capital Repairs Deduction	Line 3	$0	
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$1,828,501	
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%	
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$1,828,501	
9	Bonus Depreciation Rate (April 2020 - December 2020)	0%	0.00%	
10	Bonus Depreciation Rate (January 2021 - Mar 2021)	0%	0.00%	
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%	
12	Bonus Depreciation	Line 8 * Line 11	$0	
	Remaining Tax Depreciation			
13	Plant Additions	Line 1	$1,828,501	
14	Less Capital Repairs Deduction	Line 3	$0	
15	Less Bonus Depreciation	Line 12	$0	
16	Remaining Plant Additions Subject to 20 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$1,828,501	$1,828,501
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.000%	32.000%
18	Remaining Tax Depreciation	Line 16 * Line 17	$365,700	$585,120
19	FY21 Loss incurred due to retirements	Per Tax Department	$0	$0
20	Cost of Removal	Page 4 of 10, Line 10	$0	$0
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, 19, and 20	$365,700	$585,120

THE NARRAGANSETT ELECTRIC COMPANY
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Appendix 10.6 - Electric Transportation
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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2022
Electric Transportation Initiative

Line No.			Fiscal Year Ending March 31, 2022 (a)
	Estimated Capital Investment		
1	EDC Costs (Make-Ready & Utility-Operated)		$961,344
2	Premise Work Costs (Make-Ready & Utility-Operated)		$2,292,011
3	EVSE Costs (Utility-Operated Only)		$797,116
4	Total Capitalized Labor & Tool Costs		$276,040
5	Total Estimated Capital Investment	Line 1 + Line 4	$4,326,511
	Depreciable Net Capital Included in Rate Base		
6	Total Allowed Capital Included in Rate Base in Current Year	Line 5	$4,326,511
7	Retirements	Line 4 * 0%	$0
8	Net Depreciable Capital Included in Rate Base	Column (a) = Line 4 - Line 5; Column (b) = Prior Year Line 6	$4,326,511
	Change in Net Capital Included in Rate Base		
9	Capital Included in Rate Base	Line 5	$4,326,511
10	Cost of Removal	Section 2, Page 27 of 27, Chart 11	$0
11	**Total Net Plant in Service Including Cost of Remova**	**Line 8 + Line 10**	**$4,326,511**
	Tax Depreciation		
12	Vintage Year Tax Depreciation:		
13	2022 Spend	Page 7 of 10, Line 21	$865,302
14	Cumulative Tax Depreciation	Previous Year Line 14 + Current Year Line 13	$865,302
	Book Depreciation		
15	Composite Book Depreciation Rate	As approved per R.I.P.U.C. Docket No. 4770	2.50%
16	Book Depreciation	Column (a) = Line 1* Line 15 * 50%	$12,017
17	Cumulative Book Depreciation	Previous Year Line 17 + Current Year Line 16	$12,017
18	Composite Book Depreciation Rate	As approved per R.I.P.U.C. Docket No. 4770	5.00%
19	Book Depreciation	Column (a) = Line 2 * Line 18 * 50%	$57,300
20	Cumulative Book Depreciation	Previous Year Line 20 + Current Year Line 19	$57,300
21	Composite Book Depreciation Rate	As approved per R.I.P.U.C. Docket No. 4770	10.00%
22	Book Depreciation	Column (a) = Line 3 * Line 21 * 50%	$39,856
23	Cumulative Book Depreciation	Previous Year Line 23 + Current Year Line 22	$39,856
24	Composite Book Depreciation Rate	As approved per R.I.P.U.C. Docket No. 4770	2.50%
25	Book Depreciation	Column (a) = Line 4 * Line 24 * 50%	$3,451
26	Cumulative Book Depreciation	Previous Year Line 26 + Current Year Line 25	$3,451
27	Total Cumulative Book Depreciation	Line 17 + Line 20 + Line 23 + Line 26	$112,623
	Deferred Tax Calculation:		
28	Cumulative Book / Tax Timer	Line 14 - Line 27	$752,679
29	Effective Tax Rate		21.00%
30	Deferred Tax Reserve	Line 28 * Line 29	$158,063
31	Less: FY 2022 Federal NOL		-
32	Less: Proration Adjustment	Col (a) = Page 8 of 10, Line 40; Col = Page 9 of 10, Line 40	($85,816)
33	Net Deferred Tax Reserve	Sum of Lines 30 through 32	$72,247
	Rate Base Calculation:		
34	Cumulative Incremental Capital Included in Rate Base	Line 11	$4,326,511
35	Accumulated Depreciation	- Line 27	($112,623)
36	Deferred Tax Reserve	- Line 33	($72,247)
37	Year End Rate Base	Sum of Lines 34 through 36	$4,141,641
	Revenue Requirement Calculation:		
38	Average Rate Base	Column (a) = Current Year Line 27 ÷ 2	$2,070,820.44
39	Pre-Tax ROR		1/ 8.80%
40	Return and Taxes	Line 38 * Line 39	$182,232
41	Book Depreciation	Line 16 + Line 19 + Line 22 + Line 25	$112,623
42	Property Taxes	Tax Rate 3.176% MAL-7	$0
43	**Annual Revenue Requiremen**	**Line 40 through Line 42**	**$294,856**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2022 Capital Investments
Electric Transportation Initiative

Line No.			Fiscal Year Ending March 31, 2022 (a)
	Capital Repairs Deduction		
1	Plant Additions	Page 6 of 10, Line 5	$4,326,511
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%
3	Capital Repairs Deduction	Line 1 * Line 2	$0
	Bonus Depreciation		
4	Plant Additions	Line 1	$4,326,511
5	Less Capital Repairs Deduction	Line 3	$0
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$4,326,511
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$4,326,511
9	Bonus Depreciation Rate (April 2021 - December 2021)	0%	0.00%
10	Bonus Depreciation Rate (January 2022 - Mar 2022)	0%	0.00%
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%
12	Bonus Depreciation	Line 8 * Line 11	$0
	Remaining Tax Depreciation		
13	Plant Additions	Line 1	$4,326,511
14	Less Capital Repairs Deduction	Line 3	$0
15	Less Bonus Depreciation	Line 12	$0
16	Remaining Plant Additions Subject to 20 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$4,326,511
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.000%
18	Remaining Tax Depreciation	Line 16 * Line 17	$865,302
19	FY22 Loss incurred due to retirements	Per Tax Department	$0
20	Cost of Removal	Page 6 of 10, Line 10	$0
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, 19, and 20	$865,302

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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2020 Net Deferred Tax Reserve Proration
Electric Transportation Initiative

Line No.			(a)=Sum of (b) Total	(b) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration			
1	Book Depreciation	Page 2 of 10, Line 16 + Line 19 + Line 22 + Line 25	$21,362	$21,362
2	Bonus Depreciation	Page 3 of 10, Line 12	$0	$0
3	Remaining MACRS Tax Depreciation	Page 3 of 10, Line 18	($197,694)	($197,694)
4	FY20 tax (gain)/loss on retirements	Page 3 of 10, Line 19	$0	$0
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	($176,332)	($176,332)
6	Effective Tax Rate		21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	($37,030)	($37,030)
	Deferred Tax Not Subject to Proration			
8	Capital Repairs Deduction	Page 3 of 10, Line 3	$0	$0
9	Cost of Removal	Page 3 of 10, Line 20	$0	$0
10	Book/Tax Depreciation Timing Difference at 3/31/2020		$0	$0
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0
12	Effective Tax Rate		21.00%	21.00%
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0
14	Total Deferred Tax Reserve	Line 7 + Line 13	($37,030)	($37,030)
15	Net Operating Loss	Page 2 of 10, Line 31	$0	$0
16	Net Deferred Tax Reserve	Line 14 + Line 15	($37,030)	($37,030)
	Allocation of FY 2020 Estimated Federal NOL			
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	($176,332)	($176,332)
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	($176,332)	($176,332)
20	Total FY 2020 Federal NOL	(Page 2 of 10, Line 31) / 21%	$0	$0
21	Allocated FY 2020 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0
22	Allocated FY 2020 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0
23	Effective Tax Rate		21.00%	21.00%
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	($37,030)	($37,030)

	Proration Calculation	(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l)	(l)
26	April 2019	30	91.78%	($2,832)	($2,832)
27	May 2019	31	83.29%	($2,570)	($2,570)
28	June 2019	30	75.07%	($2,316)	($2,316)
29	July 2019	31	66.58%	($2,054)	($2,054)
30	August 2019	31	58.08%	($1,792)	($1,792)
31	September 2019	30	49.86%	($1,539)	($1,539)
32	October 2019	31	41.37%	($1,277)	($1,277)
33	November 2019	30	33.15%	($1,023)	($1,023)
34	December 2019	31	24.66%	($761)	($761)
35	January 2020	31	16.16%	($499)	($499)
36	February 2020	28	8.49%	($262)	($262)
37	March 2020	31	0.00%	$0	$0
38	Total	365		($16,925)	($16,925)
39	Deferred Tax Without Proration	Line 25		($37,030)	($37,030)
40	Proration Adjustment	Line 38 - Line 39		$20,104	$20,104

Column Notes:

(j) Sum of remaining days in the year (Col (i)) ÷ 365

(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

THE NARRAGANSETT ELECTRIC COMPANY
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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2021 Net Deferred Tax Reserve Proration
Electric Transportation Initiative

Line No.			(a)=Sum of (b) through (c) Total	(b) Vintage Year March 31, 2021	(c) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration				
1	Book Depreciation	Col (b) = Page 4 of 10, Line 16 + Line 19 + Line 22 + Line 25; Col (c) = Page 2 of 10, Line 16 + Line 19 + Line 22 + Line 25	$88,097	$45,372	$42,725
2	Bonus Depreciation	Col (b) =Page 5 of 10, Line 12 ; Col (c) = Page 3 of 10, Line 12	$0	$0	$0
3	Remaining MACRS Tax Depreciation	Col (b) = Page 4 of 10, Line 18 ; Col (c) =Page 2 of 10, Line 18	($682,011)	($365,700)	($316,311)
4	FY21 tax (gain)/loss on retirements	Col (b) = Page 5 of 10, Line 19 ; Col (c) = Page 3 of 10, Line 19	$0	$0	$0
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	($593,914)	($320,328)	($273,586)
6	Effective Tax Rate		21.00%	21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	($124,722)	($67,269)	($57,453)
	Deferred Tax Not Subject to Proration				
8	Capital Repairs Deduction	Page 5 of 10, Line 3	$0	$0	
9	Cost of Removal	Page 5 of 10, Line 20	$0	$0	
10	Book/Tax Depreciation Timing Difference at 3/31/2021		$0	$0	
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0	
12	Effective Tax Rate		21.00%	21.00%	
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0	
14	Total Deferred Tax Reserve	Line 7 + Line 13	($124,722)	($67,269)	($57,453)
15	Net Operating Loss		$0	$0	$0
16	Net Deferred Tax Reserve	Line 14 + Line 15	($124,722)	($67,269)	($57,453)
	Allocation of FY 2021 Estimated Federal NOL				
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	($320,328)	($320,328)	
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0	
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	($320,328)	($320,328)	
20	Total FY 2021 Federal NOL		$0	$0	
21	Allocated FY 2021 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0	
22	Allocated FY 2021 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0	
23	Effective Tax Rate		21.00%	21.00%	
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0	
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	($124,722)	($67,269)	($57,453)

	Proration Calculation	(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l) through (m)	(l)	(m)
26	April 2020	30	91.78%	($9,539)	($5,145)	($4,394)
27	May 2020	31	83.29%	($8,656)	($4,669)	($3,988)
28	June 2020	30	75.07%	($7,802)	($4,208)	($3,594)
29	July 2020	31	66.58%	($6,920)	($3,732)	($3,187)
30	August 2020	31	58.08%	($6,037)	($3,256)	($2,781)
31	September 2020	30	49.86%	($5,183)	($2,795)	($2,387)
32	October 2020	31	41.37%	($4,300)	($2,319)	($1,981)
33	November 2020	30	33.15%	($3,446)	($1,858)	($1,587)
34	December 2020	31	24.66%	($2,563)	($1,382)	($1,181)
35	January 2021	31	16.16%	($1,680)	($906)	($774)
36	February 2021	28	8.49%	($883)	($476)	($407)
37	March 2021	31	0.00%	$0	$0	$0
38	Total	365		($57,008)	($30,747)	($26,261)
39	Deferred Tax Without Proration	Line 25		($124,722)	($67,269)	($57,453)
40	Proration Adjustment	Line 38 - Line 39		$67,714	$36,522	$31,193

Column Notes:
(j) Sum of remaining days in the year (Col (i)) ÷ 365
(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

THE NARRAGANSETT ELECTRIC COMPANY
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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2022 Net Deferred Tax Reserve Proration
Electric Transportation Initiative

Line No.			(a)=Sum of (b) through (d) Total	(b) Vintage Year March 31, 2022	(c) Vintage Year March 31, 2021	(d) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration					
1	Book Depreciation	Line 22 + Line 25; Col (c) = Page 4 of 10, Line 16 + Line 19 + Line 22 + Line 25; Col (d) = Page 2 of 10, Line 16 + Line 19 + Line 22 + Line 25	$246,093	$112,623	$90,745	$42,725
2	Bonus Depreciation	Col (b) =Page 7 of 10, Line 12 ; Col (c) =Page 5 of 10, Line 12 ; Col (d) = Page 3 of 10, Line 12	$0	$0	$0	$0
3	Remaining MACRS Tax Depreciation	Col (b) = Page 6 of 10, Line 18 ; Col (c) = Page 4 of 10, Line 18 ; Col (d) =Page 2 of 10, Line 18	($1,640,208)	($865,302)	($585,120)	($189,786)
4	FY22 tax (gain)/loss on retirements	Col (b) = Page 7 of 10, Line 19 ; Col (c) = Page 5 of 10, Line 19 ; Col (d) = Page 3 of 10, Line 19	$0	$0	$0	$0
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	($1,394,115)	($752,679)	($494,375)	($147,061)
6	Effective Tax Rate		21.00%	21.00%	21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	($292,764)	($158,063)	($103,819)	($30,883)
	Deferred Tax Not Subject to Proration					
8	Capital Repairs Deduction	Page 7 of 10, Line 3	$0	$0		
9	Cost of Removal	Page 7 of 10, Line 20	$0	$0		
10	Book/Tax Depreciation Timing Difference at 3/31/2022		$0	$0		
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0		
12	Effective Tax Rate		21.00%	21.00%		
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0		
14	Total Deferred Tax Reserve	Line 7 + Line 13	($292,764)	($158,063)	($103,819)	($30,883)
15	Net Operating Loss		$0	-		
16	Net Deferred Tax Reserve	Line 14 + Line 15	($292,764)	($158,063)	($103,819)	($30,883)
	Allocation of FY 2022 Estimated Federal NOL					
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	($752,679)	($752,679)		
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0		
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	($752,679)	($752,679)		
20	Total FY 2022 Federal NOL		$0	$0		
21	Allocated FY 2022 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0		
22	Allocated FY 2022 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0		
23	Effective Tax Rate		21.00%	21.00%		
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0		
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	($292,764)	($158,063)	($103,819)	($30,883)

		(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l) through (n)	(l)	(m)	(n)
	Proration Calculation						
26	April 2021	30	91.78%	($22,392)	($12,089)	($7,940)	($2,362)
27	May 2021	31	83.29%	($20,320)	($10,971)	($7,206)	($2,143)
28	June 2021	30	75.07%	($18,314)	($9,888)	($6,495)	($1,932)
29	July 2021	31	66.58%	($16,242)	($8,769)	($5,760)	($1,713)
30	August 2021	31	58.08%	($14,170)	($7,651)	($5,025)	($1,495)
31	September 2021	30	49.86%	($12,165)	($6,568)	($4,314)	($1,283)
32	October 2021	31	41.37%	($10,093)	($5,449)	($3,579)	($1,065)
33	November 2021	30	33.15%	($8,088)	($4,367)	($2,868)	($853)
34	December 2021	31	24.66%	($6,016)	($3,248)	($2,133)	($635)
35	January 2022	31	16.16%	($3,944)	($2,129)	($1,398)	($416)
36	February 2022	28	8.49%	($2,072)	($1,119)	($735)	($219)
37	March 2022	31	0.00%	$0	$0	$0	$0
38	Total	365		($133,816)	($72,247)	($47,453)	($14,116)
39	Deferred Tax Without Proration	Line 25		($292,764)	($158,063)	($103,819)	($30,883)
40	Proration Adjustment	Line 38 - Line 39		$158,948	$85,816	$56,366	$16,767

Column Notes:

(j) Sum of remaining days in the year (Col (i)) ÷ 365

(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

Division 32-12

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to project costs for the Electric Heating initiative set forth in Table 6.2 in PST-1, Bates page 129, please provide greater detail that shows how these costs were estimated, including more granular information that identifies the underlying costs for the estimates shown. Please also specify whether the costs include adding employees.

Response:

Further detail on the costs set forth in Table 6.2 of Schedule PST-1, Chapter 6 - Electric Heat (Bates Page 129 of PST Book 1) can be found in three places:

- Schedule PST-1, Chapter 6 - Electric Heat, Pages 10-11 of 15 (Bates Pages 130-131 of PST Book 1). The narrative sections immediately following Table 6.2 of Schedule PST-1, Chapter 6 - Electric Heat provide detail on how the costs of Table 6.2 were developed.

- Workpaper 6.1 - Electric Heat Costs/Assumptions (Bates Pages 59-63 of PST Book 3). The tables in Workpaper 6.1 provide detailed descriptions of incremental costs of each program element, including labor costs quantified as percentages of annual full-time-equivalent (FTE) for each year.

- The Company's response to Division 16-12, a copy of which is provided as Attachment DIV 32-12 for ease of reference, provides a further itemization of the costs of Table 6.2 of Schedule PST-1, Chapter 6 - Electric Heat.

Regarding adding employees, as detailed in Workpaper 6.1 (Bates Pages 59-63 of PST Book 3), the costs of the Electric Heat Initiative include adding 0.75 FTE across all three years, plus an additional 0.25 FTE in Year 2 to support the delivery of the Ground-Source Heat Pump Program, for a total of 1.0 FTE in Year 2 only.

(This response is identical to the Company's response to Division 10-12 in Docket No. 4780.)

Prepared by or under the supervision of: Mackay Miller

Division 16-12

Request:

Schedule PST-1, Chapter 6 – Electric Heat, page 9 of 15 features Table 6.2: Costs by Program.

a. Please provide a table for each program that breaks out costs by year and in total for: i) program administration costs, ii) marketing costs, iii) customer incentive costs, iv) technical assistance costs, v) evaluation, measurement and verification costs, vi) participant costs, and vii) utility shareholder incentives.
b. Please provide a similar table for the electric heating efforts included in the 2018 Energy Efficiency Plan.

Response:

a. **Electric Heat Initiative.** An itemized breakdown of costs for the four programs is as follows:

GSHP Program	**2019**	**2020**	**2021**	**Total**
Program Administration	**$ -**	$ 27,115	**$ -**	$27,115
Marketing	**$ -**	$ 17,885	**$ -**	$17,885
Technical Assistance + EM&V	**$ -**	$ 50,000	**$ -**	$50,000
Customer Incentives	**$ -**	$ 500,000	**$ -**	$500,000
Program Cost Subtotal	**$ -**	**$ 595,000**	**$ -**	**$ 595,000**
Participant Costs	**$ -**	$ 465,000	**$ -**	$ 465,000
Total	**$ -**	**$ 1,060,000**	**$ -**	**$ 1,060,000**
Approximate Max Utility Shareholder Incentive	$0	$29,856	$0	**$ 29,856**

Equipment Incentives	**2019**	**2020**	**2021**	**Total**
Program Administration	$27,115	$27,115	$27,115	$81,346
Marketing	$17,525	$17,525	$17,525	$52,574
Technical Assistance + EM&V	$0	$0	$0	$0
Customer Incentives	$ 207,500	$ 236,250	$ 265,000	$ 708,750
Program Cost Subtotal	**$ 252,140**	**$ 280,890**	**$ 309,640**	**$ 842,670**
Participant Costs	$ 902,075	$ 966,631	$ 1,069,036	$ 2,937,742
Total	**$ 1,154,215**	**$ 1,247,521**	**$ 1,378,676**	**$ 3,780,412**
Approximate Max Utility Shareholder Incentive	$ 118,986	$ 91,196	$ 127,204	**$ 337,386**

Prepared by or under the supervision of: Mackay Miller

Community Based Outreach	**2019**	**2020**	**2021**	**Total**
Program Administration	$27,115	$27,115	$27,115	$81,346
Marketing	$ -	$ -	$ -	$ -
Technical Assistance + EM&V	$8,385	$8,385	$8,385	$25,154
Customer Incentives (to Communities)	$60,000	$60,000	$60,000	$180,000
Program Cost Subtotal	**$ 95,500**	**$ 95,500**	**$ 95,500**	**$ 286,500**
Participant Costs	$ -	$ -	$ -	$ -
Total	**$ 95,500**	**$ 95,500**	**$ 95,500**	**$ 286,500**
Approximate Utility Shareholder Incentive (Max)	**$ -**	**$ -**	**$ -**	**$ -**

Oil- and Propane-Dealer Training	**2019**	**2020**	**2021**	**Total**
Program Administration	$27,115	$27,115	$27,115	$81,346
Marketing	$8,885	$8,885	$8,885	$26,654
Technical Assistance + EM&V	$25,000	$25,000	$25,000	$75,000
Customer Incentives	$ -	$ -	$ -	$ -
Program Cost Subtotal	**$ 61,000**	**$ 61,000**	**$ 61,000**	**$ 183,000**
Participant Costs	$ -	$ -	$ -	$ -
Total	**$ 61,000**	**$ 61,000**	**$ 61,000**	**$ 183,000**
Approximate Utility Shareholder Incentive (Max)	**$ -**	**$ -**	**$ -**	**$ -**

b. **Energy Efficiency.** In the Company's annual Energy Efficiency Program Plan, the Company plans and reports administration, marketing, technical assistance, evaluation, measurement and verification costs at a program level. Many of the costs associated with these categories are shared across all the measures in a program and cannot be assigned on a per-measure basis. The utility shareholder incentive is calculated at the sector level, not the measure level.

In the Company's 2018 Energy Efficiency Procurement Plan (Docket No. 4755), electric heat pumps are included within the High-Efficiency Heating, Cooling and Hot Water (HVAC) program. The chart below is from Table E-2 of the Amended 2018 Energy Efficiency Program Plan – Revised Tables.

ENERGY STAR® HVAC

Program Planning & Administration	$70,203
Marketing	$108,511
Sales, Technical Assistance & Training	$512,274
Evaluation & Market Research	$20,690
Total	**$711,678**

Prepared by or under the supervision of: Mackay Miller

The Company does plan incentive costs at the measure level in this program. Below are the planned customer incentive costs for electrification of heating.

Measure	**Customer Incentive**
Heat Pump – Oil Electrification (early replacement)	$4,000
Heat Pump – Oil Electrification (replace on failure)	$3,000
Heat Pump – Electric Resistance (early replacement)	$4,000

(This response is identical to the Company's response to Division 5-12 in Docket No. 4780.)

Prepared by or under the supervision of: Mackay Miller

Division 32-13

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to Section 2.1 of PST-1, Bates page 122 and Table 6.2 on Bates page 129:

a. Please explain why it is reasonable to allocate $592,000 of ratepayer dollars for single ground-source heat pump installation in one customer's building.

b. How much of the Community-Based Marketing costs, if any, relate to the GSHP Program?

Response:

a. A point of clarification regarding Table 6.2 on Bates Page 129: The costs of the ground heat exchanger are estimated at $595,000, not $592,000 as stated in this data request.

The motivation for the Ground-Source Heat Pump program is to demonstrate the market transformation value of partial utility ownership in dramatically lowering the upfront costs of ground-source heat pump systems, which has been widely acknowledged as the main barrier to widespread adoption. In this context, it is reasonable to socialize the costs for the ground-source heat pump installation in one customer's building because of the benefits it could bring to all customers within the service territory. From the perspective of customers, the allocation is reasonable since the customer receiving the ground-source heat pump would be a current fuel-oil customer, and, by converting this customer, new delivery revenues would be created that would offset future cost of service requirements.

Beyond the benefits of offsetting revenues, additional benefits include significantly reducing greenhouse gas emissions, advancing Rhode Island's clean energy goals, and building a foundation to help accelerate the broader ground-source heat pump market.

b. Zero. All costs associated with the Community-Based Outreach and Marketing program are envisioned to support the Equipment Incentives program only.

(This response is identical to the Company's response to Division 10-13 in Docket No. 4780.)

Prepared by or under the supervision of: Mackay Miller

Division 32-14

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Comparing the Community-Based Marketing costs shown on Table 6.2 of PST-1, Bates page 129 ($286,500) to the Transportation Education and Outreach description for the Transportation Electrification initiative in Table 5-4 of PST-1, Bates page 115 ($499,397), please explain why the Transportation Education and Outreach costs for the Transportation initiative are so much higher than the Community-Based Marketing costs for the Electric Heating initiative. What are the higher cost drivers?

Response:

The marketing costs for the Electric Heating Initiative are lower for two primary reasons:

1) The total scale of the proposed Electric Heating Initiative is substantially smaller than the Electric Transportation Initiative, with total 3-year program budgets of about $1.9 million and $11.5 million, respectively.

2) Rhode Island's energy efficiency market is mature relative to its electric vehicle market. Preliminary heat pump outreach and delivery is already being initiated through the 2018 energy efficiency program, and the Electric Heating Initiative will benefit more significantly from the Company's long-standing outreach infrastructure and delivery experience. Incremental outreach expenses under the Electric Heating Initiative will complement preliminary energy efficiency outreach efforts, and the two will work together to further animate the state's renewable thermal market. In contrast, electric vehicle outreach is at an early stage and is not supported by other complementary programs.

(This response is identical to the Company's response to Division 10-14 in Docket No. 4780.)

Prepared by or under the supervision of: Mackay Miller

Division 32-15

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to PST-1, Table 6.2 of PST-1, Bates page 129, please provide the program costs assuming that the GSHP Program is eliminated and recalculate the BCA ratio shown on Table 6-4, assuming the elimination of the GSHP program.

Response:

The total costs of the Electric Heat Initiative without the Ground Source Heat Pump (GSHP) Program would be $1,312,170, as detailed below:

	Year 1	Year 2	Year 3	3-year Total
GSHP Program	$0	$0	$0	**$0**
Equipment Incentives	$252,140	$280,890	$309,640	**$842,670**
Community-Based Marketing	$95,500	$95,500	$95,500	**$286,500**
Oil dealer training and support	$61,000	$61,000	$61,000	**$183,000**
Total	**$408,640**	**$437,390**	**$466,140**	**$1,312,170**

The resulting Societal Cost Test ratio of the Electric Heat Initiative would be 1.36. The costs and benefits of the initiative with and without the GSHP program are detailed below:

	Electric Heat – Societal Cost Test Ratio	With GSHP	Without GSHP
Benefits	Forward Commitment: Capacity Value	$ 277,788	$ 274,896
	Energy Supply & Transmission Operating Value of Energy Provided or Saved (time- and location-specific LMP)	$ (1,121,845)	$ (1,059,015)
	Avoided Renewable Energy Credit (REC) Cost	$ (99,926)	$ (94,875)
	Greenhouse Gas (GHG) Externality Costs	$ 527,088	$ 470,093
	Criteria Air Pollutant and Other Environmental Costs	$ 222	$ 204
	Non-Electric Avoided Fuel Cost	$ 4,162,394	$ 3,851,092
	Economic Development	$ -	$ -
		$ 3,745,721	**$ 3,442,396**
Costs	Utility/Third Party Developer RE, Efficiency, or DER Costs	$ 1,073,830	$ 1,073,830
	Program Participant / Prosumer Benefits / Costs	$ 2,275,503	$ 1,448,245
		$ 3,349,332	**$ 2,522,074**
	BCA (SCT) Ratio	**1.12**	**1.36**

(This response is identical to the Company's response to Division 10-15 in Docket No. 4780.)

Prepared by or under the supervision of: Mackay Miller

Division 32-16

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to Appendix 10.7 in PST-2, please provide the annual revenue requirement for Rate Years 1, 2, and 3 for the Electric Heating initiative, showing O&M and the revenue requirements for any capital investments, if any, separately.

Response:

Please refer to Attachment DIV 32-16 for the Electric Heat revenue requirement by initiative for each rate year. The Company inadvertently did not include the O&M and capital costs relating to the ground source heat pump initiative in its original Electric Heat revenue requirement. DIV 32-16 has been revised to include these costs.

(This response is identical to the Company's response to Division 10-16 in Docket No. 4780.)

Prepared by or under the supervision of: Melissa Little

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat (Revised)

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Electric Heat Iniative
Annual Revenue Requirement Summary

Line No.			Six Months Ending March 31, 2019 (a)	Fiscal Year Ending March 31, 2020 (b)	Fiscal Year Ending March 31, 2021 (c)	Fiscal Year Ending March 31, 2022 (d)
	Operation and Maintenance (O&M) Expenses:					
1	Ground-Source Heat Pump Program		$0	$0	$95,000	$0
2	Equipment Incentives for Income Eligible Customers		$0	$226,593	$249,693	$298,146
3	Community-Based Outreach		$0	$95,500	$95,500	$95,500
4	Oil/Propane Dealer Training Programs		$0	$61,000	$61,000	$61,000
5	**Total O&M costs**	Sum of Lines 1 through 4	**$0**	**$383,093**	**$501,193**	**$454,646**
6	**Total O&M Costs Net of R&D Tax Incentives**	Line 5	**$0**	**$383,093**	**$501,193**	**$454,646**
	Capital Investment:					
7	Estimated Revenue Requirement on Rate Year Capital investment		$0	$0	$0	$0
8	Estimated Revenue Requirement on Data Year 1 Capital investment				$45,583	$88,126
9	Estimated Revenue Requirement on Data Year 2 Capital investment					$0
10	**Total Capital Investment Component of Revenue Requirement**	Sum of Lines 7 through 9	**$0**	**$0**	**$45,583**	**$88,126**
11	**Total Revenue Requirement**	Line 6 + Line 10	**$0**	**$383,093**	**$546,776**	**$542,772**

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat (Revised)

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2020
Electric Heat

Line No.			Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Estimated Capital Investment				
1	Underground pipes for Ground Source Heat Pump		$0	$0	$0
2	Total Estimated Capital Investment	Sum of Line 1	$0	$0	$0
	Depreciable Net Capital Included in Rate Base				
3	Total Allowed Capital Included in Rate Base in Current Year	Line 2	$0	$0	$0
4	Retirements	Line 3 * 0%	$0	$0	$0
5	Net Depreciable Capital Included in Rate Base	Column (a) = Line 3 - Line 4; Column (b and c) = Prior Year Line 5	$0	$0	$0
	Change in Net Capital Included in Rate Base				
6	Capital Included in Rate Base	Line 2	$0	$0	$0
7	Cost of Removal		$0	$0	$0
8	**Total Net Plant in Service Including Cost of Removal**	**Line 5 + Line 7**	**$0**	**$0**	**$0**
	Tax Depreciation				
9	Vintage Year Tax Depreciation:				
10	2020 Spend	Page 3 of 10, Line 21	$0	$0	$0
11	Cumulative Tax Depreciation	Previous Year Line 11 + Current Year Line 10	$0	$0	$0
	Book Depreciation				
12	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	10.00%	10.00%	10.00%
13	Book Depreciation	Column (a) = Line 1 * Line 12 * 50% ; Column (b and c) = Line 1 * Line 12	$0	$0	$0
14	Cumulative Book Depreciation	Previous Year Line 14 + Current Year Line 13	$0	$0	$0
15	Total Cumulative Book Depreciation	Line 14	$0	$0	$0
	Deferred Tax Calculation:				
16	Cumulative Book / Tax Timer	Line 11 - Line 15	$0	$0	$0
17	Effective Tax Rate		21.00%	21.00%	21.00%
18	Deferred Tax Reserve	Line 16 * Line 17	$0	$0	$0
19	Less: FY 2020 Federal NOL		$0	$0	$0
20	Less: Proration Adjustment	Col (a) = Page 8 of 10, Line 40; Col (b) = Page 9 of 10, Line 40; Col (c) = Page 10 of 10, Line 40	$0	$0	$0
21	Net Deferred Tax Reserve	Sum of Lines 18 through 20	$0	$0	$0
	Rate Base Calculation:				
22	Cumulative Incremental Capital Included in Rate Base	Line 8	$0	$0	$0
23	Accumulated Depreciation	- Line 15	$0	$0	$0
24	Deferred Tax Reserve	- Line 21	$0	$0	$0
25	Year End Rate Base	Sum of Lines 22 through 24	$0	$0	$0
	Revenue Requirement Calculation:				
26	Average Rate Base	Column (a) = Current Year Line 25 ÷ 2; Column (b & c) = (Prior Year Line 25 + Current Year Line 25) ÷ 2	$0	$0	$0
27	Pre-Tax ROR	1/	8.80%	8.80%	8.80%
28	Return and Taxes	Line 26 * Line 27	$0	$0	$0
29	Book Depreciation	Line 13	$0	$0	$0
30	Property Taxes	Tax Rate 3.176% MAL-7 - Columns (b & c) Line 8 * 0%	$0	$0	$0
31	**Annual Revenue Requirement**	**Line 28 + Line 29 + Line 30**	**$0**	**$0**	**$0**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2020 Capital Investments
Electric Heat

Line No.			Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Capital Repairs Deduction				
1	Plant Additions	Page 2 of 10, Line 2	$0		
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%		
3	Capital Repairs Deduction	Line 1 * Line 2	$0		
	Bonus Depreciation				
4	Plant Additions	Line 1	$0		
5	Less Capital Repairs Deduction	Line 3	$0		
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$0		
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%		
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$0		
9	Bonus Depreciation Rate (April 2019 - December 2019)	1 * 75% * 0%	0.00%		
10	Bonus Depreciation Rate (January 2020 - Mar 2020)	1 * 25% * 0%	0.00%		
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%		
12	Bonus Depreciation	Line 8 * Line 11	$0		
	Remaining Tax Depreciation				
13	Plant Additions	Line 1	$0		
14	Less Capital Repairs Deduction	Line 3	$0		
15	Less Bonus Depreciation	Line 12	$0		
16	Remaining Plant Additions Subject to 5 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$0	$0	$0
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.00%	32.00%	19.20%
18	Remaining Tax Depreciation	Line 16 * Line 17	$0	$0	$0
19	FY20 Loss incurred due to retirements	Per Tax Department	$0	$0	$0
20	Cost of Removal	Page 2 of 10, Line 7	$0	$0	$0
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, and 20	$0	$0	$0

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2021
Electric Heat

Line No.			Fiscal Year Ending March 31, 2021 (a)	Fiscal Year Ending March 31, 2022 (b)
	Estimated Capital Investment			
1	Underground pipes for Ground Source Heat Pump		$500,000	
2	Total Estimated Capital Investment	Sum of Line 1	$500,000	$0
	Depreciable Net Capital Included in Rate Base			
3	Total Allowed Capital Included in Rate Base in Current Year	Line 2	$500,000	$0
4	Retirements	Line 3 * 0%	$0	$0
5	Net Depreciable Capital Included in Rate Base	Column (a) = Line 3 - Line 4; Column (b) = Prior Year Line 5	$500,000	$500,000
	Change in Net Capital Included in Rate Base			
6	Capital Included in Rate Base	Line 2	$500,000	$0
7	Cost of Removal		$0	$0
8	**Total Net Plant in Service Including Cost of Removal**	**Line 5 + Line 7**	**$500,000**	**$500,000**
	Tax Depreciation			
9	Vintage Year Tax Depreciation:			
10	2021 Spend	Page 5 of 10, Line 21	$100,000	$160,000
11	Cumulative Tax Depreciation	Prior Year Line 11 + Current Year Line 10	$100,000	$260,000
	Book Depreciation			
12	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	10.00%	10.00%
13	Book Depreciation	Column (a) = Line 1 * Line 12 * 50% ; Column (b) = Line 1 * Line 12	$25,000	$50,000
14	Cumulative Book Depreciation	Prior Year Line 14 + Current Year Line 13	$25,000	$75,000
15	Total Cumulative Book Depreciation	Line 14	$25,000	$75,000
	Deferred Tax Calculation:			
16	Cumulative Book / Tax Timer	Line 11 - Line 15	$75,000	$185,000
17	Effective Tax Rate		21.00%	21.00%
18	Deferred Tax Reserve	Line 16 * Line 17	$15,750	$38,850
19	Less: FY 2021 Federal NOL		$0	$0
20	Less: Proration Adjustment	Col (a) = Page 9 of 10, Line 39; Col (b) = Page 10 of 10, Line 40	($8,551)	($12,542)
21	Net Deferred Tax Reserve	Sum of Lines 18 through 20	$7,199	$26,308
	Rate Base Calculation:			
22	Cumulative Incremental Capital Included in Rate Base	Line 8	$500,000	$500,000
23	Accumulated Depreciation	- Line 15	($25,000)	($75,000)
24	Deferred Tax Reserve	- Line 21	($7,199)	($26,308)
25	Year End Rate Base	Sum of Lines 22 through 24	$467,801	$398,692
	Revenue Requirement Calculation:			
26	Average Rate Base	Column (a) = Current Year Line 25 ÷ 2; Column (b) = (Prior Year Line 25 + Current Year Line 25) ÷ 2	$233,900.51	$433,246
27	Pre-Tax ROR	1/	8.80%	8.80%
28	Return and Taxes	Line 26 * Line 27	$20,583	$38,126
29	Book Depreciation	Line 13	$25,000	$50,000
30	Property Taxes	Tax Rate 3.176% MAL-7 - Column (b) Line 8 * 0%	$0	$0
31	**Annual Revenue Requirement**	**Line 28 + Line 29 + Line 30**	**$45,583**	**$88,126**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2021 Capital Investments
Electric Heat

Line No.			Fiscal Year Ending March 31, 2021 (a)	Fiscal Year Ending March 31, 2022 (b)
	Capital Repairs Deduction			
1	Plant Additions	Page 4 of 10, Line 2	$500,000	
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%	
3	Capital Repairs Deduction	Line 1 * Line 2	$0	
	Bonus Depreciation			
4	Plant Additions	Line 1	$500,000	
5	Less Capital Repairs Deduction	Line 3	$0	
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$500,000	
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%	
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$500,000	
9	Bonus Depreciation Rate (April 2020 - December 2020)	0%	0.00%	
10	Bonus Depreciation Rate (January 2021 - Mar 2021)	0%	0.00%	
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%	
12	Bonus Depreciation	Line 8 * Line 11	$0	
	Remaining Tax Depreciation			
13	Plant Additions	Line 1	$500,000	
14	Less Capital Repairs Deduction	Line 3	$0	
15	Less Bonus Depreciation	Line 12	$0	
16	Remaining Plant Additions Subject to 5 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$500,000	$500,000
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.00%	32.00%
18	Remaining Tax Depreciation	Line 16 * Line 17	$100,000	$160,000
19	FY21 Loss incurred due to retirements	Per Tax Department	$0	$0
20	Cost of Removal	Page 4 of 10, Line 7	$0	$0
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, and 20	$100,000	$160,000

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2022
Electric Heat

Line No.			Fiscal Year Ending March 31, 2022 (a)
	Estimated Capital Investment		
1	Underground pipes for Ground Source Heat Pump		$0
2	Total Estimated Capital Investment	Sum Line 1	$0
	Depreciable Net Capital Included in Rate Base		
3	Total Allowed Capital Included in Rate Base in Current Year	Line 2	$0
4	Retirements	Line 3* 0%	$0
5	Net Depreciable Capital Included in Rate Base	Column (a) = Line 3 - Line 4	$0
	Change in Net Capital Included in Rate Base		
6	Capital Included in Rate Base	Line 2	$0
7	Cost of Removal		$0
8	**Total Net Plant in Service Including Cost of Removal**	**Line 5 + Line 7**	**$0**
	Tax Depreciation		
9	Vintage Year Tax Depreciation:		
10	2022 Spend	Page 7 of 10, Line 21	$0
11	Cumulative Tax Depreciation	Current Year Line 10	$0
	Book Depreciation		
12	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	10.00%
13	Book Depreciation	Column (a) = Line 1 * Line 12 * 50%	$0
14	Cumulative Book Depreciation	Current Year Line 13	$0
15	Total Cumulative Book Depreciation	Line 14	$0
	Deferred Tax Calculation:		
16	Cumulative Book / Tax Timer	Line 11 - Line 15	$0
17	Effective Tax Rate		21.00%
18	Deferred Tax Reserve	Line 16 * Line 17	$0
19	Less: FY 2022 Federal NOL		$0
20	Less: Proration Adjustment	Col (a) = Page 10 of 10, Line 40	$0
21	Net Deferred Tax Reserve	Sum of Lines 18 through 20	$0
	Rate Base Calculation:		
22	Cumulative Incremental Capital Included in Rate Base	Line 8	$0
23	Accumulated Depreciation	- Line 15	$0
24	Deferred Tax Reserve	- Line 21	$0
25	Year End Rate Base	Sum of Lines 22 through 24	$0
	Revenue Requirement Calculation:		
26	Average Rate Base	Column (a) = Current Year Line 25 ÷ 2	$0
27	Pre-Tax ROR	1/	8.80%
28	Return and Taxes	Line 26 * Line 27	$0
29	Book Depreciation	Line 13	$0
30	Property Taxes	Tax Rate 3.176% MAL-7	$0
32	**Annual Revenue Requirement**	**Line 28 + Line 29 + Line 30**	**$0**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2022 Capital Investments
Electric Heat

Line No.			Fiscal Year Ending March 31, 2022 (a)
	Capital Repairs Deduction		
1	Plant Additions	Page 6 of 10, Line 2	$0
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%
3	Capital Repairs Deduction	Line 1 * Line 2	$0
	Bonus Depreciation		
4	Plant Additions	Line 1	$0
5	Less Capital Repairs Deduction	Line 3	$0
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$0
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$0
9	Bonus Depreciation Rate (April 2021 - December 2021)	0%	0.00%
10	Bonus Depreciation Rate (January 2022 - Mar 2022)	0%	0.00%
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%
12	Bonus Depreciation	Line 8 * Line 11	$0
	Remaining Tax Depreciation		
13	Plant Additions	Line 1	$0
14	Less Capital Repairs Deduction	Line 3	$0
15	Less Bonus Depreciation	Line 12	$0
16	Remaining Plant Additions Subject to 5 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$0
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.00%
18	Remaining Tax Depreciation	Line 16 * Line 17	$0
19	FY22 Loss incurred due to retirements	Per Tax Department	$0
20	Cost of Removal	Page 6 of 10, Line 7	$0
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, and 20	$0

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat (Revised)

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2020 Net Deferred Tax Reserve Proration
Electric Heat

Line No.			(a)= column (b) Total	(b) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration			
1	Book Depreciation	Page 2 of 10, Line 13	$0	$0
2	Bonus Depreciation	Page 3 of 10, Line 12	$0	$0
3	Remaining MACRS Tax Depreciation	Page 3 of 10, Line 18	$0	$0
4	FY20 tax (gain)/loss on retirements	Page 3 of 10, Line 19	$0	$0
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	$0	$0
6	Effective Tax Rate	Per Tax Department	21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	$0	$0
	Deferred Tax Not Subject to Proration			
8	Capital Repairs Deduction	Page 3 of 10, Line 3	$0	$0
9	Cost of Removal	Page 3 of 10, Line 20	$0	$0
10	Book/Tax Depreciation Timing Difference at 3/31/2020		$0	$0
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0
12	Effective Tax Rate		21.00%	21.00%
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0
14	Total Deferred Tax Reserve	Line 7 + Line 13	$0	$0
15	Net Operating Loss	Page 2 of 10, Line 19	$0	$0
16	Net Deferred Tax Reserve	Line 14 + Line 15	$0	$0
	Allocation of FY 2020 Estimated Federal NOL			
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	$0	$0
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	$0	$0
20	Total FY 2020 Federal NOL	Line 15 * 21%	$0	$0
21	Allocated FY 2020 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0
22	Allocated FY 2020 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0
23	Effective Tax Rate	Per Tax Department	21.00%	21.00%
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	$0	$0

		(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l)	(l)
	Proration Calculation				
26	April 2019	30	91.78%	$0	$0
27	May 2019	31	83.29%	$0	$0
28	June 2019	30	75.07%	$0	$0
29	July 2019	31	66.58%	$0	$0
30	August 2019	31	58.08%	$0	$0
31	September 2019	30	49.86%	$0	$0
32	October 2019	31	41.37%	$0	$0
33	November 2019	30	33.15%	$0	$0
34	December 2019	31	24.66%	$0	$0
35	January 2020	31	16.16%	$0	$0
36	February 2020	28	8.49%	$0	$0
37	March 2020	31	0.00%	$0	$0
38	Total	365		$0	$0
39	Deferred Tax Without Proration	Line 25		$0	$0
40	Proration Adjustment	Line 38 - Line 39		$0	$0

Column Notes:

(j) Sum of remaining days in the year (Col (i)) ÷ 365

(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat (Revised)

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2021 Net Deferred Tax Reserve Proration
Electric Heat

Line No.			(a)= Sum of (b) through (c) Total	(b) Vintage Year March 31, 2021	(c) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration				
1	Book Depreciation	Col (b) = Page 4 of 10, Line 13 ;Col (c) = Page 2 of 10, Line 13	$25,000	$25,000	$0
2	Bonus Depreciation	Page 5 of 10, Line 12	$0	$0	
3	Remaining MACRS Tax Depreciation	Col (b) = Page 5 of 10, Line 18; Col (c) = Page 3 of 10, Line 18	($100,000)	($100,000)	$0
4	FY21 tax (gain)/loss on retirements	Col (b) = Page 5 of 10, Line 19; Col (c) = Page 3 of 10, Line 19	$0	$0	$0
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	($75,000)	($75,000)	$0
6	Effective Tax Rate	Per Tax Department	21.00%	21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	($15,750)	($15,750)	$0
	Deferred Tax Not Subject to Proration				
8	Capital Repairs Deduction	Page 5 of 10, Line 3	$0	$0	
9	Cost of Removal	Page 5 of 10, Line 20	$0	$0	
10	Book/Tax Depreciation Timing Difference at 3/31/2021		$0	$0	
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0	
12	Effective Tax Rate		21.00%	21.00%	
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0	
14	Total Deferred Tax Reserve	Line 7 + Line 13	($15,750)	($15,750)	$0
15	Net Operating Loss		$0	$0	$0
16	Net Deferred Tax Reserve	Line 14 + Line 15	($15,750)	($15,750)	$0
	Allocation of FY 2021 Estimated Federal NOL				
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	($75,000)	($75,000)	
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0	
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	($75,000)	($75,000)	
20	Total FY 2021 Federal NOL		$0	$0	
21	Allocated FY 2021 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0	
22	Allocated FY 2021 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0	
23	Effective Tax Rate	Per Tax Department	21.00%	21.00%	
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0	
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	($15,750)	($15,750)	$0

		(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l) through (m)	(l)	(m)
	Proration Calculation					
26	April 2020	30	91.78%	($1,205)	($1,205)	$0
27	May 2020	31	83.29%	($1,093)	($1,093)	$0
28	June 2020	30	75.07%	($985)	($985)	$0
29	July 2020	31	66.58%	($874)	($874)	$0
30	August 2020	31	58.08%	($762)	($762)	$0
31	September 2020	30	49.86%	($654)	($654)	$0
32	October 2020	31	41.37%	($543)	($543)	$0
33	November 2020	30	33.15%	($435)	($435)	$0
34	December 2020	31	24.66%	($324)	($324)	$0
35	January 2021	31	16.16%	($212)	($212)	$0
36	February 2021	28	8.49%	($111)	($111)	$0
37	March 2021	31	0.00%	$0	$0	$0
38	Total	365		($7,199)	($7,199)	$0
39	Deferred Tax Without Proration	Line 25		($15,750)	($15,750)	$0
40	Proration Adjustment	Line 38 - Line 39		$8,551	$8,551	$0

Column Notes:

(j) Sum of remaining days in the year (Col (i)) ÷ 365

(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat (Revised)

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2022 Net Deferred Tax Reserve Electric Proration
Electric Heat

Line No.			(a)=Sum of (b) through (d) Total	(b) Vintage Year March 31, 2022	(c) Vintage Year March 31, 2021	(d) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration					
1	Book Depreciation	Col (b) = Page 6 of 10, Line 13; Col (c) = Page 4 of 10, Line 13 ;Col (d) = Page 2 of 10, Line 13	$50,000	$0	$50,000	$0
2	Bonus Depreciation	Page 7 of 10, Line 12	$0	$0		
3	Remaining MACRS Tax Depreciation	Col (b) = Page 7 of 10, Line 18; Col (c) = Page 5 of 10, Line 18; Col (c) = Page 3 of 10, Line 18	($160,000)	$0	($160,000)	$0
4	FY22 tax (gain)/loss on retirements	Page 7 of 10, Line 19	$0	$0		
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	($110,000)	$0	($110,000)	$0
6	Effective Tax Rate	Per Tax Department	21.00%	21.00%	21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	($23,100)	$0	($23,100)	$0
	Deferred Tax Not Subject to Proration					
8	Capital Repairs Deduction	Page 5 of 10, Line 3	$0	$0		
9	Cost of Removal	Page 5 of 10, Line 20	$0	$0		
10	Book/Tax Depreciation Timing Difference at 3/31/2022		$0	$0		
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0		
12	Effective Tax Rate		21.00%	21.00%		
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0		
14	Total Deferred Tax Reserve	Line 7 + Line 13	($23,100)	$0	($23,100)	$0
15	Net Operating Loss		$0	$0	$0	$0
16	Net Deferred Tax Reserve	Line 14 + Line 15	($23,100)	$0	($23,100)	$0
	Allocation of FY 2022 Estimated Federal NOL					
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	$0	$0		
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0		
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	$0	$0		
20	Total FY 2022 Federal NOL		$0	$0		
21	Allocated FY 2022 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0		
22	Allocated FY 2022 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0		
23	Effective Tax Rate	Per Tax Department	21.00%	21.00%		
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0		
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	($23,100)	$0	($23,100)	$0

	Proration Calculation	(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l) through (n)	(l)	(m)	(n)
26	April 2021	30	91.78%	($1,767)	$0	($1,767)	$0
27	May 2021	31	83.29%	($1,603)	$0	($1,603)	$0
28	June 2021	30	75.07%	($1,445)	$0	($1,445)	$0
29	July 2021	31	66.58%	($1,282)	$0	($1,282)	$0
30	August 2021	31	58.08%	($1,118)	$0	($1,118)	$0
31	September 2021	30	49.86%	($960)	$0	($960)	$0
32	October 2021	31	41.37%	($796)	$0	($796)	$0
33	November 2021	30	33.15%	($638)	$0	($638)	$0
34	December 2021	31	24.66%	($475)	$0	($475)	$0
35	January 2022	31	16.16%	($311)	$0	($311)	$0
36	February 2022	28	8.49%	($163)	$0	($163)	$0
37	March 2022	31	0.00%	$0	$0	$0	$0
38	Total	365		($10,558)	$0	($10,558)	$0
39	Deferred Tax Without Proration	Line 25		($23,100)	$0	($23,100)	$0
40	Proration Adjustment	Line 38 - Line 39		$12,542	$0	$12,542	$0

Column Notes:
(j) Sum of remaining days in the year (Col (i)) ÷ 365
(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

Division 32-17

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Please explain why there is a difference between the costs for the Electric Heating initiative shown on Table 6.2 of PST-1, Bates page 129 and the O&M expenses shown in Appendix 10.7.

Response:

Please refer to the Company's response to Division 16-21, a copy of which is provided as Attachment DIV 32-17 for ease of reference. The Company noted that, because of an error in Appendix 10.7 in PST Book 2, the Electric Heat Factor (EHF) was omitted from the projected revenue requirement of the Company's Power Sector Transformation Plan.

(This response is identical to the Company's response to Division 10-17 in Docket No. 4780.)

Prepared by or under the supervision of: Mackay Miller

Division 16-21

Request:

Schedule PST-2, Appendix 10.10, 8.0 Electric Heat Initiative, R.I.P.U.C. No. 2205, Sheet 8, states, "The Electric Heat Factor ("EHF") is designed to recover the Company's investment in ground heat exchangers constructed, owned, and operated by the Company, any ongoing O&M expense on such ground heat exchangers, plus expenses associated with the other elements under the Company's EH Initiative as identified below." Please provide the Company's investment broken out by program, measure type (i.e., air- vs. ground-source) and cost type (i.e., capitalized cost, municipal property taxes and O&M costs).

Response:

The Electric Heat Factor (EHF) is designed to cover only investments in the *Ground-Source Heat Pump* program of the Electric Heat Initiative. The Company notes that due to an error in PST Book 2 of 3 in Docket No. 4780, the EHF was omitted from the projected Revenue Requirement of the Power Sector Transformation plan.

An itemized account of the investments envisioned to be recovered through the EHF is as follows:

Ground-Source Heat Pump program category	**Estimated Investment to be recovered through EHF**
Underground heat exchanger	$500,000
Municipal Property Taxes	$-0- in year placed in service; 3.34% Rate Year effective property tax rate[1]
O&M expense	$0

(This response is identical to the Company's response to Division 5-21 in Docket No. 4780.)

[1] Rate Year property tax expense for Narragansett Electric of $30,530,258 per Schedule MAL-7-ELEC, Page 2(Bates Page 50 of Book 9) over Rate Year average net plant of $915,314,386 per Schedule MAL-11-ELEC, Page 1 at Line 5 (c) (Bates Page 91of Book 9).

Prepared by or under the supervision of: Mackay Miller

Division 32-18

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Referring to Appendix 10.7 in PST-2, please provide the annual revenue requirement for Rate Years 1, 2, and 3 for the Electric Heating initiative, showing O&M and the revenue requirements for any capital investments separately, assuming the GSHP program is eliminated.

Response:

Please refer to Attachment DIV 32-18 for the Electric Heat revenue requirement by initiative, excluding Ground Source Heat Pump initiative, for each rate year.

(This response is identical to the Company's response to Division 10-18 in Docket No. 4780.)

Prepared by or under the supervision of: Melissa Little

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat
Page 1 of 10

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Electric Heat Iniative
Annual Revenue Requirement Summary

Line No.			Six Months Ending March 31, 2019 (a)	Fiscal Year Ending March 31, 2020 (b)	Fiscal Year Ending March 31, 2021 (c)	Fiscal Year Ending March 31, 2022 (d)
	Operation and Maintenance (O&M) Expenses:					
1	Ground-Source Heat Pump Program		$0	$0	$0	$0
2	Equipment Incentives for Income Eligible Customers		$0	$226,593	$249,693	$298,146
3	Community-Based Outreach		$0	$95,500	$95,500	$95,500
4	Oil/Propane Dealer Training Programs		$0	$61,000	$61,000	$61,000
5	**Total O&M costs**	Sum of Lines 1 through 4	**$0**	**$383,093**	**$406,193**	**$454,646**
6	**Total O&M Costs Net of R&D Tax Incentives**	Line 5	**$0**	**$383,093**	**$406,193**	**$454,646**
	Capital Investment:					
7	Estimated Revenue Requirement on Rate Year Capital investment		$0	$0	$0	$0
8	Estimated Revenue Requirement on Data Year 1 Capital investment				$0	$0
9	Estimated Revenue Requirement on Data Year 2 Capital investment					$0
10	**Total Capital Investment Component of Revenue Requirement**	Sum of Lines 7 through 9	**$0**	**$0**	**$0**	**$0**
11	**Total Revenue Requirement**	Line 6 + Line 10	**$0**	**$383,093**	**$406,193**	**$454,646**

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2020
Electric Heat

Line No.			Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Estimated Capital Investment				
1	Underground pipes for Ground Source Heat Pump		$0	$0	$0
2	Total Estimated Capital Investment	Sum of Line 1	$0	$0	$0
	Depreciable Net Capital Included in Rate Base				
3	Total Allowed Capital Included in Rate Base in Current Year	Line 2	$0	$0	$0
4	Retirements	Line 3 * 0%	$0	$0	$0
5	Net Depreciable Capital Included in Rate Base	Column (a) = Line 3 - Line 4; Column (b and c) = Prior Year Line 5	$0	$0	$0
	Change in Net Capital Included in Rate Base				
6	Capital Included in Rate Base	Line 2	$0	$0	$0
7	Cost of Removal		$0	$0	$0
8	**Total Net Plant in Service Including Cost of Removal**	**Line 5 + Line 7**	**$0**	**$0**	**$0**
	Tax Depreciation				
9	Vintage Year Tax Depreciation:				
10	2020 Spend	Page 3 of 10, Line 21	$0	$0	$0
11	Cumulative Tax Depreciation	Previous Year Line 11 + Current Year Line 10	$0	$0	$0
	Book Depreciation				
12	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	10.00%	10.00%	10.00%
13	Book Depreciation	Column (a) = Line 1 * Line 12 * 50% ; Column (b and c) = Line 1 * Line 12	$0	$0	$0
14	Cumulative Book Depreciation	Previous Year Line 14 + Current Year Line 13	$0	$0	$0
15	Total Cumulative Book Depreciation	Line 14	$0	$0	$0
	Deferred Tax Calculation:				
16	Cumulative Book / Tax Timer	Line 11 - Line 15	$0	$0	$0
17	Effective Tax Rate		21.00%	21.00%	21.00%
18	Deferred Tax Reserve	Line 16 * Line 17	$0	$0	$0
19	Less: FY 2020 Federal NOL		$0	$0	$0
20	Less: Proration Adjustment	Col (a) = Page 8 of 10, Line 40; Col (b) = Page 9 of 10, Line 40; Col (c) = Page 10 of 10, Line 40	$0	$0	$0
21	Net Deferred Tax Reserve	Sum of Lines 18 through 20	$0	$0	$0
	Rate Base Calculation:				
22	Cumulative Incremental Capital Included in Rate Base	Line 8	$0	$0	$0
23	Accumulated Depreciation	- Line 15	$0	$0	$0
24	Deferred Tax Reserve	- Line 21	$0	$0	$0
25	Year End Rate Base	Sum of Lines 22 through 24	$0	$0	$0
	Revenue Requirement Calculation:				
26	Average Rate Base	Column (a) = Current Year Line 25 ÷ 2; Column (b & c) = (Prior Year Line 25 + Current Year Line 25) ÷ 2	$0	$0	$0
27	Pre-Tax ROR	1/	8.80%	8.80%	8.80%
28	Return and Taxes	Line 26 * Line 27	$0	$0	$0
29	Book Depreciation	Line 13	$0	$0	$0
30	Property Taxes	Tax Rate 3.176% MAL-7 - Columns (b & c) Line 8 * 0%	$0	$0	$0
31	**Annual Revenue Requirement**	**Line 28 + Line 29 + Line 30**	**$0**	**$0**	**$0**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2020 Capital Investments
Electric Heat

Line No.			Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Capital Repairs Deduction				
1	Plant Additions	Page 2 of 10, Line 2	$0		
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%		
3	Capital Repairs Deduction	Line 1 * Line 2	$0		
	Bonus Depreciation				
4	Plant Additions	Line 1	$0		
5	Less Capital Repairs Deduction	Line 3	$0		
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$0		
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%		
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$0		
9	Bonus Depreciation Rate (April 2019 - December 2019)	1 * 75% * 0%	0.00%		
10	Bonus Depreciation Rate (January 2020 - Mar 2020)	1 * 25% * 0%	0.00%		
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%		
12	Bonus Depreciation	Line 8 * Line 11	$0		
	Remaining Tax Depreciation				
13	Plant Additions	Line 1	$0		
14	Less Capital Repairs Deduction	Line 3	$0		
15	Less Bonus Depreciation	Line 12	$0		
16	Remaining Plant Additions Subject to 5 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$0	$0	$0
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.00%	32.00%	19.20%
18	Remaining Tax Depreciation	Line 16 * Line 17	$0	$0	$0
19	FY20 Loss incurred due to retirements	Per Tax Department	$0	$0	$0
20	Cost of Removal	Page 2 of 10, Line 7	$0	$0	$0
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, and 20	$0	$0	$0

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2021
Electric Heat

Line No.			Fiscal Year Ending March 31, 2021 (a)	Fiscal Year Ending March 31, 2022 (b)
	Estimated Capital Investment			
1	Underground pipes for Ground Source Heat Pump		$0	
2	Total Estimated Capital Investment	Sum of Line 1	$0	$0
	Depreciable Net Capital Included in Rate Base			
3	Total Allowed Capital Included in Rate Base in Current Year	Line 2	$0	$0
4	Retirements	Line 3 * 0%	$0	$0
5	Net Depreciable Capital Included in Rate Base	Column (a) = Line 3 - Line 4; Column (b) = Prior Year Line 5	$0	$0
	Change in Net Capital Included in Rate Base			
6	Capital Included in Rate Base	Line 2	$0	$0
7	Cost of Removal		$0	$0
8	**Total Net Plant in Service Including Cost of Removal**	**Line 5 + Line 7**	**$0**	**$0**
	Tax Depreciation			
9	Vintage Year Tax Depreciation:			
10	2021 Spend	Page 5 of 10, Line 21	$0	$0
11	Cumulative Tax Depreciation	Prior Year Line 11 + Current Year Line 10	$0	$0
	Book Depreciation			
12	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	10.00%	10.00%
13	Book Depreciation	Column (a) = Line 1 * Line 12 * 50% ; Column (b) = Line 1 * Line 12	$0	$0
14	Cumulative Book Depreciation	Prior Year Line 14 + Current Year Line 13	$0	$0
15	Total Cumulative Book Depreciation	Line 14	$0	$0
	Deferred Tax Calculation:			
16	Cumulative Book / Tax Timer	Line 11 - Line 15	$0	$0
17	Effective Tax Rate		21.00%	21.00%
18	Deferred Tax Reserve	Line 16 * Line 17	$0	$0
19	Less: FY 2021 Federal NOL		$0	$0
20	Less: Proration Adjustment	Col (a) = Page 9 of 10, Line 39; Col (b) = Page 10 of 10, Line 40	$0	$0
21	Net Deferred Tax Reserve	Sum of Lines 18 through 20	$0	$0
	Rate Base Calculation:			
22	Cumulative Incremental Capital Included in Rate Base	Line 8	$0	$0
23	Accumulated Depreciation	- Line 15	$0	$0
24	Deferred Tax Reserve	- Line 21	$0	$0
25	Year End Rate Base	Sum of Lines 22 through 24	$0	$0
	Revenue Requirement Calculation:			
26	Average Rate Base	Column (a) = Current Year Line 25 ÷ 2; Column (b) = (Prior Year Line 25 + Current Year Line 25) ÷ 2	$0.00	$0
27	Pre-Tax ROR	1/	8.80%	8.80%
28	Return and Taxes	Line 26 * Line 27	$0	$0
29	Book Depreciation	Line 13	$0	$0
30	Property Taxes	Tax Rate 3.176% MAL-7 - Column (b) Line 8 * 0%	$0	$0
31	**Annual Revenue Requirement**	**Line 28 + Line 29 + Line 30**	**$0**	**$0**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2021 Capital Investments
Electric Heat

Line No.			Fiscal Year Ending March 31, 2021 (a)	Fiscal Year Ending March 31, 2022 (b)
	Capital Repairs Deduction			
1	Plant Additions	Page 4 of 10, Line 2	$0	
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%	
3	Capital Repairs Deduction	Line 1 * Line 2	$0	
	Bonus Depreciation			
4	Plant Additions	Line 1	$0	
5	Less Capital Repairs Deduction	Line 3	$0	
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$0	
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%	
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$0	
9	Bonus Depreciation Rate (April 2020 - December 2020)	0%	0.00%	
10	Bonus Depreciation Rate (January 2021 - Mar 2021)	0%	0.00%	
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%	
12	Bonus Depreciation	Line 8 * Line 11	$0	
	Remaining Tax Depreciation			
13	Plant Additions	Line 1	$0	
14	Less Capital Repairs Deduction	Line 3	$0	
15	Less Bonus Depreciation	Line 12	$0	
16	Remaining Plant Additions Subject to 5 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$0	$0
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.00%	32.00%
18	Remaining Tax Depreciation	Line 16 * Line 17	$0	$0
19	FY21 Loss incurred due to retirements	Per Tax Department	$0	$0
20	Cost of Removal	Page 4 of 10, Line 7	$0	$0
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, and 20	$0	$0

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
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Appendix 10.7 - Electric Heat
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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Revenue Requirement on Estimated Capital Investment 12 months ending March 31, 2022
Electric Heat

Line No.			Fiscal Year Ending March 31, 2022 (a)
	Estimated Capital Investment		
1	Underground pipes for Ground Source Heat Pump		$0
2	Total Estimated Capital Investment	Sum Line 1	$0
	Depreciable Net Capital Included in Rate Base		
3	Total Allowed Capital Included in Rate Base in Current Year	Line 2	$0
4	Retirements	Line 3* 0%	$0
5	Net Depreciable Capital Included in Rate Base	Column (a) = Line 3 - Line 4	$0
	Change in Net Capital Included in Rate Base		
6	Capital Included in Rate Base	Line 2	$0
7	Cost of Removal		$0
8	**Total Net Plant in Service Including Cost of Removal**	**Line 5 + Line 7**	**$0**
	Tax Depreciation		
9	Vintage Year Tax Depreciation:		
10	2022 Spend	Page 7 of 10, Line 21	$0
11	Cumulative Tax Depreciation	Current Year Line 10	$0
	Book Depreciation		
12	Composite Book Depreciation Rate	As filed per R.I.P.U.C. Docket No. 4770	10.00%
13	Book Depreciation	Column (a) = Line 1 * Line 12 * 50%	$0
14	Cumulative Book Depreciation	Current Year Line 13	$0
15	Total Cumulative Book Depreciation	Line 14	$0
	Deferred Tax Calculation:		
16	Cumulative Book / Tax Timer	Line 11 - Line 15	$0
17	Effective Tax Rate		21.00%
18	Deferred Tax Reserve	Line 16 * Line 17	$0
19	Less: FY 2022 Federal NOL		$0
20	Less: Proration Adjustment	Col (a) = Page 10 of 10, Line 40	$0
21	Net Deferred Tax Reserve	Sum of Lines 18 through 20	$0
	Rate Base Calculation:		
22	Cumulative Incremental Capital Included in Rate Base	Line 8	$0
23	Accumulated Depreciation	- Line 15	$0
24	Deferred Tax Reserve	- Line 21	$0
25	Year End Rate Base	Sum of Lines 22 through 24	$0
	Revenue Requirement Calculation:		
26	Average Rate Base	Column (a) = Current Year Line 25 ÷ 2	$0
27	Pre-Tax ROR	1/	8.80%
28	Return and Taxes	Line 26 * Line 27	$0
29	Book Depreciation	Line 13	$0
30	Property Taxes	Tax Rate 3.176% MAL-7	$0
32	**Annual Revenue Requirement**	**Line 28 + Line 29 + Line 30**	**$0**

1/ Weighted Average Cost of Capital as file in R.I.P.U.C. Docket No. 4770, Schedule MAL-1-ELEC

	Ratio	Rate	Rate	Taxes	Return
Long Term Debt	48.47%	4.69%	2.27%		2.27%
Short Term Debt	0.45%	1.76%	0.01%		0.01%
Preferred Stock	0.11%	4.50%	0.00%		0.00%
Common Equity	50.97%	10.10%	5.15%	1.37%	6.52%
	100.00%		7.43%	1.37%	8.80%

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Tax Depreciation and Repairs Deduction on Fiscal Year 2022 Capital Investments
Electric Heat

Line No.			Fiscal Year Ending March 31, 2022 (a)
	Capital Repairs Deduction		
1	Plant Additions	Page 6 of 10, Line 2	$0
2	Capital Repairs Deduction Rate	Per Tax Department	0.00%
3	Capital Repairs Deduction	Line 1 * Line 2	$0
	Bonus Depreciation		
4	Plant Additions	Line 1	$0
5	Less Capital Repairs Deduction	Line 3	$0
6	Plant Additions Net of Capital Repairs Deduction	Line 4 - Line 5	$0
7	Percent of Plant Eligible for Bonus Depreciation	Per Tax Department	100.00%
8	Plant Eligible for Bonus Depreciation	Line 6 * Line 7	$0
9	Bonus Depreciation Rate (April 2021 - December 2021)	0%	0.00%
10	Bonus Depreciation Rate (January 2022 - Mar 2022)	0%	0.00%
11	Total Bonus Depreciation Rate	Line 9 + Line 10	0.00%
12	Bonus Depreciation	Line 8 * Line 11	$0
	Remaining Tax Depreciation		
13	Plant Additions	Line 1	$0
14	Less Capital Repairs Deduction	Line 3	$0
15	Less Bonus Depreciation	Line 12	$0
16	Remaining Plant Additions Subject to 5 YR MACRS Tax Depreciation	Line 13 - Line 14 - Line 15	$0
17	5 YR MACRS Tax Depreciation Rates	Per IRS Publication 946	20.00%
18	Remaining Tax Depreciation	Line 16 * Line 17	$0
19	FY22 Loss incurred due to retirements	Per Tax Department	$0
20	Cost of Removal	Page 6 of 10, Line 7	$0
21	Total Tax Depreciation and Repairs Deduction	Sum of Lines 3, 12, 18, and 20	$0

THE NARRAGANSETT ELECTRIC COMPANY
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The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2020 Net Deferred Tax Reserve Proration
Electric Heat

Line No.			(a)= column (b) Total	(b) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration			
1	Book Depreciation	Page 2 of 10, Line 13	$0	$0
2	Bonus Depreciation	Page 3 of 10, Line 12	$0	$0
3	Remaining MACRS Tax Depreciation	Page 3 of 10, Line 18	$0	$0
4	FY20 tax (gain)/loss on retirements	Page 3 of 10, Line 19	$0	$0
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	$0	$0
6	Effective Tax Rate	Per Tax Department	21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	$0	$0
	Deferred Tax Not Subject to Proration			
8	Capital Repairs Deduction	Page 3 of 10, Line 3	$0	$0
9	Cost of Removal	Page 3 of 10, Line 20	$0	$0
10	Book/Tax Depreciation Timing Difference at 3/31/2020		$0	$0
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0
12	Effective Tax Rate		21.00%	21.00%
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0
14	Total Deferred Tax Reserve	Line 7 + Line 13	$0	$0
15	Net Operating Loss	Page 2 of 10, Line 19	$0	$0
16	Net Deferred Tax Reserve	Line 14 + Line 15	$0	$0
	Allocation of FY 2020 Estimated Federal NOL			
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	$0	$0
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	$0	$0
20	Total FY 2020 Federal NOL	Line 15 * 21%	$0	$0
21	Allocated FY 2020 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0
22	Allocated FY 2020 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0
23	Effective Tax Rate	Per Tax Department	21.00%	21.00%
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	$0	$0

		(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l)	(l)
	Proration Calculation				
26	April 2019	30	91.78%	$0	$0
27	May 2019	31	83.29%	$0	$0
28	June 2019	30	75.07%	$0	$0
29	July 2019	31	66.58%	$0	$0
30	August 2019	31	58.08%	$0	$0
31	September 2019	30	49.86%	$0	$0
32	October 2019	31	41.37%	$0	$0
33	November 2019	30	33.15%	$0	$0
34	December 2019	31	24.66%	$0	$0
35	January 2020	31	16.16%	$0	$0
36	February 2020	28	8.49%	$0	$0
37	March 2020	31	0.00%	$0	$0
38	Total	365		$0	$0
39	Deferred Tax Without Proration	Line 25		$0	$0
40	Proration Adjustment	Line 38 - Line 39		$0	$0

Column Notes:

(j) Sum of remaining days in the year (Col (i)) ÷ 365
(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2021 Net Deferred Tax Reserve Proration
Electric Heat

Line No.			(a)= Sum of (b) through (c) Total	(b) Vintage Year March 31, 2021	(c) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration				
1	Book Depreciation	Col (b) = Page 4 of 10, Line 13 ;Col (c) = Page 2 of 10, Line 13	$0	$0	$0
2	Bonus Depreciation	Page 5 of 10, Line 12	$0	$0	
3	Remaining MACRS Tax Depreciation	Col (b) = Page 5 of 10, Line 18; Col (c) = Page 3 of 10, Line 18	$0	$0	$0
4	FY21 tax (gain)/loss on retirements	Col (b) = Page 5 of 10, Line 19; Col (c) = Page 3 of 10, Line 19	$0	$0	$0
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	$0	$0	$0
6	Effective Tax Rate	Per Tax Department	21.00%	21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	$0	$0	$0
	Deferred Tax Not Subject to Proration				
8	Capital Repairs Deduction	Page 5 of 10, Line 3	$0	$0	
9	Cost of Removal	Page 5 of 10, Line 20	$0	$0	
10	Book/Tax Depreciation Timing Difference at 3/31/2021		$0	$0	
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0	
12	Effective Tax Rate		21.00%	21.00%	
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0	
14	Total Deferred Tax Reserve	Line 7 + Line 13	$0	$0	$0
15	Net Operating Loss		$0	$0	$0
16	Net Deferred Tax Reserve	Line 14 + Line 15	$0	$0	$0
	Allocation of FY 2021 Estimated Federal NOL				
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	$0	$0	
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0	
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	$0	$0	
20	Total FY 2021 Federal NOL		$0	$0	
21	Allocated FY 2021 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0	
22	Allocated FY 2021 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0	
23	Effective Tax Rate	Per Tax Department	21.00%	21.00%	
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0	
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	$0	$0	$0

	Proration Calculation	(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l) through (m)	(l)	(m)
26	April 2020	30	91.78%	$0	$0	$0
27	May 2020	31	83.29%	$0	$0	$0
28	June 2020	30	75.07%	$0	$0	$0
29	July 2020	31	66.58%	$0	$0	$0
30	August 2020	31	58.08%	$0	$0	$0
31	September 2020	30	49.86%	$0	$0	$0
32	October 2020	31	41.37%	$0	$0	$0
33	November 2020	30	33.15%	$0	$0	$0
34	December 2020	31	24.66%	$0	$0	$0
35	January 2021	31	16.16%	$0	$0	$0
36	February 2021	28	8.49%	$0	$0	$0
37	March 2021	31	0.00%	$0	$0	$0
38	Total	365		$0	$0	$0
39	Deferred Tax Without Proration	Line 25		$0	$0	$0
40	Proration Adjustment	Line 38 - Line 39		$0	$0	$0

Column Notes:

(j) Sum of remaining days in the year (Col (i)) ÷ 365

(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Appendix 10.7 - Electric Heat

The Narragansett Electric Company
d/b/a National Grid
Power Sector Transformation (PST)
Calculation of Fiscal Year 2022 Net Deferred Tax Reserve Electric Proration
Electric Heat

Line No.			(a)=Sum of (b) through (d) Total	(b) Vintage Year March 31, 2022	(c) Vintage Year March 31, 2021	(d) Vintage Year March 31, 2020
	Deferred Tax Subject to Proration					
1	Book Depreciation	Col (b) = Page 6 of 10, Line 13; Col (c) = Page 4 of 10, Line 13 ;Col (d) = Page 2 of 10, Line 13	$0	$0	$0	$0
2	Bonus Depreciation	Page 7 of 10, Line 12	$0	$0		
3	Remaining MACRS Tax Depreciation	Col (b) = Page 7 of 10, Line 18; Col (c) = Page 5 of 10, Line 18; Col (c) = Page 3 of 10, Line 18	$0	$0	$0	$0
4	FY22 tax (gain)/loss on retirements	Page 7 of 10, Line 19	$0	$0		
5	Cumulative Book / Tax Timer	Sum of Lines 1 through 4	$0	$0	$0	$0
6	Effective Tax Rate	Per Tax Department	21.00%	21.00%	21.00%	21.00%
7	Deferred Tax Reserve	Line 5 * Line 6	$0	$0	$0	$0
	Deferred Tax Not Subject to Proration					
8	Capital Repairs Deduction	Page 5 of 10, Line 3	$0	$0		
9	Cost of Removal	Page 5 of 10, Line 20	$0	$0		
10	Book/Tax Depreciation Timing Difference at 3/31/2022		$0	$0		
11	Cumulative Book / Tax Timer	Line 8 + Line 9 + Line 10	$0	$0		
12	Effective Tax Rate		21.00%	21.00%		
13	Deferred Tax Reserve	Line 11 * Line 12	$0	$0		
14	Total Deferred Tax Reserve	Line 7 + Line 13	$0	$0	$0	$0
15	Net Operating Loss		$0	$0	$0	$0
16	Net Deferred Tax Reserve	Line 14 + Line 15	$0	$0	$0	$0
	Allocation of FY 2022 Estimated Federal NOL					
17	Cumulative Book/Tax Timer Subject to Proration	Col (b) = Line 5	$0	$0		
18	Cumulative Book/Tax Timer Not Subject to Proration	Line 11	$0	$0		
19	Total Cumulative Book/Tax Timer	Line 17 + Line 18	$0	$0		
20	Total FY 2022 Federal NOL		$0	$0		
21	Allocated FY 2022 Federal NOL Not Subject to Proration	(Line 18 / Line 19) * Line 20	$0	$0		
22	Allocated FY 2022 Federal NOL Subject to Proration	(Line 17 / Line 19) * Line 20	$0	$0		
23	Effective Tax Rate	Per Tax Department	21.00%	21.00%		
24	Deferred Tax Benefit subject to proration	Line 22 * Line 23	$0	$0		
25	Net Deferred Tax Reserve subject to proration	Line 7 + Line 24	$0	$0	$0	$0

		(i) Number of Days in Month	(j) Proration Percentage	(k)= Sum of (l) through (n)	(l)	(m)	(n)
	Proration Calculation						
26	April 2021	30	91.78%	$0	$0	$0	$0
27	May 2021	31	83.29%	$0	$0	$0	$0
28	June 2021	30	75.07%	$0	$0	$0	$0
29	July 2021	31	66.58%	$0	$0	$0	$0
30	August 2021	31	58.08%	$0	$0	$0	$0
31	September 2021	30	49.86%	$0	$0	$0	$0
32	October 2021	31	41.37%	$0	$0	$0	$0
33	November 2021	30	33.15%	$0	$0	$0	$0
34	December 2021	31	24.66%	$0	$0	$0	$0
35	January 2022	31	16.16%	$0	$0	$0	$0
36	February 2022	28	8.49%	$0	$0	$0	$0
37	March 2022	31	0.00%	$0	$0	$0	$0
38	Total	365		$0	$0	$0	$0
39	Deferred Tax Without Proration	Line 25		$0	$0	$0	$0
40	Proration Adjustment	Line 38 - Line 39		$0	$0	$0	$0

Column Notes:
(j) Sum of remaining days in the year (Col (i)) ÷ 365
(l) through (r) = Current Year Line 25 ÷ 12 * Current Month Col (j)

Division 32-19

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Please refer to Schedule PST – 1, Chapter 4 – AMF, Page 3 of 31, in which the Company seeks approval for FY19 costs of $2 million "to undertake the next phase of design, including further exploration of partnerships, stakeholder input, and other innovative program elements, and to undertake a procurement exercise."

a. Please describe the information that the Company anticipates gaining from a "further exploration of partnerships," and how such information would be factored into the Company's full AMI deployment proposal. Please provide an illustrative example with your response.
b. Please describe the process by which the Company proposes to solicit stakeholder input.
c. Please describe the "other innovative program elements" that the Company intends to explore.
d. Please describe the procurement exercise the Company intends to conduct and how such information would be factored into the Company's full AMI deployment proposal.
e. Please provide a table showing how the requested $2 million will be split among the categories listed above.

Response:

a. The Rhode Island Power Sector Transformation Phase One Report to Governor Gina Raimondo (November 2017) (the PST Phase One Report) recommended that the Company's AMF plan address shared communication infrastructure through partnerships to reduce costs.[1] In response, the Company commenced an effort to explore the value of a state-wide communications system with the external support from a consultant. Through this effort, the Company identified possible partners, as outlined on Page 15 of Schedule PST-1, Chapter 4 - AMF (Bates Page 83 of PST Book 1). The Company is planning to initiate a more detailed analysis and engage with interested parties during the Detailed Planning and Procurement phase of the AMF program in Fiscal Year 2019. If the Company finds willing partners, it may then explore ways to structure a potential partnership.

   In addition, as part of the procurement effort, the Company recently released a Request for Information (RFI), a copy of which is provided as Attachment DIV 32-19-1. The objective of the RFI is to qualify suppliers to receive the end-to-end Request for Solution (RFS) and to gather market intelligence. A number of questions were included in the RFI

[1] *See* PST Phase One Report, at 42 http://www.ripuc.org/utilityinfo/electric/PST%20Report_Nov_8.pdf.

that will further inform the Company on opportunities related to telecommunications partnering. This information will support development of the RFS and discussions with potential partners. The outcomes of these efforts will support the telecommunications recommendation to be included in the Company's December 1, 2018 AMF proposal in its inaugural annual PST plan.

b. The Company plans to follow a process similar to the one it will implement for Niagara Mohawk, which is described in the Company's response to NERI 20-9, a copy of which is provided as Attachment DIV 32-19-2 for ease of reference. The Rhode Island stakeholder plan schedule will consider the Docket No. 4780 procedural schedule and the desire to share feedback between the New York and Rhode Island stakeholder engagement activities.

c. The Company plans to assess opportunities for additional AMF functionalities and related benefits during the Detailed Planning and Procurement phase of the program. This assessment will be informed by the results of the RFI described in response to part a. above, the RFS responses, and the input of Accenture Consulting, which is supporting the development of the Company's AMF proposal. Additional functionalities identified for further exploration at this point include load disaggregation and gas demand response.

d. The Company plans to issue a RFS in April requesting vendor bids for an end-to-end AMF solution that includes the following elements:

- Meter equipment including smart electric meters and gas encoder-receiver-transmitters (ERTs);
- Field Area Network (FAN) to move meter data to National Grid and other service providers as required; and
- Information technology (IT) platform including the AMF head end, meter data management system, and other systems necessary for ongoing IT operations.

The RFS will be issued to qualify suppliers established by the RFI. The Company plans to select a vendor provider and AMF solution through this process and will refine the AMF business case and benefit-cost analysis proposal to include the specific solution functionality and vendor pricing.

e. The Company has not developed detailed cost estimates for each subcomponent of the study. Rather, the $2 million estimate was done at the departmental function level (*e.g.*, IS, cyber/digital security, CMS, legal), as set forth in the Attachment DIV 23-5, a copy of which is provided as Attachment DIV 32-19-3 for ease of reference, and not at the activity level (*e.g.*, customer engagement plan).

(This response is identical to the Company's response to Division 10-19 in Docket No. 4780.)

Prepared by or under the supervision of: John Leana

nationalgrid

Request for Information

Advanced Metering Functionality (AMF) Procurement and Business Case Support

National Grid

Request for Information

1.0 Introduction

National Grid ("Company") is a gas and electric investor-owned utility serving nearly 3.3 million electric and 3.5 million gas customers through its subsidiary companies in Massachusetts, New York and Rhode Island. As part of electric grid modernization proceedings and related activities in each state, the Company has filed grid modernizations plans that included the capabilities and related investments that the Company believes are required to achieve the state's modernization objectives. Advanced metering functionality/infrastructure (AMF/AMI) is a foundational element of the Company's modernization plans. The Company strongly believes that AMF/AMI will provide significant customer and grid side benefits and has filed business cases supported by benefit-cost analysis requesting regulatory approval to progress AMF/AMI implementation in all three state jurisdictions. The following is an overview of the filings and status in each state.

In Massachusetts, Massachusetts Electric Company and Nantucket Electric Company filed for electric AMF implementation as part of a grid-modernization program submitted in August 2015 to the Massachusetts Department of Public Utilities (D.P.U 15-120). Full, service territory-wide, targeted, and opt-in AMF options were presented for consideration. Massachusetts Electric Company and Nantucket Electric Company jointly filed an updated grid modernization filing with the Massachusetts Department of Public Utilities in June 2016, and the Department held evidentiary hearings in May 2017. The Department is not required to act on the filing within a specific period of time; however, a decision in this docket is expected during 2018.

In New York, Niagara Mohawk Power Corporation (NMPC) proposed service territory-wide electric and gas AMI deployment as part of its April 2017 rate case (Cases 17-E-0238 and 17-G-0239). The proposal contained a detailed business case and benefit-cost analysis. On January 19, 2018, NMPC, New York State Department of Public Service Staff, and various parties representing diverse interests entered into a Joint Proposal in which NMPC agreed to convene a collaborative to refine and update its AMI business case. Under the Joint Proposal, NMPC will file a report with the New York State Public Service Commission (NYPSC) that contains, among other things, a revised AMI business case by October 1, 2018 for NYPSC review and action.

In Rhode Island, Narragansett Electric and Gas filed a business case and benefit cost analysis for service territory wide electric and gas AMF implementation as part of its November 2017 rate case. AMF was included as an element of the Grid Modernization plan in the Power Sector Transformation (PST) section of the filing. The business case included an AMF benefit cost analysis for a Narragansett only implementation, and a joint Narragansett and Niagara Mohawk implementation to show potential synergies and cost savings to RI customers should AMF deployment in New York be approved by the state's Public Service Commission. The filing requests funding to develop a more detailed AMF implementation plan and generally aligns the decision process and deployment schedule for advancing AMF/AMI with Niagara Mohawk. The revised AMF deployment proposal is to be filed, along with other PST investments, no later than December 1, 2018 for PUC review and approval as part of the proposed PST investment recovery provision. The schedule provides time for continued collaboration with the Division and other interested parties on the Company's plan to implement AMI. The PUC has spun off PST (Docket 4780) from the main rate case and established a procedural schedule.

Summary of National Grid AMF/AMI Proposals

State/Company	Scope	End Points	Meter Deployment Plan[1]	
			Start Date	Duration
MA/ MA Electric	• Full/Targeted/Opt-in • Electric only	1.3 M electric	TBD	3-4 years
NY/Niagara Mohawk	• Territory-Wide • Gas & Electric	1.7 M electric 640 k gas ERTs	FY21 – FY22	4-years
RI/Narragansett Electric & Gas	• Territory-Wide • Gas & Electric	515 k electric 275 k gas ERTs	FY21	1½ years[2]

1 Current filed proposal projections, assumes an 18-month back-office systems implementation.
2 Gas ERTs are deployed based on the normal AMR replacement cycle of approximately 11-years.

2.0 Objectives

The Request for Information (RFI) is the preliminary process to qualify suppliers to receive the end-to-end Request for Solution (RFS) and to gather market intelligence. The RFS will ask vendors to provide an end-to-end AMF/AMI solution that includes;

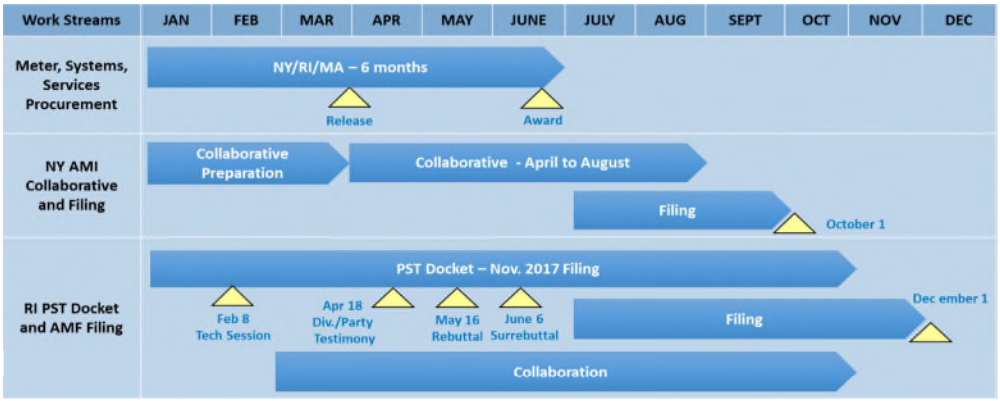
- Meter Equipment including smart electric meters and gas encoder-receiver-transmitters (ERTs);
- Field Area Network (FAN) to move meter data to National Grid and other service providers (if needed);
- IT platform including the AMI head end, meter data management system, and other systems necessary for ongoing IT operations.
- Data components, resolution and latency requirements for customer engagement and distribution applications

All suppliers will be notified of National Grid's decision to be included in RFS by **mid April, 2018**. The company plans to release the RFS by the end of **April, 2018**.

3.0 Timeline

a. Regulatory filings
The Company plans to make two regulatory filings in the last quarter of 2018 to request regulatory approval to implement AMF/AMI. The filings will contain, among other things, a revised AMI business case and benefit-cost analysis that considers input from stakeholder collaboration process and the results of the RFS. NMPC will file a report with the New York State Public Service Commission (NYPSC) by October 1, 2018 for NYPSC review and action. The Narragansett Electric and Gas AMF proposal is to be filed, along with other PST investments, no later than December 1, 2018 for PUC review and approval as part of the proposed PST investment recovery provision proposal.

Time-line of the in-scope activities is included in the below diagram.



4.0 Questions
In responding to the questions below do not include sales literature.

Please respond to question 1 with no more than five (5) pages. .

1. Explain your experience, including assembling partners as required, for developing AMF/AMI End to End solution proposals for gas and electric utilities that exceed 1M End Points. Describe awarded contracts and the nature of the program. Include references and contact information.

2. Please indicate if you would be interested in submitting a bid only for specific states or if you are interested in all three states.

Notwithstanding your response to question 1, please answer the following questions for market intelligence purposes with no more than a total of fifteen (15) pages.

3. Explain how your network currently supports or has plans to support (next 2 years) an open architecture and define what open architecture means to you.

4. What is your shortest measurement interval of the existing electric meter technology and expected future technologies (next 2 years).

5. Please describe your load disaggregation functionality for existing electric meter technology and expected future technologies (next 2 years).

6. Please describe the potential latency options for reading meters as it pertains to questions 3 and 4 above and also the process for end to end power outage notification/restoration processing including but not limited to latency.

7. Describe how your endpoints (if applicable) are capable of downloading non-proprietary applications. If so, which are currently in deployment?

8. Do your endpoints support IEC DLMS/COSEM protocol and/or ANSI C12.19? ANSI C12.19 protocols and have both been deployed?

9. Please explain how flexible your solution is with regards to the integration of third parties into your eco-system, i.e. telecom.

10. Please describe what innovative business solution approaches your company has proposed or implemented to maximize the value of an AMF deployment and reduce the implementation cost.

Please describe key AMF deployment best practices the company should consider in its business case.

11. Please describe if your company has experimented with different ownership models for different elements of the end-to-end solution. If so, please provide a high level description of the pro and cons of such models.

12. Define future proofing. What does this concept mean to you and how would your proposal support National Grid in hedging its technology risk over the 20 year life of these assets?

NERI 20-9

Request:

Reference Chapter 4, p. 5, describing the AMF program implementation and timeline, p. 2425, regarding process design, and the Company's statements during the 02/28 Tech Conference regarding stakeholder engagement in its Rhode Island and New York AMF program development processes.

a. Has the Company developed any proposed stakeholder engagement timelines and processes to engage Rhode Island stakeholders in its New York (Niagara Mohawk) AMI program development, and New York stakeholders it its Rhode Island AMF program development? If yes, please describe those proposed timelines and processes.

b. Does the Company plan to coordinate the New York and Rhode Island deployment processes? If so, please describe how.

Response:

a. In New York, Section 15.4 of the Joint Proposal, which was approved by the New York State Public Service Commission in its *Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plans* (issued and effective March 15, 2018) in Cases 17-E-0238 and 17-G-0239, sets forth the stakeholder engagement timeline for Niagara Mohawk Power Corporation's (NMPC) AMI program development. A summary of the timeline is provided in the following table:

New York NMPC Stakeholder Engagement Plan Summary

Key Activities	Objective	NY Timeline
1. Initial Large Group meeting to review and discuss current AMI proposal.	a. Achieve a common understanding of the business case proposal b. Identify areas requiring further exploration or refinement c. Identify areas requiring smaller Working Group sessions	By April 30, 2018
2. Refine and update AMI business plan and hold smaller Working Group sessions, as needed.	a. Perform additional research and analysis to refine identified areas of the business case b. Hold Working Group meetings to explore and develop common understanding of specific AMI proposal areas. c. Engage stakeholders in the development of the Customer engagement plan component of the business case	May – August 1, 2018

Prepared by or under the supervision of: John Leana

Key Activities	Objective	NY Timeline
3. Second Large Group collaborative meeting	a. Company presentation of refined and update business case addressing stakeholder identified areas b. Capture additional questions, comments, or proposed modifications for Company consideration	August 1, 2018
4. Third Large Group collaborative meeting	a. Seek clarification, as required, of party comments b. Provide new information, if any, to address party comments	August 30, 2018
5. Prepare and file refined AMI business case	a. Once the refined business case is filed, it would be subject to NY PSC approval.	October 1, 2018

In Rhode Island, the Company is developing a proposal that it plans to review with the Division of Public Utilities and Carriers and the Office of Energy Resources. The Rhode Island stakeholder plan proposal will consider the Docket No. 4780 procedural schedule and the desire to share feedback between the New York and Rhode Island stakeholder engagement activities.

b. Assuming both jurisdictions receive regulatory approval of deployment plans that share a similar implementation timeline, the Company would coordinate the Rhode Island deployment process with the New York deployment process. The approach will include a combination of centralized and jurisdiction-based program management that will be designed in detail following regulatory approval.

(This response is identical to the Company's response to NERI 3-9 in Docket No. 4780)

Prepared by or under the supervision of: John Leana

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Responses to Division's Twenty-Third Set of Data Requests
Issued February 12, 2018

Division 23-5

Request:

Please provide an itemization of the estimated costs used to develop the estimate for the cost of the AMI study. Please also provide an itemization of the estimated costs used to develop the estimates for the AMI study proposed for New York. If the Company expects the parts of the studies for both jurisdictions will have overlap, please also show the itemization on a combined basis.

Response:

The Company developed the $2 million estimate of Rhode Island AMI study costs by taking into consideration the estimate for the Niagara Mohawk Power Corporation (Niagara Mohawk) AMI study. Attachment DIV 23-5, Page 1, provides the itemization of the estimated costs of the AMI work activities that Niagara Mohawk plans to undertake in 2018 to continue the development of its AMI plan. Those costs are estimated at $2.988 million, as shown in the attachment. The Company expects to undertake similar activities and incur a similar level of costs in Rhode Island to advance the Rhode Island AMI plan. The itemization of estimated costs on a combined Rhode Island and Niagara Mohawk basis is included on Page 2 of Attachment DIV 23-5. The estimate for the combined study is $4.045 million.

(This response is identical to the Company's response to Division 7-5 in Docket No. 4780.)

Prepared by or under the supervision of: John Leana

Niagara Mohawk 2018 AMI Work Plan Activities and Estimated Costs

Activities	Scope	Required Functions													
		Project Lead/Staff	Procurement	IS	Cyber/ Digital Security	Meter Eng.	MDS	NESI/Customer	Pricing/Regulatory	CMS	Telecom	Meter Asset Mgmt.	Legal	Consultants	Total
Stakeholder Collaboration	Meeting preparation , documentation, follow-up Input to detailed plan elements Options development & analysis	X	AN	X	AN	X	X	X	X	X	AN	X	X	X	
Customer Engagement Plan	Customer education Data sharing : GBC/Portal Rate design pilots Collaboration/revenue opport. AMI opt-out Data privacy/Cyber	X		X	X		X	X	X				X	X	
Metrics	Measures/frequency Customer surveys	X					X	X	X	X					
Meter deployment plan	Geographic plan/logistics	X				X	X	X	X	X	X	X			
Organization and Process Change Assessment (Day-1 Readiness related)	Identify organization and process impacts	X			X	X	X	X		X	X	X		X	
Procurement	RFP SaaS vs own, Multi-comp	X	X	X	X	X	X	X	X	X	X	X		X	
Business Case/BCA filing	Revised business case	X						X	X			X	X		
FTEs	Annual estimate	3	1	1	0.25	0.5	0.5	1	1	0.5	0.5	1	0.5		10.75
Costs		**$ 498,900.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 41,575.00**	**$ 83,150.00**	**$ 83,150.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 83,150.00**	**$ 83,150.00**	**$ 166,300.00**	**$ 83,150.00**	**$ 1,200,000**	**$ 2,987,725.00**

AN - Function Support As Needed
X - Function Support Required

Rhode Island and Niagara Mohawk 2018 AMI Work Plan Activities and Estimated Costs

Activities	Scope	Required Functions													
		Project Lead/Staff	Procurement	IS	Cyber/ Digital Security	Meter Eng.	MDS	NESI/Customer	Pricing/Regulatory	CMS	Telecom	Meter Asset Mgmt.	Legal	Consultants	Total
Stakeholder Collaboration	Meeting preparation , documentation, follow-up Input to detailed plan elements Options development & analysis	X	AN	X	AN	X	X	X	X	X	AN	X	X	X	
Customer Engagement Plan	Customer education Data sharing : GBC/Portal Rate design pilots Collaboration/revenue opport. AMI opt-out Data privacy/Cyber	X		X	X		X	X	X				X	X	
Metrics	Measures/frequency Customer surveys	X					X	X	X	X					
Meter deployment plan	Geographic plan/logistics	X				X	X	X	X	X	X	X			
Organization and Process Change Assessment (Day-1 Readiness related)	Identify organization and process impacts	X			X	X	X	X		X	X	X		X	
Procurement	RFP SaaS vs own, Multi-comp	X	X	X	X	X	X	X	X	X	X	X		X	
Business Case/BCA filing	Revised business case	X						X	X			X	X		
FTEs	Annual estimate	3	1	1	0.5	0.5	1.5	1.5	1	0.5	1	1	1		13.5
Costs		**$ 498,900.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 83,150.00**	**$ 83,150.00**	**$ 249,450.00**	**$ 249,450.00**	**$ 166,300.00**	**$ 83,150.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 1,800,000.00**	**$ 4,045,050.00**

AN - Function Support As Needed
X - Function Support Required

Division 32-20

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Refer to Appendix 10.4 – AMI Stand Alone, Page 1 of 31 and Appendix 10.5 – AMI Shared, Page 1 of 31. Please provide columns similar to those included in the Annual Revenue Requirement General Summary tables documenting the cost elements for the $2 million for the Six Months Ended March 31, 2019. Please do this for both the AMI Stand Alone and AMI Shared expenses and costs.

Response:

Please refer to Attachment DIV 32-20-1 for the revenue requirement general summary which includes a column for the $2 million for the six months ending March 31, 2019 for the AMI study by cost element.

An itemization of the AMI study costs was presented in the Company's response to Division 23-5, a copy of which is provided as Attachment DIV 32-20-2. The combined AMI study for New York and Rhode Island is $4,045,050, of which $2 million was approved for recovery in the Niagara Mohawk Power Corporation (NMPC) rate case, Case No. 17-E-0238. Please see the summary below for the calculation of the Rhode Island revenue requirement for the AMI study.

Cost Element	Combined AMI Study Costs	NMPC	RI
Consultants	$1,800,000	$900,000	$900,000
Labor and associated benefits	$2,245,050	$1,122,525	$1,122,525
Total AMI Study Costs	$4,045,050	$2,022,525	$2,022,525
Rounded Down	$4,000,000	$2,000,000	$2,000,000

(This response is identical to the Company's response to Division 10-20 in Docket No. 4780.)

Prepared by or under the supervision of: John Leana

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
Power Sector Transformation (PST)
AMI
Annual Revenue Requirement General Summary

Line No.			Six Months Ending March 31, 2019	Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Electric Operation and Maintenance (O&M) Expenses:					
1	AMI Costs		$0	$3,975,282	$2,294,486	$4,277,539
2	CMS Costs		$0	$0	$0	$0
3	Meter Data Service Costs		$0	$0	$389,698	$802,778
4	Customer Engagement Plans Costs		$0	$925,740	$3,394,245	$2,004,136
5	IS Costs - Electric		$0	$4,364,767	$3,156,360	$4,695,673
6	AMI Study (Consultants)		$583,110	$0	$0	$0
7	AMI Study (Labor and associated benefits)		$712,690	$0	$0	$0
8	**Total Electric O&M costs**	Sum of Lines 1 through 7	**$1,295,800**	**$9,265,789**	**$9,234,790**	**$11,780,126**
	Gas Operation and Maintenance (O&M) Expenses:					
9	AMI Costs		$0	$1,323,178	$1,999	$3,080
10	CMS Costs		$0	$0	$0	$0
11	Meter Data Service Costs		$0	$0	$119,534	$246,239
12	Customer Engagement Plans Costs		$0	$0	$0	$0
13	IS Costs - Gas		$0	$2,372,024	$1,368,169	$949,645
14	AMI Study (Consultants)		$316,890	$0	$0	$0
15	AMI Study (Labor and associated benefits)		$387,310	$0	$0	$0
16	**Total Gas O&M costs**	Sum of Lines 9 through 15	**$704,200**	**$3,695,202**	**$1,489,702**	**$1,198,965**
	Total O&M costs		**$2,000,000**	**$12,960,991**	**$10,724,492**	**$12,979,091**
17	Electric Capital Investment:					
18	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2020 Capital Investment		$0	$121,193	$289,875	$280,621
19	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2021 Capital Investment				$3,602,929	$8,242,211
20	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2022 Capital Investment					$4,952,349
21	**Total Electric Capital Investment Component of Revenue Requirement**	Sum of Lines 17 through 20	**$0**	**$121,193**	**$3,892,804**	**$13,475,181**
22	Gas Capital Investment:					
23	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2020 Capital Investment		$0	$49,502	$118,051	$114,228
24	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2021 Capital Investment				$551,224	$1,110,783
25	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2022 Capital Investment					$23,802
26	**Total Gas Capital Investment Component of Revenue Requirement**	Sum of Lines 22 through 25	**$0**	**$49,502**	**$669,275**	**$1,248,814**
27	**Total Electric Revenue Requirement**	Line 8 + Line 21	**$1,295,800**	**$9,386,982**	**$13,127,594**	**$25,255,307**
28	**Total Gas Revenue Requirement**	Line 16 + Line 26	**$704,200**	**$3,744,704**	**$2,158,977**	**$2,447,779**
29	**Total Electric & Gas Revenue Requirement**	Line 27 + Line 28	**$2,000,000**	**$13,131,686**	**$15,286,571**	**$27,703,086**

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
Power Sector Transformation (PST)
AMI
Annual Revenue Requirement General Summary

Line No.			Fiscal Year Ending March 31, 2019	Fiscal Year Ending March 31, 2020 (a)	Fiscal Year Ending March 31, 2021 (b)	Fiscal Year Ending March 31, 2022 (c)
	Electric Operation and Maintenance (O&M) Expenses:					
1	AMI Costs		$0	$3,180,226	$2,285,684	$4,235,568
2	CMS Costs		$0	$0	$0	$0
3	Meter Data Service Costs		$0	$0	$389,698	$802,778
4	Customer Engagement Plans Costs		$0	$925,740	$3,394,245	$2,004,136
5	IS Costs - Electric		$0	$1,114,327	$1,452,916	$3,117,347
6	AMI Study (Consultants)		$583,110	$0	$0	$0
7	AMI Study (Labor and associated benefits)		$712,690	$0	$0	$0
8	**Total Electric O&M costs**	Sum of Lines 1 through 7	**$1,295,800**	**$5,220,293**	**$7,522,544**	**$10,159,829**
	Gas Operation and Maintenance (O&M) Expenses:					
9	AMI Costs		$0	$1,058,542	$1,999	$3,080
10	CMS Costs		$0	$0	$0	$0
11	Meter Data Service Costs		$0	$0	$119,534	$246,239
12	Customer Engagement Plans Costs		$0	$0	$0	$0
13	IS Costs - Gas		$0	$605,579	$524,139	$496,453
14	AMI Study (Consultants)		$316,890	$0	$0	$0
15	AMI Study (Labor and associated benefits)		$387,310	$0	$0	$0
16	**Total Gas O&M costs**	Sum of Lines 9 through 15	**$704,200**	**$1,664,121**	**$645,672**	**$745,772**
	Total O&M costs		**$2,000,000**	**$6,884,414**	**$8,168,216**	**$10,905,601**
17	Electric Capital Investment:					
18	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2020 Capital Investment		$0	$108,971	$260,642	$252,321
19	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2021 Capital Investment				$2,938,614	$6,938,558
20	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2022 Capital Investment					$4,889,954
21	**Total Electric Capital Investment Component of Revenue Requirement**	Sum of Lines 17 through 20	**$0**	**$108,971**	**$3,199,256**	**$12,080,833**
22	Gas Capital Investment:					
23	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2020 Capital Investment		$0	$42,756	$101,963	$98,661
24	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2021 Capital Investment				$202,067	$430,838
25	Estimated Revenue Requirement on Fiscal Year Ending March 31, 2022 Capital Investment					$21,494
26	**Total Gas Capital Investment Component of Revenue Requirement**	Sum of Lines 22 through 25	**$0**	**$42,756**	**$304,030**	**$550,993**
27	**Total Electric Revenue Requirement**	Line 8 + Line 21	**$1,295,800**	**$5,329,264**	**$10,721,800**	**$22,240,662**
28	**Total Gas Revenue Requirement**	Line 16 + Line 26	**$704,200**	**$1,706,877**	**$949,702**	**$1,296,765**
29	**Total Electric & Gas Revenue Requirement**	Line 27 + Line 28	**$2,000,000**	**$7,036,141**	**$11,671,502**	**$23,537,427**

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Responses to Division's Twenty-Third Set of Data Requests
Issued February 12, 2018

Division 23-5

Request:

Please provide an itemization of the estimated costs used to develop the estimate for the cost of the AMI study. Please also provide an itemization of the estimated costs used to develop the estimates for the AMI study proposed for New York. If the Company expects the parts of the studies for both jurisdictions will have overlap, please also show the itemization on a combined basis.

Response:

The Company developed the $2 million estimate of Rhode Island AMI study costs by taking into consideration the estimate for the Niagara Mohawk Power Corporation (Niagara Mohawk) AMI study. Attachment DIV 23-5, Page 1, provides the itemization of the estimated costs of the AMI work activities that Niagara Mohawk plans to undertake in 2018 to continue the development of its AMI plan. Those costs are estimated at $2.988 million, as shown in the attachment. The Company expects to undertake similar activities and incur a similar level of costs in Rhode Island to advance the Rhode Island AMI plan. The itemization of estimated costs on a combined Rhode Island and Niagara Mohawk basis is included on Page 2 of Attachment DIV 23-5. The estimate for the combined study is $4.045 million.

(This response is identical to the Company's response to Division 7-5 in Docket No. 4780.)

Prepared by or under the supervision of: John Leana

Niagara Mohawk 2018 AMI Work Plan Activities and Estimated Costs

Activities	Scope	Required Functions													
		Project Lead/Staff	Procurement	IS	Cyber/ Digital Security	Meter Eng.	MDS	NES/Customer	Pricing/Regulatory	CMS	Telecom	Meter Asset Mgmt.	Legal	Consultants	Total
Stakeholder Collaboration	·Meeting preparation , documentation, follow-up ·Input to detailed plan elements ·Options development & analysis	X	AN	X	AN	X	X	X	X	X	AN	X	X	X	
Customer Engagement Plan	·Customer education ·Data sharing : GBC/Portal ·Rate design pilots ·Collaboration/revenue opport. ·AMI opt-out ·Data privacy/Cyber	X		X	X		X	X	X				X	X	
Metrics	·Measures/frequency ·Customer surveys	X					X	X	X	X					
Meter deployment plan	·Geographic plan/logistics	X				X	X	X	X	X	X	X			
Organization and Process Change Assessment (Day-1 Readiness related)	·Identify organization and process impacts	X			X	X	X	X		X	X	X		X	
Procurement	·RFP ·SaaS vs own, Multi-comp	X	X	X	X	X	X	X	X	X	X	X		X	
Business Case/BCA filing	·Revised business case	X						X	X			X	X		
FTEs	·Annual estimate	3	1	1	0.25	0.5	0.5	1	1	0.5	0.5	1	0.5		10.75
Costs		**$ 498,900.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 41,575.00**	**$ 83,150.00**	**$ 83,150.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 83,150.00**	**$ 83,150.00**	**$ 166,300.00**	**$ 83,150.00**	**$ 1,200,000**	**$ 2,987,725.00**

AN - Function Support As Needed
X - Function Support Required

Rhode Island and Niagara Mohawk 2018 AMI Work Plan Activities and Estimated Costs

Activities	Scope	Required Functions													
		Project Lead/Staff	Procurement	IS	Cyber/ Digital Security	Meter Eng.	MDS	NES/Customer	Pricing/Regulatory	CMS	Telecom	Meter Asset Mgmt.	Legal	Consultants	Total
Stakeholder Collaboration	Meeting preparation , documentation, follow-up Input to detailed plan elements Options development & analysis	X	AN	X	AN	X	X	X	X	X	AN	X	X	X	
Customer Engagement Plan	Customer education Data sharing : GBC/Portal Rate design pilots Collaboration/revenue opport. AMI opt-out Data privacy/Cyber	X		X	X		X	X	X				X	X	
Metrics	Measures/frequency Customer surveys	X					X	X	X	X					
Meter deployment plan	Geographic plan/logistics	X				X	X	X	X	X	X	X			
Organization and Process Change Assessment (Day-1 Readiness related)	Identify organization and process impacts	X			X	X	X	X		X	X	X		X	
Procurement	RFP SaaS vs own, Multi-comp	X	X	X	X	X	X	X	X	X	X	X		X	
Business Case/BCA filing	Revised business case	X						X	X			X	X		
FTEs	Annual estimate	3	1	1	0.5	0.5	1.5	1.5	1	0.5	1	1	1		13.5
Costs		**$ 498,900.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 83,150.00**	**$ 83,150.00**	**$ 249,450.00**	**$ 249,450.00**	**$ 166,300.00**	**$ 83,150.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 166,300.00**	**$ 1,800,000.00**	**$ 4,045,050.00**

AN - Function Support As Needed
X - Function Support Required

Division 32-21

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Refer to PST Appendix 4.2 regarding benefits from VVO/AMF integration and the Company's proposal to invest in Feeder Monitoring Sensors:

a. Please describe the information that the subset of AMF meters acting as end-of-line sensors will provide to the Company, and how that information will be used to provide benefits to the grid.
b. Please describe the information that the Company's proposed feeder monitoring sensors will provide to the Company, and how that information will be used to provide benefits to the grid.
c. Please describe and quantify the value of the benefits provided by the feeder monitoring sensors that are incremental to those provided by the subset of AMF meters acting as end-of-line sensors.
d. Please discuss whether using AMF meters as sensors could reduce or obviate the investment in feeder monitoring sensors.

Response:

a. In addition to normal customer usage information, the subset of AMF meters acting as "end-of-line" sensors would provide the Company's VVO/CVR control system with the interval voltage information at the customer service location (at the meter). It is important to note that, although the term "end-of-line" is used, it does not mean to imply these meters are necessarily physically located at the end of the circuit, nor always the same meter. This subset of meters represents the locations that experience the lowest voltage on the circuit, and are generally towards the end of the line, but could also be located before a mid-line regulator, or other locations on the circuit. Using the AMF deployment, the lowest voltage meters on the circuit will be used to inform the VVO/CVR control system of how much voltage is still available for voltage reduction.

b. The feeder monitors, as described in Schedule PST-1, Chapter 3 – Modern Grid of the Company's Power Sector Transformation (PST) Plan, are sensors which measure the voltage and current, and therefore real and reactive power, of the primary distribution circuit. These monitors are attached to the 15KV class primary conductors and are targeted at the 133 circuits which currently do not have primary interval metering at the substation. This interval metering will be reported to the Company's SCADA and EMS/ADMS systems. This information will enhance the "situational awareness" of the Company's control room operator, as well as provide additional information to

Distribution Planning to inform future infrastructure investments. Where possible and appropriate, this data may also be integrated into the Company's VVO/CVR system.

c. The feeder monitoring sensors and AMF meters provide different information to the Company and have different benefits as described in the Company's responses to parts a. and b. above. With respect to the VVO/CVR program proposed in the Company's Fiscal Year 2019 Electric Infrastructure, Safety, and Reliability (ISR) Plan, the Company estimated as part of the AMF business case that the AMF customer voltage information would provide an incremental one percent energy reduction benefit.

d. As discussed above, these two programs are independent and provide different benefits to the Company.

(This response is identical to the Company's response to Division 10-21 in Docket No. 4780.)

Prepared by or under the supervision of: John Leana

Division 32-22

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Please provide PST Appendixes 10.1 through 10.9 in native format with all formulas intact, including all revisions made in response to Division 19-8.

Response:

Please see Attachment DIV 32-22 for the Excel files for PST Appendices 10.1 through 10.9 in native form with all formulas intact, including all revisions made in response to Division 19-8.

Attachment Name	**File Name**
DIV 32-22-1	Appendix 10.1
	Appendix 10.2
DIV 32-22-2A	02-Rev Req_Grid Mod RI Only workstream _AA
DIV 32-22-2B	02-RevReq_Grid Mod RI Only workstream _Cybersecurity
DIV 32-22-2C	02-RevReq_Grid Mod RI Only workstream _DataLake
DIV 32-22-2D	02-Rev Req_Grid Mod RI Only workstream_DSCADA
DIV 32-22-2E	02-RevReq_Grid Mod RI Only workstream _ESB
DIV 32-22-2F	02-RevReq_Grid Mod RI Only workstream _Feeder
DIV 32-22-2G	02-RevReq_Grid Mod RI Only workstream_GIS(BR)
DIV 32-22-2H	02-Rev Req_Grid Mod RI Only workstream_GIS(IS)
DIV 32-22-2I	02-RevReq_Grid Mod RI Only workstream _PIHistorian
DIV 32-22-2J	02-Rev Req_Grid Mod RI Only workstream _RTUSeparation
DIV 32-22-2K	02-RevReq_Grid Mod RI Onlyworkstream _SystemData
DIV 32-22-2L	02-Rev Req_Grid Mod RI Only workstream _Telecom
DIV 32-22-2M	Summary GridMod Projects Breakout - RI Only
	Appendix 10.3
DIV 32-22-3A	02-Rev Req_Grid Mod Synergy workstream_AA
DIV 32-22-3B	02-Rev Req_Grid Mod Synergy workstream_Cybersecurity
DIV 32-22-3C	02-Rev Req_Grid Mod Synergy workstream_DataLake
DIV 32-22-3D	02-Rev Req_Grid Mod Synergy workstream_DSCADA
DIV 32-22-3E	02-Rev Req_Grid Mod Synergy workstream_ESB
DIV 32-22-3F	02-Rev Req_Grid Mod Synergy workstream_Feeder
DIV 32-22-3G	02-Rev Req_Grid Mod Synergy workstream_GIS(BR)
DIV 32-22-3H	02-Rev Req_Grid Mod Synergy workstream_GIS(IS)

Prepared by or under the supervision of: Melissa Little

Attachment Name	File Name
DIV 32-22-3I	02-Rev Req_Grid Mod Synergy workstream_PIHistorian
DIV 32-22-3J	02-Rev Req_Grid Mod Synergy workstream_RTUSeparation
DIV 32-22-3K	02-Rev Req_Grid Mod Synergy workstream_SystemData
DIV 32-22-3L	02-Rev Req_Grid Mod Synergy workstream_Telecom
DIV 32-22-3M	Summary GridMod Projects Breakout - Synergy
DIV 32-22-4	Appendix 10.4
DIV 32-22-5	Appendix 10.5
DIV 32-22-6	Appendix 10.6
DIV 32-22-7	Appendix 10.7
DIV 32-22-8	Appendix 10.8
DIV 32-22-9	Appendix 10.9

(This response is identical to the Company's response to Division 10-22 in Docket No. 4780).

Prepared by or under the supervision of: Melissa Little

Division 32-23

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Refer to Attachment DIV 19-8-3. In this attachment, the Company includes GIS Data Enhancement (IS) costs in its first year revenue requirements. Please clarify whether the Company is seeking Commission approval of those costs in the instant proceeding, in the same way that the Company is seeking Commission approval of $2,000,000 in AMF planning costs.

Response:

Yes. The Company is seeking Public Utilities Commission (PUC) approval of the GIS Data Enhancement costs in its first year revenue requirements, in the same way that the Company is seeking PUC approval of $2,000,000 in AMF planning costs. The Company responded in Division 19-12 that it is seeking to recover operating and maintenance costs associated with the GIS Data Enhancement project. On March 14, 2018, the Company's New York affiliate, Niagara Mohawk Power Corporation, received approval from the New York Public Service Commission to move forward with its GIS Data Enhancement project. Therefore, the Company proposes to move forward with a Multi-Jurisdictional deployment and is seeking approval of $427,000 in its first year revenue requirements for the GIS Data Enhancement project presented in the table on Page 1 of 2 of Attachment DIV 19-8-3.

(This response is identical to the Company's response to Division 10-23 in Docket No. 4780.)

Prepared by or under the supervision of: Robert Sheridan

Division 32-24

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Refer to response to Attachment DIV 5-38:

a. For each substation for which 3V0 protection is proposed, pending, has been installed, or is in the process of being installed, please describe the criteria or conditions that occurred, or were forecast to occur, that the Company used to determine that 3V0 protection was warranted. Please support your response with relevant data, such as the existing quantity of DG as a percentage of the transformer capacity or the number of occurrences of reverse power flow.
b. For each substation that has been upgraded to 3V0 protection, please provide the cost of the upgrade.
c. Attachment DIV 5-38 appears to show 339 MW of distributed generation interconnected to the distribution grid. Please confirm that this is accurate. If not, please explain.
d. Please provide the capacity of distributed generation interconnected to the Company's distribution grid by fuel type, date of approval to interconnect, and rate class.
e. Please discuss the level of visibility and control the Company currently has with respect to various types of solar distributed generation. For example, for projects 1 MW or larger, does the Company have any real-time visibility or the ability to curtail exports to the grid from the project?
f. Please discuss in detail how the Company's proposed grid-side investments to enable DER would change the level of visibility and control for solar PV. Would the level of visibility and control vary by project size?
g. Please discuss whether the Company's proposed grid-side investments would have any impact on the need to install additional 3V0 protection through the use of better monitoring or control devices, or any other capabilities.
h. Please provide the Company's forecast of customer-owned distributed generation growth over the next five years.

Response:

a. The substations for which 3V0 protection has been proposed, pending, has been installed, or is in the process of being installed, were selected based on their ratio of distributed generation to minimum load. The Company's criteria for determining the need for 3V0 compares the maximum generation of a feeder to the minimum load and then assumes an N-1 contingency (*i.e.*, one feeder with largest load being open on the same bus). If that ratio exceeds 67 percent, the Company begins the evaluation of requiring 3V0 protection

of the substation power transformer because the substation bus could be in an unintentional island operation.

Attachment DIV 5-38 provided with the Company's response to Division 5-38, a copy of which is provided as Attachment DIV 32-24-1 for ease of reference, shows the capacity of distributed generation (DG) installations, ground fault detection details, and when 3V0 installation is planned.

b. The cost for upgrading Chase Hill and Chopmist substations are provided below:

i. Transformer T2 (115/12.47 kV) of Chase Hill was upgraded with 3V0 protection in 2017. The approximate cost of the project was $162,000.

ii. Transformer T3 (23/12.47 kV) of Chopmist substation was upgraded with 3V0 protection in 2017. The approximate cost of the project was $112,000.

c. The 339 MW of DG in Attachment DIV 5-38 includes DG that is already interconnected to the distribution system as well as any pending applications. This number was calculated based on available information as of September 2017.

d. Please refer to Attachment DIV 32-24-2 for the capacity of DG interconnected to the Company's distribution system by fuel type, date of approval to interconnect, and rate class.

e. Solar sites 1MW and greater have reclosers installed at the point of common coupling. These reclosers are equipped with communication features that allow for remote monitoring of total site output, as well as remote tripping capabilities. The Company currently does not actively use these assets for the purpose of curtailing site output for adjustment of overall system performance. Instead these are used for general site monitoring and informative purposes should the need arise for system switching or other operational needs that are not necessarily related to DG activity. Today, sites are typically only remotely opened when required for necessary system operational needs and circumstances. In the future, as saturation of DG continues to grow, there will increasingly be a possibility that some level of curtailment may be needed to maintain power quality and reliability of the electric distribution system.

f. The Company's proposed grid-side investments include sensors for monitoring to provide real time information at the head end of feeders and integration with SCADA and a future distribution management system. The Company has not proposed monitoring and control investments for specific interconnections in its Power Sector Transformation (PST)

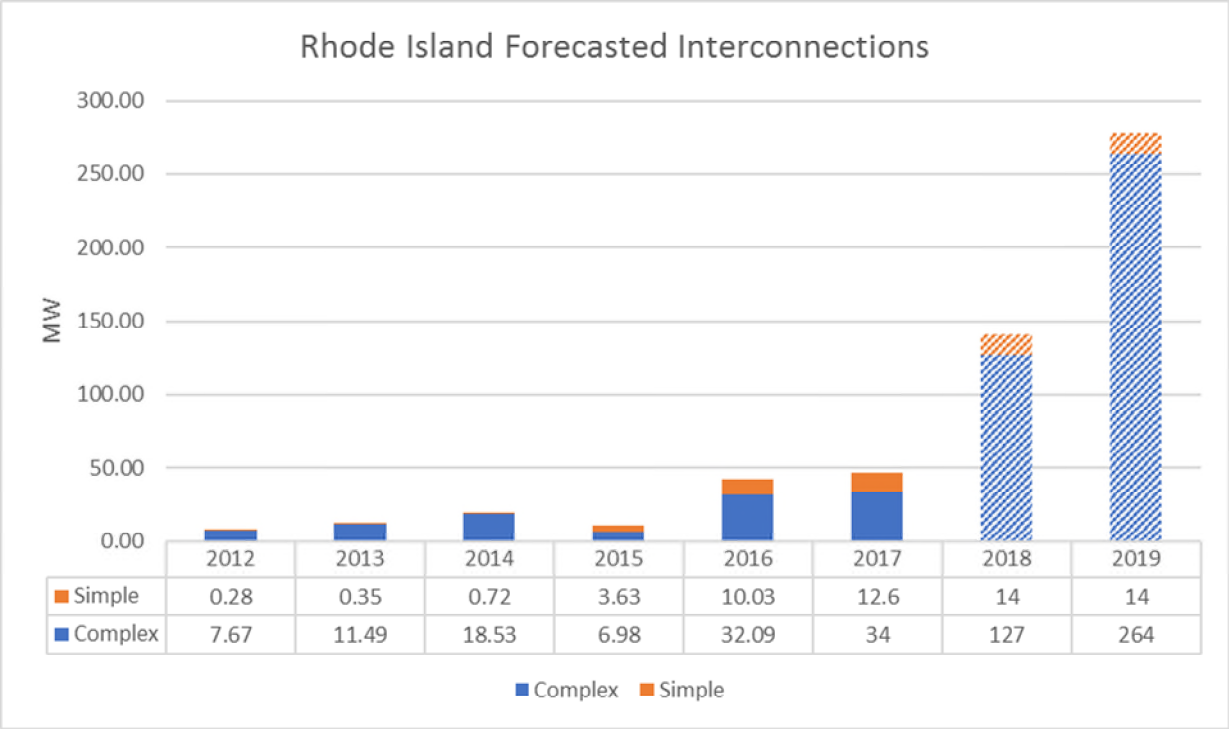
Plan. Any necessary monitoring and control for a specific interconnection is determined as part of an interconnection study and may vary by project size.

g. No. The proposed grid side investments do not obviate the need for the 3V0 protection to protect the system during conditions in which there is power being delivered in the reverse direction through our substation transformers.

h. The Company does not have a forecast of customer-owned DG growth over the next five years. Figure 1 shows the Company's forecast of customer-owned DG growth over the current calendar year, 2018, and the next calendar year, 2019. Based on updated customer required-by dates, the Company is forecasting 141 MW to be interconnected in 2018. In 2019, the Company is projecting 278 MW to be interconnected, for a two-year total of 419 MWs. The 2019 forecast was developed by applying the new legislated timelines to currently-received projects and forecasting based on historical trends for future projects. A historical cancellation rate was then applied to that total MW resulting in the 278 MW amount.

These updated numbers differ from the original 2018 and 2019 projections in the Company's initial filing in Docket No. 4770, Book 4. In the High Case scenario included in that filing, the Company was projecting 210 MWs in both years for a total of 420 MWs over the two years. Given that the two-year total remains essentially the same with updated information, this update does not impact the Company's need for additional resources for DG interconnection discussed in the filing.

Figure 1:



	2012	2013	2014	2015	2016	2017	2018	2019
Simple	0.28	0.35	0.72	3.63	10.03	12.6	14	14
Complex	7.67	11.49	18.53	6.98	32.09	34	127	264

2018 forecast includes January and February actuals

(This response is identical to the Company's response to Division 10-24 in Docket No. 4780.)

Substation	DG kWs	Notes	Subpart	Projected 3V0 in-service Date
Chopmist	33969	3V0/protection installed or in progress	b	T1, T3 - existing, T2 - TBD
Coventry	7417	3V0/protection installed or in progress	b	2018
Dexter	12818	3V0/protection installed or in progress	b	2020
Kenyon	12064	3V0/protection installed or in progress	b	2018
Kilvert St	9838	3V0/protection installed or in progress	b	T2 - 2018, T1 - 2020
West Cranston	17023	3V0/protection installed or in progress	b	2019
Wood River	34205	3V0/protection installed or in progress	b	2019
Hopkins Hill	9311	3V0 proposed or pending	c	2020
Lafayette	2228	3V0 proposed or pending	c	2023
Nasonville	7803	3V0 proposed or pending	c	TBD
Old Baptist Road	3251	3V0 proposed or pending	c	T2 - 2018, T1 - 2020
Peacedale	4819	3V0 proposed or pending	c	2021
Point Street	5397	3V0 proposed or pending	c	2022
Pontiac	938	3V0 proposed or pending	c	2021
Quonset	7200	3V0 proposed or pending	c	2022
Riverside	3187	3V0 proposed or pending	c	2023
Staples	7157	3V0 proposed or pending	c	2021
Tiverton	7539	3V0 proposed or pending	c	2019
Warwick Mall	756	3V0 proposed or pending	c	2023
Davisville	14838	Existing ground fault sensing	d	existing
Drumrock	21321	Existing ground fault sensing	d	existing
Johnston	29914	Existing ground fault sensing	d	existing
Kent County	8025	Existing ground fault sensing	d	existing
West Kingston	6880	Existing ground fault sensing	d	existing
Woonsocket	7640	Existing ground fault sensing	d	existing
Chase Hill	3506	Completed new substation (3V0/protection included)	e	existing
Admiral Street (12kV)	NA	Pending new/rebuild (3V0/protection to be included)		2025
Anthony	673			TBD
Auburn (12kV)	NA	Pending new/rebuild (3V0/protection to be included)		2028
Bonnet	104			TBD
Bristol	477			TBD
Central Falls	7			TBD
Centredale	51			TBD
Clarke Street	157			TBD
Clarkson Street	523			TBD
Division St	1903			TBD
Dyer Street	122			TBD
East George St	57			TBD
East Providence	NA	Pending new/rebuild (3V0/protection to be included)		2022
Eldred	290			TBD
Elmwood	180			TBD
Farnum	60			TBD
Farnum Pike	2695			TBD
Gate Two	567			TBD
Harrison	105			TBD
Highland Park	260			TBD
Hope	643			TBD
Hospital	49			TBD
Hunt River	129			TBD
Jepson	30807	Pending new/rebuild (3V0/protection to be included)		2021
Kingston	72			TBD
Knightsville	55			TBD
Langworthy Corner	166			TBD
Lincoln Avenue	321			TBD
Lippitt Hill	273			TBD

Substation	DG kWs	Notes	Subpart	Projected 3V0 in-service Date
Manton	132			TBD
Merton	7			TBD
Natick	67			TBD
New London Ave	NA	Pending new/rebuild (3V0/protection to be included)		2018
Newport	NA	Pending new/rebuild (3V0/protection to be included)		2020
Pawtucket 1	1643			TBD
Pawtucket 2	20			TBD
Putnam Pike	2851			TBD
Shun Pike	NA			TBD
Southeast (13kV)	NA	Pending new/rebuild (3V0/protection to be included)		2022
Tiogue Ave	44			TBD
Tower Hill	4888			2018
Valley	1151			TBD
Wakefield	380			TBD
Wampanoag	2485			TBD
Warren	941			TBD
Warwick	218			TBD
Washington	4358			TBD
West Greenville	108			TBD
West Howard	24			TBD
Westerly	291			TBD

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
RI-000204	1/1/1984	Hydro	C-06	370.0
RI-000203	3/1/1985	Hydro	C-06	1200.0
RI-000206	1/1/1989	Hydro	C-06	1800.0
RI-000090	7/31/1998	Solar	A-16	0.5
RI-000083	9/3/1998	Solar	A-16	1.0
RI-000205	10/1/1998	Methane	C-06	235
NECO-000026	7/22/1999	Solar	A-16	2.1
RI-000116	9/9/1999	Solar	G-32	58.0
RI-000084	12/31/1999	Solar	A-16	4.0
RI-000085	6/15/2000	Solar	A-16	1.4
RI-000086	7/1/2000	Solar	A-16	0.3
RI-000088	10/1/2000	Solar	A-16	5.0
NECO-000035	6/21/2001	Solar	A-16	1.1
NECO-000036	11/1/2001	Solar	A-16	1.8
NECO-000037	1/1/2002	Solar	G-32	2.0
NECO-000034	3/12/2002	Solar	G-02	5.8
NECO-000033	5/1/2002	Solar	G-32	2.0
NECO-000031	8/15/2002	Solar	G-32	2.0
NECO-000032	8/15/2002	Solar	G-02	2.0
NECO-000030	2/3/2003	Solar	A-16	2.5
NECO-000003	8/1/2003	Solar	A-16	3.6
NECO-000002	8/4/2003	Wind	A-16	10.0
NECO-000004	10/6/2003	Solar	A-16	3.0
NECO-000006	1/15/2004	Solar	A-16	3.0
NECO-000007	5/14/2004	Solar	G-02	8.0
NECO-000014	9/10/2004	Solar	A-16	8.4
NECO-000024	9/17/2004	Solar	G-32	3.6
NECO-000025	9/17/2004	Solar	G-32	9.0
NECO-000012	9/29/2004	Natural Gas	G-62	240
NECO-000001	10/27/2004	Solar	A-16	10.5
NECO-000008	10/28/2004	Solar	A-16	5.0
NECO-000023	11/9/2004	Solar	A-16	5.3
RI-000004	1/7/2005	Solar	A-16	2.7
NECO-000009	3/9/2005	Solar	G-02	1.8
NECO-000018	5/5/2005	Solar	G-32	1.8
NECO-000010	5/10/2005	Solar	G-02	20.0
RI-000001	5/25/2005	Solar	A-16	10.0
NECO-000027	5/27/2005	Solar	A-16	4.0
RI-000087	6/1/2005	Solar	A-16	3.0
NECO-000022	6/2/2005	Solar	C-06	15.0
NECO-000011	6/21/2005	Solar	A-16	9.0
NECO-000015	8/10/2005	Solar	A-16	4.5
NECO-000021	8/12/2005	Solar	A-16	2.9
NECO-000020	8/12/2005	Solar	A-16	7.3
NECO-000016	8/24/2005	Solar	A-16	5.1
NECO-000017	8/24/2005	Solar	A-16	5.1
RI-000007	10/25/2005	Solar	G-62	1.0
RI-000045	10/27/2005	Solar	A-16	4.0
RI-000010	10/27/2005	Solar	G-02	5.0
RI-000006	12/12/2005	Solar	A-16	3.1
NECO-000028	12/29/2005	Solar	G-32	24.9
RI-000069	12/31/2005	Solar	A-16	5.6
RI-000044	1/1/2006	Solar	C-06	3.0
RI-000089	1/1/2006	Solar	A-16	5.2
RI-000041	1/26/2006	Solar	C-06	1.1
RI-000027	1/27/2006	Solar	A-16	6.0
RI-000033	1/27/2006	Solar	A-16	6.8
RI-000038	2/7/2006	Solar	A-16	3.4
RI-000031	2/20/2006	Solar	A-16	5.1
RI-000005	3/2/2006	Solar	A-16	4.0
NECO-000013	3/17/2006	Solar	A-16	5.3
RI-000012	3/31/2006	Solar	C-06	5.9
NECO-000019	4/1/2006	Wind	G-32	660.0
RI-000011	4/7/2006	Solar	A-16	4.0
RI-000032	4/14/2006	Solar	A-16	4.6
RI-000008	4/14/2006	Solar	A-16	10.5
RI-000014	4/17/2006	Solar	A-16	4.0
RI-000026	4/27/2006	Solar	A-16	4.0
RI-000030	4/27/2006	Solar	A-16	4.2
NECO-000029	5/1/2006	Solar	C-06	50.0
RI-000039	5/9/2006	Solar	A-16	4.6
RI-000016	5/9/2006	Solar	A-16	5.7
RI-000022	5/18/2006	Solar	A-16	4.0
RI-000003	6/2/2006	Solar	A-16	5.1
RI-000025	7/5/2006	Solar	A-16	3.4
RI-000019	7/26/2006	Solar	A-16	3.3
RI-000021	7/26/2006	Solar	A-16	3.8
RI-000020	7/26/2006	Solar	A-16	5.3
RI-000017	7/26/2006	Solar	A-16	5.9
RI-000024	8/17/2006	Solar	A-16	3.8
RI-000054	8/31/2006	Solar	G-02	1.8
RI-000040	9/16/2006	Solar	A-16	5.7
RI-000028	10/10/2006	Solar	A-16	3.1
RI-000002	10/30/2006	Solar	A-60	5.3
RI-000013	10/30/2006	Solar	A-16	6.9
RI-000036	11/2/2006	Solar	A-16	1.4
RI-000051	12/1/2006	Solar	A-16	4.2
RI-000035	12/11/2006	Solar	A-16	6.3

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RI-000018	12/19/2006	Solar	A-16	3.3
RI-000009	12/19/2006	Solar	A-16	4.0
RI-000070	12/19/2006	Natural Gas	C-06	360
RI-000042a	1/11/2007	Solar	A-16	5.9
RI-000042b	1/11/2007	Solar	A-16	5.9
RI-000046	1/11/2007	Solar	A-16	6.4
RI-000023	1/12/2007	Solar	A-16	1.7
RI-000049	1/31/2007	Solar	G-02	2.0
RI-000050	2/1/2007	Solar	G-02	2.0
RI-000043	2/2/2007	Solar	A-16	3.4
RI-000052	2/6/2007	Solar	A-16	5.9
RI-000037	2/16/2007	Solar	A-16	5.7
RI-000053	6/11/2007	Solar	C-06	15.5
13252188	7/5/2007	Wind	A-16	2.5
RI-000059	7/6/2007	Solar	G-32	2.0
RI-000060	7/6/2007	Solar	G-32	2.0
RI-000062	7/19/2007	Solar	C-06	3.1
RI-000073	8/28/2007	Solar	A-16	3.0
RI-000071	9/25/2007	Solar	A-16	3.2
RI-000056	9/26/2007	Solar	G-02	19.4
RI-000061	9/27/2007	Solar	G-32	2.0
RI-000074	10/1/2007	Solar	A-16	1.8
13252183	10/10/2007	Solar	A-16	3.0
RI-000072	10/12/2007	Solar	A-16	2.5
RI-000077	10/22/2007	Solar	A-16	3.7
RI-000080	10/23/2007	Wind	A-16	2.4
RI-000078	10/29/2007	Solar	A-16	7.6
RI-000082	11/7/2007	Solar	A-16	2.8
RI-000079	11/16/2007	Solar	G-02	24.5
RI-000081	12/7/2007	Solar	A-16	4.2
RI-000058	12/13/2007	Solar	C-06	1.6
RI-000057	12/31/2007	Solar	A-16	3.2
RI-000055	12/31/2007	Solar	A-16	7.0
RI-000068	3/12/2008	Natural Gas	B-32	75
RI-000095	5/9/2008	Natural Gas	A-16	1.2
RI-000096	6/9/2008	Solar	A-16	5.3
RI-000102	6/13/2008	Solar	G-02	2.0
RI-000075	6/18/2008	Solar	A-16	5.4
RI-000097	6/25/2008	Solar	A-16	5.1
RI-000098	6/26/2008	Solar	A-16	5.6
RI-000100	7/3/2008	Wind	A-16	4.8
RI-000091	7/21/2008	Natural Gas	B-62	2280
RI-000105	8/14/2008	Natural Gas	A-16	1.2
RI-000104	8/26/2008	Solar	A-16	7.2
13276532	9/1/2008	Solar	A-16	3.0
RI-000103	9/17/2008	Solar	A-16	3.0
RI-000112	9/26/2008	Solar	A-16	3.0
RI-000110	9/29/2008	Solar	A-16	4.2
RI-000107	9/30/2008	Solar	A-16	3.2
RI-000111	10/8/2008	Solar	C-06	3.3
RI-000113	10/14/2008	Solar	A-16	3.1
RI-000109	10/30/2008	Solar	A-16	2.9
13276516	11/16/2008	Solar	A-16	6.0
RI-000120	11/20/2008	Wind	A-16	1.2
RI-000119	11/20/2008	Solar	A-16	2.0
RI-000117	11/20/2008	Solar	A-16	2.0
RI-000093	11/24/2008	Natural Gas	G-02	75
RI-000094	11/24/2008	Natural Gas	G-02	75
RI-000121	12/8/2008	Solar	A-16	2.9
RI-000126	1/14/2009	Solar	A-16	1.8
RI-000122	1/14/2009	Solar	A-16	2.0
RI-000128	1/15/2009	Solar	A-16	3.2
RI-000124	1/15/2009	Solar	A-16	5.0
RI-000123	2/17/2009	Solar	C-06	27.6
RI-000129	2/26/2009	Solar	A-16	6.0
RI-000101	3/18/2009	Wind	G-32	1500.0
RI-000135	4/1/2009	Solar	A-16	7.0
RI-000133	4/7/2009	Solar	A-16	3.8
RI-000137	4/22/2009	Solar	A-16	5.5
RI-000108	5/18/2009	Solar	G-02	23.6
RI-000136	6/19/2009	Solar	A-16	1.8
RI-000144	7/6/2009	Wind	A-16	1.3
RI-000142	7/7/2009	Solar	A-16	4.2
RI-000132	8/18/2009	Wind	G-32	100.0
13252180	8/19/2009	Solar	A-16	1.6
RI-000147	8/20/2009	Solar	A-16	3.9
RI-000114	10/8/2009	Hydro	G-02	1200.0
RI-000134	11/17/2009	Natural Gas	G-32	120
RI-000151	11/18/2009	Solar	A-16	1.8
RI-000148	11/19/2009	Solar	A-16	2.1
RI-000157	12/4/2009	Solar	A-16	3.6
RI-000146	12/10/2009	Wind	G-02	100.0
RI-000160	12/29/2009	Solar	G-02	50.0
RI-000154	12/29/2009	Solar	G-02	75.0
13343572	12/31/2009	Diesel	G-32	5500
RI-000159	1/11/2010	Solar	A-16	5.0
RI-000163	1/12/2010	Solar	A-16	3.0
RI-000162	1/15/2010	Solar	A-16	4.5

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13244665	2/1/2010	Wind	G-62	1.2
13244823	2/1/2010	Wind	G-62	7.0
13244440	2/12/2010	Solar	A-16	6.0
RI-000152	2/22/2010	Solar	A-16	4.8
13244999	2/26/2010	Solar	A-16	5.3
13276481	3/24/2010	Solar	A-16	3.0
RI-000176	6/10/2010	Wind	A-16	1.5
RI-000177	6/22/2010	Solar	A-16	6.0
RI-000167	6/25/2010	Natural Gas	G-02	30
RI-000174	7/19/2010	Solar	A-16	3.0
RI-000183	7/19/2010	Solar	A-16	3.0
RI-000184	7/23/2010	Solar	A-16	4.0
RI-000172	7/26/2010	Solar	A-16	4.0
RI-000175	8/2/2010	Wind	C-06	1.5
RI-000156	8/17/2010	Solar	A-16	3.2
13482845	9/22/2010	Natural Gas	G-32	75
RI-000171	10/5/2010	Solar	A-16	4.0
RI-000127	10/8/2010	Wind	C-06	10.0
RI-000178	10/19/2010	Solar	A-16	14.0
RI-000194	11/10/2010	Solar	A-16	3.6
RI-000190	11/16/2010	Solar	C-06	4.0
RI-000170	11/19/2010	Solar	A-16	3.0
RI-000181	11/19/2010	Solar	A-16	3.0
RI-000209	1/7/2011	Wind	A-16	1.5
RI-000207	1/13/2011	Solar	A-16	4.0
RI-000193	1/18/2011	Solar	A-16	5.0
RI-000208	2/1/2011	Solar	A-16	5.0
RI-000216	3/2/2011	Solar	A-16	5.3
RI-000188	3/2/2011	Solar	G-32	164.0
RI-000153	3/3/2011	Natural Gas	G-62	213
RI-000192a	3/9/2011	Solar	G-02	19.0
RI-000212	3/18/2011	Solar	A-16	2.6
RI-000201	3/22/2011	Solar	G-02	30.0
RI-000200	3/23/2011	Solar	A-16	2.9
RI-000191	3/23/2011	Solar	C-06	50.0
RI-000192c	3/30/2011	Solar	G-02	20.3
RI-000192b	4/5/2011	Solar	G-02	21.0
RI-000218	4/8/2011	Solar	A-16	4.8
13338797	6/7/2011	Solar	G-32	50.0
12440329	6/13/2011	solar	C-06	19.5
RI-000210	7/13/2011	Solar	A-16	1.1
RI-000224	8/2/2011	Solar	A-16	2.3
13335868	8/5/2011	Solar	C-06	7.0
RI-000228	8/11/2011	Solar	G-32	13.0
RI-000199	9/9/2011	Solar	B-62	405.0
RI-000229	10/7/2011	Solar	A-16	3.0
RI-000227	10/10/2011	Solar	G-02	60.0
RI-000230	10/17/2011	Solar	A-16	4.0
RI-000213	10/19/2011	Wind	G-02	100.0
RI-000217	11/10/2011	Solar	C-06	35.0
RI-000232	11/18/2011	Solar	C-06	10.0
RI-000234	12/20/2011	Solar	A-16	6.0
13433708	1/20/2012	Solar	A-16	4.0
13163366	1/27/2012	Solar	A-16	3.0
13163630	1/27/2012	Solar	A-16	4.0
13287157	1/27/2012	Solar	G-02	150.0
13168640	1/30/2012	Solar	A-16	5.0
13337931	2/1/2012	Hydro	B-32	225.0
13286055	2/10/2012	Solar	G-32	260.0
12240150	2/13/2012	Solar	A-16	4.0
13163682	2/13/2012	Solar	A-16	7.0
13169212	2/13/2012	Solar	A-16	0.6
13169627	2/27/2012	Solar	G-02	100.0
12148883	2/28/2012	Solar	A-16	8.0
13168408	2/29/2012	Solar	A-16	4.0
12442025	3/9/2012	Solar	A-16	5.0
13168551	3/9/2012	Solar	A-16	5.0
13551480	3/12/2012	Solar	G-02	6.0
13170555	3/14/2012	Solar	A-16	7.2
12381648	3/16/2012	Solar	C-06	7.5
13168708	3/16/2012	Solar	C-06	3.0
13339553	3/20/2012	Wind	G-02	225.0
13169065	3/30/2012	Solar	G-02	10.0
13168803	4/2/2012	Solar	G-02	20.0
12729266	5/1/2012	solar	A-16	6.0
12808914	5/10/2012	Solar	G-02	23.0
13433977	5/14/2012	Wind	C-06	50.0
13177748	5/22/2012	Solar	C-06	6.0
12778215	5/30/2012	solar	A-16	4.7
12723949	5/31/2012	solar	A-16	3.0
12726566	5/31/2012	solar	A-16	5.3
12797813	5/31/2012	solar	C-06	4.7
13511760	6/5/2012	Wind	C-06	275.0
12364353	6/19/2012	solar	C-06	15.3
12613705	6/25/2012	solar	G-62	50.0
13168581	6/25/2012	Solar	C-06	4.0
13168917	6/25/2012	Solar	C-06	10.0
12790101	7/2/2012	solar	A-16	5.2

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12981846	7/2/2012	Solar	A-16	3.4
12930973	7/16/2012	solar	A-16	2.0
12741538	7/18/2012	solar	A-16	3.2
12700487	7/19/2012	solar	C-06	1.3
13262387	7/20/2012	Solar	A-16	3.7
13086985	7/30/2012	Solar	C-06	4.7
12733869	8/3/2012	solar	A-16	4.7
13063715	8/3/2012	Solar	C-06	3.9
12815821	8/8/2012	Solar	A-16	3.2
13263785	8/15/2012	Solar	A-16	2.4
12700157	8/29/2012	solar	C-06	6.5
13356318	9/4/2012	Solar	A-16	2.4
13432975	9/5/2012	Solar	A-16	4.3
13407239	9/7/2012	Solar	A-16	3.9
13256165	9/28/2012	Solar	A-16	5.0
13609645	9/28/2012	Solar	A-16	1.7
13227471	10/5/2012	Solar	C-06	2.0
13188008	10/10/2012	Solar	G-02	21.0
13115934	10/16/2012	Wind	G-32	4500.0
13755485	11/16/2012	Solar	A-16	7.0
13679422	11/20/2012	Solar	A-16	1.3
12995866	11/21/2012	wind	G-02	1500.0
13868654	11/26/2012	Solar	A-16	3.9
13301833	11/30/2012	Solar	C-06	5.3
12252717	12/4/2012	Wind	G-02	10.0
13854152	12/5/2012	Solar	A-16	5.0
12762756	12/20/2012	solar	A-16	3.7
12282568	12/21/2012	Solar	G-32	10.3
13605369	2/6/2013	Solar	C-06	0.4
13605566	2/6/2013	Solar	C-06	0.4
13911749	2/6/2013	Solar	A-16	1.4
13933429	2/22/2013	Solar	A-16	4.0
13338577	2/25/2013	Diesel	G-32	1700
14588725	3/26/2013	Solar	A-16	1.5
14469194	3/27/2013	Solar	A-16	3.0
14726048	5/3/2013	Solar	A-16	4.0
12619342	5/14/2013	Natural Gas	G-02	30
12476079	5/20/2013	solar	G-02	500.0
14276764	6/14/2013	Solar	A-16	2.8
14847417	6/14/2013	Solar	A-16	4.0
14278306	6/26/2013	Solar	A-16	0.9
14129872	7/3/2013	Solar	C-06	12.9
12841229	7/9/2013	Solar	C-06	2000.0
13451348	7/9/2013	Solar	C-06	500.0
14276819	7/10/2013	Solar	A-16	3.0
14726475	7/10/2013	Solar	A-16	2.2
14601977	7/17/2013	Solar	A-16	5.0
14601995	7/19/2013	Solar	A-16	5.2
13078797	7/23/2013	solar	G-32	500.0
14589949	7/31/2013	Solar	G-02	28.0
14790269	8/2/2013	Solar	G-02	23.0
14601876	8/8/2013	Solar	A-16	2.2
14276693	8/9/2013	Solar	A-16	0.9
14761875	8/9/2013	Solar	A-16	3.7
14780864	8/9/2013	Solar	A-16	2.0
14855860	8/9/2013	Solar	G-02	14.0
13220170	8/14/2013	Solar	G-32	300.0
13425175	8/16/2013	Solar	A-16	20.0
14767040	8/16/2013	Solar	A-16	4.0
15481450	8/20/2013	Solar	C-06	10.0
14735613	8/22/2013	Solar	A-16	5.0
15476331	8/22/2013	Solar	A-16	2.5
15212872	8/27/2013	Solar	A-16	4.3
15280721	9/4/2013	Solar	A-16	6.0
15358807	9/4/2013	Solar	A-16	5.2
15378490	9/4/2013	Solar	A-16	2.2
14726436	9/6/2013	Solar	A-16	2.8
14753836	9/19/2013	Solar	A-16	5.2
15187880	9/19/2013	Solar	A-16	5.2
15289861	9/19/2013	Solar	A-16	4.3
14874919	9/26/2013	Solar	A-16	3.0
13633302	10/3/2013	Solar	C-06	120.0
15075211	10/3/2013	Solar	A-16	5.2
15128281	10/3/2013	Solar	A-16	8.0
15211271	10/3/2013	Solar	A-16	5.1
15660811	10/3/2013	Solar	A-16	2.6
12311355	10/16/2013	Solar	C-06	2000.0
15140057	10/16/2013	Solar	A-16	3.7
15441523	10/16/2013	Solar	A-16	6.5
15551310	10/16/2013	Solar	A-16	4.1
15135359	10/17/2013	Solar	A-16	7.7
15150360	10/18/2013	Solar	A-16	2.2
14800225	10/21/2013	Solar	A-16	13.0
15877444	10/23/2013	Solar	A-16	3.7
15886590	10/23/2013	Solar	A-16	1.3
15960523	10/29/2013	Solar	C-06	3.9
15613973	11/6/2013	Solar	A-16	3.6
15912539	11/15/2013	Solar	A-16	5.8

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16020398	11/18/2013	Solar	A-16	5.2
13154246	11/22/2013	Solar	C-06	3000.0
14913107	11/26/2013	Solar	A-16	2.8
15600663	11/26/2013	Solar	A-16	3.0
15950635	11/26/2013	Solar	C-06	5.2
15960570	11/26/2013	Solar	A-16	3.2
16032506	11/26/2013	Solar	A-16	8.0
14761967	12/18/2013	Solar	A-16	7.7
15960546	12/19/2013	Solar	A-16	5.8
16004074	12/19/2013	Solar	A-16	8.0
16020662	12/19/2013	Solar	A-16	4.3
13105351	12/20/2013	Solar	C-06	45.6
13213633	12/27/2013	Solar	G-02	500.0
15779010	1/10/2014	Solar	A-16	10.8
15660814	1/14/2014	Solar	A-16	7.7
16119917	1/14/2014	Solar	A-16	5.0
16281029	1/14/2014	Solar	A-16	3.4
15680716	1/17/2014	Solar	A-16	6.5
15551662	1/28/2014	Solar	A-16	3.4
15650232	1/28/2014	Solar	A-16	3.9
15987219	1/28/2014	Solar	A-16	3.4
16049358	1/28/2014	Solar	A-16	4.3
16052781	1/28/2014	Solar	A-16	3.0
16240969	1/28/2014	Solar	A-16	3.9
14797804	1/29/2014	Solar	A-16	8.0
12713724	2/3/2014	solar	G-32	135.0
16020824	2/3/2014	Solar	A-16	1.3
15862797	2/11/2014	Solar	A-16	4.0
16315480	2/11/2014	Solar	A-16	6.0
15700681	3/5/2014	Solar	A-16	2.6
12483609	3/11/2014	Diesel	G-02	75
13590877	3/17/2014	Solar	G-02	300.0
12295410	3/18/2014	solar	C-06	1833.0
12798181	3/18/2014	solar	G-32	320.0
12798597	3/18/2014	Solar	C-06	500.0
12822936	3/18/2014	solar	A-16	500.0
16538805	4/11/2014	Solar	A-16	5.0
16714328	4/17/2014	Solar	A-16	2.6
16863933	5/1/2014	Solar	A-16	0.4
14882524	5/8/2014	Solar	A-16	3.4
16659042	5/14/2014	Solar	A-16	5.0
15672019	5/22/2014	Solar	G-02	24.0
13177831	5/23/2014	Solar	A-16	0.6
16849037	6/2/2014	Solar	A-16	7.8
15672618	6/5/2014	Solar	G-62	24.0
17071966	6/16/2014	Solar	A-16	6.0
16658943	6/17/2014	Solar	A-16	7.5
16714678	6/17/2014	Solar	A-16	11.0
16811848	6/28/2014	Solar	A-16	7.5
16837237	7/1/2014	Solar	A-16	5.2
16922760	7/1/2014	Solar	A-16	6.5
16789421	7/2/2014	Solar	A-16	5.0
16923859	7/7/2014	Solar	A-16	14.2
17192714	7/14/2014	Solar	A-16	3.2
15430757	7/16/2014	Solar	A-16	3.0
16796924	7/23/2014	Solar	A-16	4.0
16841395	7/23/2014	Solar	A-16	6.3
17099078	8/4/2014	Solar	A-16	3.0
16617414	8/18/2014	Solar	C-06	60.0
16837718	8/21/2014	Solar	A-16	3.9
16841481	8/21/2014	Solar	A-16	5.3
16922768	8/21/2014	Solar	A-60	2.5
16847839	8/27/2014	Solar	A-16	2.8
17470091	8/27/2014	Solar	A-16	3.8
17584869	8/27/2014	Solar	A-16	4.0
16611202	9/3/2014	Solar	C-06	75.0
16979864	9/5/2014	Solar	A-16	7.1
16999144	9/5/2014	Solar	A-16	3.5
17490946	9/5/2014	Solar	A-16	3.3
17584887	9/5/2014	Solar	A-16	9.0
16631931	9/9/2014	Solar	G-02	30.0
13578666	9/16/2014	Solar	G-32	250.0
12771251	9/25/2014	Natural Gas	B-62	12500
17447224	9/26/2014	Solar	A-16	3.4
17769192	9/26/2014	Solar	A-16	2.5
17449362	9/29/2014	Solar	A-16	7.6
16788456	9/30/2014	Solar	A-16	5.5
17665432	10/1/2014	Solar	A-16	2.5
17665342	10/2/2014	Solar	A-16	4.0
17665302	10/7/2014	Solar	A-16	3.0
17732018	10/7/2014	Solar	A-16	3.0
17723937	10/10/2014	Solar	A-16	7.6
17471891	10/14/2014	Solar	A-16	3.9
17711343	10/17/2014	Solar	A-16	5.0
17634957	10/22/2014	Solar	C-06	56.0
17457905	10/23/2014	Solar	A-16	7.0
17891429	10/23/2014	Solar	A-16	5.0
17472411	10/28/2014	Solar	A-16	7.5

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15862938	10/29/2014	Solar	A-16	8.2
17413565	10/29/2014	Solar	A-16	3.5
17732094	10/29/2014	Solar	A-16	2.8
17678400	10/30/2014	Solar	A-16	11.0
17743200	10/30/2014	Solar	A-16	3.0
17473331	11/4/2014	Solar	A-16	4.5
17775953	11/6/2014	Solar	A-16	9.3
17722478	11/7/2014	Solar	A-16	2.8
18154533	11/10/2014	Solar	A-16	5.0
17281317	11/13/2014	Solar	C-06	9.0
17513659	11/14/2014	Solar	A-16	4.5
17472940	11/17/2014	Solar	A-16	5.5
17372548	11/19/2014	Solar	A-16	10.0
17743158	11/19/2014	Solar	A-16	4.0
17732079	11/21/2014	Solar	A-16	7.3
12937966	11/24/2014	solar	C-06	850.0
17832890	11/24/2014	Solar	A-16	5.0
17354436	11/25/2014	Solar	A-16	4.5
17833152	11/26/2014	Solar	A-16	5.0
17504085	12/1/2014	Solar	A-16	5.0
13532404	12/4/2014	Solar	C-06	50.0
17324151	12/4/2014	Solar	C-06	128.0
17473280	12/10/2014	Solar	A-16	6.5
15049726	12/12/2014	Solar	A-16	4.3
18469711	12/16/2014	Solar	A-16	5.0
17824272	12/19/2014	Solar	A-16	10.5
17766993	12/22/2014	Solar	A-16	14.3
17473990	12/23/2014	Solar	A-16	5.5
18560388	12/29/2014	Solar	A-16	2.8
16960369	12/30/2014	Solar	A-16	3.0
18416675	12/30/2014	Solar	A-16	6.0
18187567	1/2/2015	Solar	A-16	5.0
17754096	1/15/2015	Solar	A-16	7.6
17765231	1/15/2015	Solar	A-16	3.0
17505949	1/16/2015	Solar	A-16	8.0
18366203	1/16/2015	Solar	A-16	8.5
17735302	1/23/2015	Solar	C-06	72.0
18584634	1/28/2015	Solar	A-16	2.8
17283959	1/30/2015	Solar	G-02	185.6
18772378	2/3/2015	Solar	G-32	45.0
17722568	2/5/2015	Solar	G-02	9.5
18584954	2/5/2015	Solar	A-16	5.0
18584847	2/9/2015	Solar	A-16	12.5
13989237	2/10/2015	Solar	C-06	499.0
17987568	2/12/2015	Solar	A-16	5.0
18347914	2/13/2015	Solar	A-16	7.8
18780202	2/19/2015	Solar	A-16	4.0
18754877	2/26/2015	Solar	A-16	9.0
18361129	3/3/2015	Solar	A-16	10.0
18619648	3/5/2015	Solar	A-16	4.5
16973223	3/16/2015	Solar	G-32	75.0
18781609	3/16/2015	Solar	A-16	1.0
18660843	3/18/2015	Solar	A-16	4.8
16972525	3/20/2015	Solar	G-02	42.0
18989989	3/25/2015	Solar	A-16	3.0
18990314	3/31/2015	Solar	A-16	1.5
18668838	4/2/2015	Solar	A-16	7.5
18348311	4/10/2015	Solar	A-16	5.0
18347993	4/15/2015	Solar	A-16	3.5
18548205	4/15/2015	Solar	A-16	6.0
18680155	4/16/2015	Solar	A-16	4.0
18722171	4/16/2015	Solar	A-16	7.0
18876691	4/16/2015	Solar	A-16	3.8
18660887	4/17/2015	Solar	A-16	3.3
19228110	4/20/2015	Solar	A-16	7.5
18451747	4/21/2015	Solar	A-16	4.5
18680191	4/24/2015	Solar	A-16	10.3
18366178	4/30/2015	Solar	A-16	4.2
18960165	4/30/2015	Solar	A-16	4.5
18603480	5/4/2015	Solar	C-06	15.0
19071415	5/6/2015	Solar	C-06	6.0
16969653	5/7/2015	Solar	A-16	9.5
17344217	5/7/2015	Solar	C-06	10.0
17471782	5/7/2015	Solar	A-16	4.7
18721804	5/7/2015	Solar	A-16	8.8
18348135	5/13/2015	Solar	A-16	6.0
18348273	5/14/2015	Solar	A-16	7.0
18721737	5/15/2015	Solar	A-16	4.5
19307110	5/18/2015	Solar	A-16	6.0
18936614	5/19/2015	Solar	A-16	5.0
18678756	5/21/2015	Solar	A-16	5.0
18348048	5/22/2015	Solar	A-16	2.8
19173522	5/26/2015	Solar	A-16	3.0
19404974	5/26/2015	Solar	A-16	5.8
18777358	5/29/2015	Solar	A-16	1.3
18856922	6/1/2015	Solar	A-16	3.3
18365562	6/3/2015	Solar	A-16	14.3
19404643	6/3/2015	Solar	A-16	4.0

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19017395	6/4/2015	Solar	A-16	4.5
19473860	6/4/2015	Solar	A-16	9.0
18875605	6/5/2015	Solar	A-16	5.0
18494358	6/8/2015	Solar	A-16	6.8
18619674	6/8/2015	Solar	C-06	9.8
19382570	6/8/2015	Solar	A-16	7.6
19450143	6/8/2015	Solar	A-16	5.5
19550488	6/8/2015	Solar	C-06	5.0
18371575	6/10/2015	Solar	A-16	7.0
19218356	6/10/2015	Solar	G-02	6.0
18533188	6/11/2015	Solar	A-16	4.5
18534436	6/11/2015	Solar	A-16	5.5
18559630	6/11/2015	Solar	A-16	4.0
18721787	6/11/2015	Solar	A-16	7.8
19229414	6/12/2015	Solar	A-16	1.3
18433083	6/15/2015	Solar	A-16	7.5
19484417	6/22/2015	Solar	A-16	4.5
18409571	6/24/2015	Solar	A-16	3.8
19492787	6/25/2015	Solar	A-16	7.0
19677859	6/25/2015	Solar	A-16	6.0
18428533	6/26/2015	Solar	A-16	4.5
19600029	6/26/2015	Solar	A-16	5.7
15613020	6/29/2015	Solar	C-06	17.3
18951406	6/29/2015	Solar	A-16	2.0
19458908	6/29/2015	Solar	A-16	10.0
19495506	6/29/2015	Solar	A-16	4.8
19505363	6/29/2015	Solar	A-16	6.5
19677883	6/29/2015	Solar	A-16	4.3
14805719	6/30/2015	Solar	C-06	1375.0
18432757	6/30/2015	Solar	A-16	5.5
18348360	7/6/2015	Solar	A-16	5.5
18518316	7/6/2015	Solar	A-16	6.3
19649090	7/6/2015	Solar	C-06	10.0
18360524	7/8/2015	Solar	A-16	5.0
18646452	7/10/2015	Solar	A-16	2.5
18348181	7/13/2015	Solar	A-16	6.5
18631712	7/13/2015	Solar	A-16	2.3
18781524	7/13/2015	Solar	A-16	6.3
18401763	7/15/2015	Solar	A-16	8.0
18450500	7/15/2015	Solar	A-16	10.0
18990014	7/15/2015	Solar	A-16	9.5
19018208	7/15/2015	Solar	A-16	8.3
19129111	7/15/2015	Solar	A-16	5.8
19450184	7/16/2015	Solar	A-16	6.5
18458148	7/20/2015	Solar	A-16	10.0
19228079	7/20/2015	Solar	A-16	8.8
19450061	7/21/2015	Solar	A-16	2.5
18428559	7/22/2015	Solar	A-16	3.5
19677923	7/22/2015	Solar	A-16	3.8
19495476	7/23/2015	Solar	A-16	7.5
19372732	7/24/2015	Solar	A-16	7.6
19373127	7/24/2015	Solar	A-16	5.0
16632724	7/27/2015	Solar	C-06	56.0
19633166	7/28/2015	Solar	A-16	10.0
18359843	7/29/2015	Solar	A-16	8.5
19416589	7/29/2015	Solar	A-16	7.6
19471818	7/29/2015	Solar	A-16	10.0
19734967	7/29/2015	Solar	A-16	10.0
18494462	7/30/2015	Solar	A-16	5.8
19009614	7/30/2015	Solar	A-16	3.3
19025410	7/30/2015	Solar	A-16	6.5
18360575	7/31/2015	Solar	A-16	6.5
19017394	7/31/2015	Solar	A-16	6.3
18618997	8/3/2015	Solar	A-16	3.5
19494530	8/4/2015	Solar	A-16	7.6
19007050	8/10/2015	Solar	A-16	6.0
19015897	8/10/2015	Solar	A-16	8.0
19015922	8/10/2015	Solar	A-16	5.3
19845879	8/10/2015	Solar	A-16	7.6
19845940	8/10/2015	Solar	A-16	5.0
19968167	8/11/2015	Solar	A-16	6.0
18559627	8/12/2015	Solar	A-16	4.0
19754558	8/12/2015	Solar	A-16	4.0
20039678	8/12/2015	Solar	A-16	6.0
18458216	8/17/2015	Solar	A-16	3.0
18981784	8/17/2015	Solar	A-16	3.8
19873976	8/19/2015	Solar	A-16	5.0
18360154	8/20/2015	Solar	G-32	63.0
19294346	8/20/2015	Solar	A-16	8.3
19766078	8/21/2015	Solar	A-16	9.5
19798085	8/24/2015	Solar	A-16	7.6
18590612	8/25/2015	Solar	A-16	5.5
18982248	8/27/2015	Solar	A-16	5.0
19006935	8/27/2015	Solar	A-16	6.5
19024760	8/27/2015	Solar	A-16	5.3
19058830	8/27/2015	Solar	A-16	6.3
19059353	8/27/2015	Solar	A-16	4.0
20097132	8/27/2015	Solar	A-16	10.0

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19050157	8/28/2015	Solar	A-16	3.8
19294413	8/28/2015	Solar	A-16	5.0
19025450	8/31/2015	Solar	A-16	3.8
19798137	8/31/2015	Solar	A-16	7.6
19876998	8/31/2015	Solar	A-16	5.0
19735050	9/2/2015	Solar	A-16	4.0
19798702	9/3/2015	Solar	A-16	3.6
19834229	9/3/2015	Solar	A-16	3.0
19876697	9/3/2015	Solar	A-16	6.0
20040455	9/3/2015	Solar	A-16	5.0
20016844	9/4/2015	Solar	A-16	6.6
18990026	9/8/2015	Solar	A-16	8.0
19016256	9/10/2015	Solar	A-16	2.5
19669607	9/11/2015	Solar	C-06	44.5
19755686	9/11/2015	Solar	A-16	7.6
19057458	9/15/2015	Solar	A-16	7.0
19058690	9/15/2015	Solar	A-16	2.0
19633575	9/15/2015	Solar	A-16	7.6
20227074	9/16/2015	Solar	A-16	3.8
20326342	9/16/2015	Solar	A-16	13.5
20058009	9/17/2015	Solar	A-16	10.5
19691732	9/18/2015	Solar	G-02	44.5
20117502	9/18/2015	Solar	A-16	10.0
20237900	9/18/2015	Solar	C-06	9.5
19755606	9/21/2015	Solar	A-16	5.0
20147716	9/21/2015	Solar	A-16	3.4
19732992	9/22/2015	Solar	G-02	40.0
13276444	9/23/2015	Solar	A-16	5.3
18781644	9/25/2015	Solar	A-16	6.0
19721919	9/25/2015	Solar	A-16	2.8
20017234	9/25/2015	Solar	A-16	7.5
19540419	9/29/2015	Solar	A-16	8.3
19058173	10/1/2015	Solar	A-16	4.5
20262081	10/1/2015	Solar	A-16	3.8
17214367	10/2/2015	Solar	C-06	495.0
20068978	10/2/2015	Solar	A-16	3.8
20250758	10/2/2015	Solar	A-16	3.0
19735092	10/5/2015	Solar	A-16	3.0
20210004	10/6/2015	Solar	A-16	6.0
19552187	10/7/2015	Solar	A-16	3.0
19058050	10/8/2015	Solar	A-16	4.5
19058488	10/8/2015	Solar	A-16	7.3
17473158	10/9/2015	Solar	A-16	5.3
18936275	10/9/2015	Solar	A-16	4.8
19510213	10/9/2015	Solar	A-16	13.6
19633610	10/9/2015	Solar	A-16	10.0
19833829	10/9/2015	Solar	A-16	7.5
19976638	10/9/2015	Solar	A-16	8.0
20177362	10/9/2015	Solar	A-16	6.0
19025458	10/12/2015	Solar	A-16	5.5
19701843	10/14/2015	Solar	A-16	3.0
20091034	10/14/2015	Solar	A-16	3.8
20366392	10/14/2015	Solar	A-16	5.0
20377708	10/14/2015	Solar	A-16	3.8
17525613	10/15/2015	Solar	A-16	2.0
19017387	10/15/2015	Solar	A-16	9.3
19058552	10/15/2015	Solar	A-16	4.8
20126748	10/15/2015	Solar	A-16	5.0
20322583	10/15/2015	Solar	A-16	3.8
20305154	10/16/2015	Solar	A-16	10.0
20421460	10/19/2015	Solar	A-16	7.6
19699695	10/20/2015	Solar	A-16	7.3
20100637	10/20/2015	Solar	A-16	3.8
20126958	10/20/2015	Solar	A-16	3.8
20411553	10/20/2015	Solar	A-16	3.8
19024489	10/21/2015	Solar	A-16	8.5
19025440	10/21/2015	Solar	A-16	5.5
19552116	10/21/2015	Solar	A-16	8.0
19687957	10/21/2015	Solar	C-06	0.4
19735006	10/21/2015	Solar	A-16	6.8
20126613	10/21/2015	Solar	A-16	3.0
20240441	10/21/2015	Solar	A-16	11.4
20377730	10/26/2015	Solar	A-16	5.0
19978049	10/27/2015	Solar	A-16	4.3
20196659	10/27/2015	Solar	C-06	5.0
20366384	10/27/2015	Solar	A-16	3.8
18365951	10/28/2015	Solar	C-06	20.0
19734966	10/28/2015	Solar	A-16	8.0
19815323	10/28/2015	Solar	C-06	18.0
20175142	10/28/2015	Solar	A-16	10.0
20226455	10/28/2015	Solar	A-16	10.0
20465710	10/28/2015	Solar	A-16	6.0
20489147	10/28/2015	Solar	A-16	7.6
19614759	10/29/2015	Solar	C-06	36.0
19614990	10/29/2015	Solar	C-06	40.0
19633116	10/29/2015	Solar	A-16	7.6
20305201	10/29/2015	Solar	A-16	10.0
20434507	10/29/2015	Solar	A-16	4.5

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19458228	10/30/2015	Solar	G-02	9.0
20086151	10/30/2015	Solar	A-16	5.0
20240835	10/30/2015	Solar	A-16	11.4
20602170	10/30/2015	Solar	A-16	10.0
20465454	11/2/2015	Solar	A-16	6.0
20602202	11/2/2015	Solar	A-16	10.0
19057753	11/3/2015	Solar	A-16	6.5
19745199	11/3/2015	Solar	A-16	8.5
19855837	11/3/2015	Solar	A-16	6.0
19867641	11/3/2015	Solar	A-16	11.4
20333766	11/3/2015	Solar	A-16	5.0
19307166	11/4/2015	Solar	A-16	7.5
20250875	11/4/2015	Solar	A-16	3.8
20253284	11/4/2015	Solar	A-16	10.0
20465522	11/4/2015	Solar	A-16	3.0
19294323	11/5/2015	Solar	A-16	8.3
19306434	11/5/2015	Solar	A-16	3.3
20037055	11/5/2015	Solar	A-16	9.0
20560406	11/5/2015	Solar	A-16	3.0
20210073	11/6/2015	Solar	A-16	3.8
20573975	11/7/2015	Solar	A-16	3.8
20632409	11/7/2015	Solar	A-16	8.3
19550814	11/10/2015	Solar	A-16	11.5
17453649	11/16/2015	Solar	C-06	26.0
19735150	11/16/2015	Solar	A-16	7.6
20408022	11/16/2015	Solar	A-16	3.8
20560148	11/16/2015	Solar	A-16	3.8
20600107	11/16/2015	Solar	A-16	6.0
20076564	11/17/2015	Solar	A-16	7.6
20177737	11/17/2015	Solar	A-16	8.0
20276992	11/17/2015	Solar	A-16	10.0
20488999	11/17/2015	Solar	A-16	5.0
20582343	11/18/2015	Solar	A-16	5.0
20709224	11/18/2015	Solar	A-16	7.5
19755632	11/19/2015	Solar	A-16	6.0
20250581	11/19/2015	Solar	A-16	6.0
20110557	11/20/2015	Solar	A-16	4.3
19058276	11/23/2015	Solar	A-16	5.0
19551784	11/23/2015	Solar	A-16	7.5
19911662	11/23/2015	Solar	A-16	10.0
19937319	11/23/2015	Solar	A-16	10.0
20146004	11/23/2015	Solar	A-16	6.0
19551148	11/24/2015	Solar	A-16	7.5
20554372	11/24/2015	Solar	A-16	3.8
19755704	11/25/2015	Solar	A-16	6.0
20652812	11/25/2015	Solar	A-16	7.6
20661789	11/25/2015	Solar	A-16	6.0
20147611	11/30/2015	Solar	A-16	8.0
19907745	12/2/2015	Solar	A-16	6.0
20240846	12/2/2015	Solar	A-16	10.0
20302109	12/2/2015	Solar	A-16	10.0
20396288	12/2/2015	Solar	A-16	3.8
20489074	12/2/2015	Solar	A-16	5.0
20599936	12/2/2015	Solar	A-16	7.6
20600022	12/2/2015	Solar	A-16	6.0
20146787	12/4/2015	Solar	A-16	9.3
20657169	12/4/2015	Solar	A-16	5.5
20661810	12/4/2015	Solar	A-16	6.8
19721785	12/7/2015	Solar	A-16	5.5
20175237	12/7/2015	Solar	A-16	7.6
20159636	12/8/2015	Solar	A-16	5.0
20613734	12/8/2015	Solar	A-16	3.0
20039696	12/9/2015	Solar	A-16	7.7
20196448	12/9/2015	Solar	A-16	6.0
20466083	12/9/2015	Solar	A-16	3.8
19876210	12/10/2015	Solar	A-16	5.3
19294233	12/11/2015	Solar	A-16	3.5
20295335	12/11/2015	Solar	A-16	3.0
20607932	12/14/2015	Solar	A-16	6.0
20608523	12/14/2015	Solar	A-16	10.0
20858456	12/14/2015	Solar	C-06	7.6
20091015	12/16/2015	Solar	A-16	5.0
19294283	12/17/2015	Solar	A-16	8.0
20322402	12/18/2015	Solar	A-16	5.0
20489046	12/18/2015	Solar	A-16	6.0
20512314	12/18/2015	Solar	A-16	3.8
20525336	12/18/2015	Solar	A-16	3.8
20567880	12/18/2015	Solar	A-16	5.0
20587932	12/18/2015	Solar	A-16	10.0
20600194	12/18/2015	Solar	A-16	5.0
20613863	12/18/2015	Solar	A-16	3.0
20647957	12/18/2015	Solar	A-16	10.0
20688802	12/18/2015	Solar	A-16	3.0
20705843	12/18/2015	Solar	A-16	5.0
20786153	12/18/2015	Solar	A-16	10.0
20867133	12/18/2015	Solar	A-16	5.0
20295289	12/21/2015	Solar	A-16	3.8
20525653	12/21/2015	Solar	A-16	7.6

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19025186	12/22/2015	Solar	A-16	4.5
20304120	12/22/2015	Solar	A-16	6.0
20440081	12/22/2015	Solar	A-16	4.8
20513179	12/22/2015	Solar	A-16	6.0
20525866	12/22/2015	Solar	A-60	6.0
20554396	12/22/2015	Solar	A-16	10.0
20613727	12/22/2015	Solar	A-16	3.8
20647738	12/22/2015	Solar	A-16	6.0
20647799	12/22/2015	Solar	A-16	7.6
20657093	12/22/2015	Solar	A-16	5.0
20666887	12/22/2015	Solar	A-16	3.0
20666994	12/22/2015	Solar	A-16	5.0
20689245	12/22/2015	Solar	A-16	6.0
20705636	12/22/2015	Solar	A-16	3.8
20705787	12/22/2015	Solar	A-16	7.6
20791715	12/22/2015	Solar	A-16	5.0
20791934	12/22/2015	Solar	A-16	6.0
20818948	12/22/2015	Solar	A-16	6.0
19735822	12/23/2015	Solar	A-16	3.8
20068889	12/23/2015	Solar	A-16	5.0
20187139	12/23/2015	Solar	A-16	10.0
20197890	12/23/2015	Solar	A-16	3.8
20210908	12/23/2015	Solar	A-16	2.6
20358063	12/23/2015	Solar	A-16	7.5
20419584	12/23/2015	Solar	A-16	3.9
20557178	12/23/2015	Solar	C-06	27.0
20584896	12/23/2015	Solar	A-16	1.9
20587953	12/23/2015	Solar	A-16	6.0
20593264	12/23/2015	Solar	A-16	3.8
20593271	12/23/2015	Solar	A-16	3.0
20647842	12/23/2015	Solar	A-16	3.0
20791532	12/23/2015	Solar	A-16	10.0
20791927	12/23/2015	Solar	A-16	5.0
20801791	12/23/2015	Solar	A-16	7.1
20818921	12/23/2015	Solar	A-16	3.0
20148654	12/24/2015	Solar	G-32	44.0
20715713	12/24/2015	Solar	A-16	6.0
20818886	12/24/2015	Solar	A-16	6.0
20833045	12/24/2015	Solar	A-16	4.8
20513194	12/28/2015	Solar	A-16	6.5
20702819	12/28/2015	Solar	A-16	2.4
20791909	12/28/2015	Solar	A-16	5.0
20947755	12/28/2015	Solar	A-16	6.3
20791639	12/29/2015	Solar	A-16	3.8
20429297	12/30/2015	Solar	A-16	5.0
20494720	12/30/2015	Solar	A-16	7.6
20593600	12/30/2015	Solar	A-16	7.6
20715655	12/30/2015	Solar	A-16	2.5
20210343	12/31/2015	Solar	A-16	5.2
20791846	12/31/2015	Solar	A-16	6.0
20944036	12/31/2015	Solar	A-16	9.0
20362206	1/4/2016	Solar	A-16	3.9
20494743	1/4/2016	Solar	A-16	5.0
20525776	1/4/2016	Solar	A-16	3.8
20841563	1/4/2016	Solar	A-16	10.0
20889470	1/4/2016	Solar	A-16	6.0
20067671	1/5/2016	Solar	A-16	7.6
20786136	1/5/2016	Solar	A-16	5.5
20791788	1/5/2016	Solar	A-16	3.0
19721699	1/6/2016	Solar	A-16	5.0
20802513	1/6/2016	Solar	A-16	7.6
20358523	1/7/2016	Solar	A-16	4.5
20359684	1/7/2016	Solar	A-16	5.0
20703810	1/7/2016	Solar	A-16	7.3
20730269	1/7/2016	Solar	A-16	10.0
21003317	1/7/2016	Solar	A-16	8.0
20514461	1/12/2016	Solar	A-16	6.0
20558948	1/12/2016	Solar	C-06	15.2
20587449	1/13/2016	Solar	A-16	7.6
20705801	1/13/2016	Solar	A-16	3.8
20991504	1/13/2016	Solar	A-16	3.8
20588560	1/14/2016	Solar	A-16	6.0
20723840	1/14/2016	Solar	A-16	6.0
17798519	1/15/2016	Solar	A-16	7.1
20195731	1/19/2016	Solar	A-16	5.8
20513750	1/19/2016	Solar	A-16	4.1
20700848	1/19/2016	Solar	A-16	6.0
20939170	1/19/2016	Solar	A-16	6.1
21086976	1/19/2016	Solar	A-16	7.6
20745245	1/20/2016	Solar	A-16	9.5
20949674	1/20/2016	Solar	A-16	4.1
20647912	1/21/2016	Solar	A-16	5.0
21005975	1/21/2016	Solar	A-16	5.0
18960118	1/25/2016	Solar	A-16	5.0
19754757	1/25/2016	Solar	A-16	7.0
20430367	1/28/2016	Solar	A-16	12.9
20817163	1/28/2016	Solar	A-16	3.0
21053797	1/28/2016	Solar	A-16	7.6

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20196452	1/29/2016	Solar	A-16	9.8
20276964	1/29/2016	Solar	A-16	6.8
20588986	1/29/2016	Solar	A-16	5.0
20652993	1/29/2016	Solar	A-16	5.0
20867105	1/29/2016	Solar	A-16	7.8
20894862	1/29/2016	Solar	A-16	8.6
20989305	1/29/2016	Solar	A-16	5.0
21047315	1/29/2016	Solar	A-60	3.8
21160833	1/29/2016	Solar	A-16	5.0
20587622	2/1/2016	Solar	A-16	5.2
20739617	2/1/2016	Solar	A-16	3.8
20832613	2/1/2016	Solar	A-16	3.0
20935083	2/1/2016	Solar	A-16	4.1
20995104	2/1/2016	Solar	A-16	6.0
20313410	2/2/2016	Solar	A-16	8.8
20648001	2/2/2016	Solar	A-16	5.0
20791894	2/2/2016	Solar	A-16	5.0
20198819	2/3/2016	Solar	A-16	10.0
20199029	2/3/2016	Solar	A-16	7.6
20208048	2/3/2016	Solar	A-16	10.0
20208722	2/3/2016	Solar	A-16	9.3
20410749	2/3/2016	Solar	A-16	4.0
20587402	2/3/2016	Solar	A-16	3.9
20989117	2/3/2016	Solar	A-16	3.0
21031126	2/4/2016	Solar	A-16	11.4
20177683	2/10/2016	Solar	G-02	70.0
20419770	2/10/2016	Solar	A-16	3.9
20706111	2/10/2016	Solar	A-16	6.0
20745293	2/10/2016	Solar	A-16	5.0
20889516	2/10/2016	Solar	A-16	5.0
21137635	2/10/2016	Solar	A-16	4.5
20931466	2/12/2016	Solar	A-16	7.3
20931680	2/12/2016	Solar	A-16	9.0
21013161	2/12/2016	Solar	A-16	3.8
21013171	2/12/2016	Solar	A-16	3.8
21015911	2/12/2016	Solar	A-16	3.7
21222300	2/16/2016	Solar	A-16	10.0
21013236	2/17/2016	Solar	A-16	3.8
21053372	2/17/2016	Solar	A-16	3.8
19024861	2/18/2016	Solar	A-16	5.0
20438478	2/18/2016	Solar	A-16	3.0
20538662	2/18/2016	Solar	A-16	3.4
20608533	2/18/2016	Solar	A-16	3.0
20666947	2/18/2016	Solar	A-16	5.0
20702593	2/18/2016	Solar	A-16	8.2
20858795	2/18/2016	Solar	A-16	7.0
20863647	2/18/2016	Solar	A-16	8.4
20936095	2/18/2016	Solar	A-16	5.0
21013121	2/18/2016	Solar	A-16	3.0
21053785	2/18/2016	Solar	A-16	3.8
21053788	2/18/2016	Solar	A-16	3.0
21057822	2/18/2016	Solar	A-16	5.0
21068054	2/18/2016	Solar	A-16	3.8
21069201	2/18/2016	Solar	A-16	3.8
21132549	2/18/2016	Solar	A-16	8.0
21157116	2/18/2016	Solar	A-16	3.8
21218844	2/18/2016	Solar	A-16	11.0
21276649	2/18/2016	Solar	A-16	3.8
20549695	2/19/2016	Solar	A-16	11.4
20876129	2/24/2016	Solar	A-16	5.0
21157166	2/24/2016	Solar	A-16	5.0
20791445	2/25/2016	Solar	A-16	5.0
20871383	2/25/2016	Solar	A-16	3.0
20978542	2/25/2016	Solar	A-16	7.6
20995460	2/25/2016	Solar	A-16	5.0
21008632	2/25/2016	Solar	A-16	3.0
21087945	2/25/2016	Solar	A-16	3.0
21124321	2/26/2016	Solar	A-16	5.0
21146407	2/26/2016	Solar	A-16	3.0
20051725	2/29/2016	Solar	G-32	112.0
20513455	2/29/2016	Solar	A-16	7.1
21129293	2/29/2016	Solar	A-16	3.0
20525503	3/1/2016	Solar	A-16	7.6
20875484	3/1/2016	Solar	A-16	6.0
21138541	3/1/2016	Solar	A-16	3.8
20183933	3/2/2016	Solar	G-02	42.0
20184066	3/2/2016	Solar	G-02	42.0
20653255	3/2/2016	Solar	A-16	5.0
21005855	3/2/2016	Solar	A-16	5.0
21018225	3/2/2016	Solar	A-16	5.0
21035662	3/2/2016	Solar	A-16	3.8
21053722	3/2/2016	Solar	A-16	6.0
20723878	3/3/2016	Solar	A-16	6.0
20989226	3/3/2016	Solar	A-16	7.6
20681556	3/4/2016	Solar	A-16	5.8
20703553	3/4/2016	Solar	A-16	6.5
20736279	3/4/2016	Solar	A-16	3.6
20964292	3/4/2016	Solar	A-16	6.0

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21057808	3/7/2016	Solar	A-16	6.0
21123087	3/7/2016	Solar	A-16	4.5
21173512	3/8/2016	Solar	A-16	3.0
20978605	3/9/2016	Solar	A-16	3.8
21157319	3/9/2016	Solar	A-16	6.0
20430005	3/10/2016	Solar	A-16	5.0
20955529	3/10/2016	Solar	A-16	5.0
21094087	3/10/2016	Solar	A-16	5.8
20939658	3/11/2016	Solar	A-16	7.7
20964275	3/11/2016	Solar	A-16	5.0
20751188	3/14/2016	Solar	A-16	10.0
20875858	3/14/2016	Solar	A-16	6.0
21236800	3/14/2016	Solar	A-16	6.0
20681390	3/15/2016	Solar	A-16	4.0
21336436	3/15/2016	Solar	A-16	6.0
19403715	3/16/2016	Solar	C-06	20.0
21363127	3/16/2016	Solar	A-16	3.8
20989413	3/17/2016	Solar	A-16	3.0
21047136	3/17/2016	Solar	A-16	10.0
21053221	3/18/2016	Solar	A-16	5.0
20995364	3/21/2016	Solar	A-16	5.0
21035553	3/21/2016	Solar	A-16	7.6
21093847	3/21/2016	Solar	A-16	10.0
21018495	3/22/2016	Solar	A-16	2.8
20638101	3/23/2016	Solar	A-16	10.0
20701734	3/23/2016	Solar	A-16	4.3
20818440	3/23/2016	Solar	A-16	7.6
20862126	3/23/2016	Solar	A-16	10.0
20863092	3/23/2016	Solar	A-16	5.0
20864059	3/23/2016	Solar	A-16	5.8
20906734	3/23/2016	Solar	A-16	6.0
20943723	3/23/2016	Solar	A-16	6.9
20964162	3/23/2016	Solar	A-16	7.1
21016607	3/23/2016	Solar	A-16	10.0
21027550	3/23/2016	Solar	A-16	3.7
21027779	3/23/2016	Solar	A-16	7.6
21053752	3/23/2016	Solar	A-16	7.1
21082182	3/23/2016	Solar	A-16	6.2
21082214	3/23/2016	Solar	A-16	6.0
21082245	3/23/2016	Solar	A-16	7.6
21093928	3/23/2016	Solar	A-16	5.0
21122201	3/23/2016	Solar	A-16	3.9
21129128	3/23/2016	Solar	A-16	8.2
21149072	3/23/2016	Solar	A-16	7.1
21181702	3/23/2016	Solar	A-16	6.0
21184103	3/23/2016	Solar	A-16	3.5
21267527	3/23/2016	Solar	A-16	3.8
20236829	3/24/2016	Solar	A-16	6.0
20727203	3/24/2016	Solar	C-06	19.8
20823991	3/24/2016	Solar	A-16	8.5
20995395	3/24/2016	Solar	A-16	3.8
21053791	3/24/2016	Solar	A-16	5.0
21157284	3/24/2016	Solar	A-16	3.8
21212740	3/24/2016	Solar	C-06	15.1
21233860	3/24/2016	Solar	A-16	6.0
21239822	3/24/2016	Solar	C-06	5.0
21239825	3/24/2016	Solar	A-16	7.6
21296140	3/24/2016	Solar	A-16	7.6
20452923	3/25/2016	Solar	A-16	6.0
20495877	3/25/2016	Solar	A-16	6.0
20996182	3/25/2016	Solar	A-16	7.6
21357972	3/25/2016	Solar	A-16	3.8
20585989	3/28/2016	Solar	A-16	5.2
20617695	3/28/2016	Solar	A-16	3.9
20818970	3/28/2016	Solar	A-16	6.0
20896399	3/28/2016	Solar	A-16	5.2
21122885	3/28/2016	Solar	A-16	4.0
21135124	3/28/2016	Solar	A-16	3.4
21184159	3/28/2016	Solar	A-16	4.3
20889530	3/29/2016	Solar	A-16	7.6
20991328	3/29/2016	Solar	A-16	5.0
21219896	3/29/2016	Solar	A-16	5.0
21358002	3/29/2016	Solar	A-16	5.0
20639215	3/30/2016	Solar	A-16	15.0
21275000	3/30/2016	Solar	A-16	5.0
20168893	3/31/2016	Solar	A-16	6.0
20989455	3/31/2016	Solar	A-16	5.0
21047318	3/31/2016	Solar	A-16	3.0
21226700	3/31/2016	Solar	A-16	5.2
21253233	4/1/2016	Solar	A-16	5.0
21010799	4/4/2016	Solar	A-16	7.6
21203131	4/4/2016	Solar	A-16	5.0
21315100	4/4/2016	Solar	A-16	3.8
21351669	4/4/2016	Solar	A-16	5.0
21400682	4/4/2016	Solar	A-16	5.0
21248986	4/5/2016	Solar	A-16	13.0
21274462	4/5/2016	Solar	A-16	3.0
20494831	4/6/2016	Solar	A-16	3.3

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21233818	4/6/2016	Solar	A-16	3.0
21472955	4/6/2016	Solar	A-16	5.0
20863814	4/7/2016	Solar	A-16	4.5
20989488	4/7/2016	Solar	A-16	3.8
21027438	4/7/2016	Solar	A-16	3.9
21135099	4/7/2016	Solar	A-16	4.3
21184428	4/7/2016	Solar	A-16	7.7
20768058	4/8/2016	Solar	A-16	7.6
21210400	4/8/2016	Solar	A-16	5.0
21374926	4/8/2016	Solar	A-60	11.4
20998968	4/11/2016	Solar	A-16	6.0
21013211	4/11/2016	Solar	A-16	3.8
20495797	4/12/2016	Solar	A-16	2.0
20817484	4/13/2016	Solar	G-02	136.2
21577957	4/13/2016	Solar	A-16	3.6
20495714	4/14/2016	Solar	A-16	3.8
20689938	4/14/2016	Solar	A-16	3.8
21018420	4/14/2016	Solar	A-16	7.6
20295847	4/18/2016	Solar	A-16	7.6
20315284	4/18/2016	Solar	A-16	7.6
20493235	4/18/2016	Solar	A-16	10.0
20493551	4/18/2016	Solar	A-16	6.0
20493779	4/18/2016	Solar	A-16	7.6
20757114	4/18/2016	Solar	A-16	4.1
20863266	4/18/2016	Solar	A-16	7.6
20875954	4/18/2016	Solar	A-16	7.6
20961836	4/18/2016	Solar	A-16	4.3
20976967	4/18/2016	Solar	A-16	3.0
21000421	4/18/2016	Solar	A-16	5.0
21042595	4/18/2016	Solar	A-16	4.5
21108539	4/18/2016	Solar	A-16	16.4
21240406	4/18/2016	Solar	A-16	5.0
21240421	4/18/2016	Solar	A-16	6.0
21240538	4/18/2016	Solar	A-16	5.4
21319703	4/18/2016	Solar	A-16	6.8
21319726	4/18/2016	Solar	A-16	9.0
21346995	4/18/2016	Solar	A-16	3.8
21369895	4/18/2016	Solar	A-16	5.2
21371517	4/18/2016	Solar	A-16	8.0
21407766	4/18/2016	Solar	A-16	6.7
20495915	4/19/2016	Solar	A-16	7.6
20798925	4/19/2016	Solar	A-16	5.8
20862051	4/19/2016	Solar	A-16	3.8
20884057	4/19/2016	Solar	A-16	3.3
20921710	4/19/2016	Solar	A-16	11.0
20943764	4/19/2016	Solar	A-16	7.5
21410652	4/19/2016	Solar	A-16	4.6
21488561	4/19/2016	Solar	A-16	3.0
20702451	4/20/2016	Solar	A-16	4.0
20702962	4/20/2016	Solar	A-16	6.9
20759136	4/20/2016	Solar	A-16	3.8
21240350	4/20/2016	Solar	A-16	8.1
21295942	4/20/2016	Solar	A-16	3.0
20652580	4/21/2016	Solar	A-16	5.0
21267586	4/21/2016	Solar	A-16	7.5
21407827	4/21/2016	Solar	A-16	2.6
21507596	4/21/2016	Solar	A-16	11.4
21513883	4/21/2016	Solar	A-16	3.8
21541096	4/21/2016	Solar	A-60	3.8
20921559	4/22/2016	Solar	A-16	9.0
20977858	4/22/2016	Solar	A-16	4.8
21076956	4/22/2016	Solar	A-16	11.4
20939493	4/25/2016	Solar	A-16	3.5
21074185	4/25/2016	Solar	A-16	10.3
21438841	4/25/2016	Solar	A-16	3.8
21357870	4/26/2016	Solar	A-16	3.0
20800412	4/27/2016	Solar	A-16	8.6
21148974	4/27/2016	Solar	A-16	6.0
21184200	4/27/2016	Solar	A-16	7.6
21184251	4/27/2016	Solar	A-16	5.0
21210418	4/27/2016	Solar	A-16	7.6
21267454	4/27/2016	Solar	A-16	6.0
21439027	4/27/2016	Solar	A-16	5.0
21439049	4/27/2016	Solar	A-16	3.0
21462210	4/27/2016	Solar	A-16	11.4
21525883	4/27/2016	Solar	A-16	5.0
21537501	4/27/2016	Solar	A-16	3.0
21606638	4/27/2016	Solar	A-16	6.0
21149100	4/28/2016	Solar	A-16	10.0
21149225	4/28/2016	Solar	A-16	7.6
21210371	4/28/2016	Solar	A-16	6.3
21405863	4/28/2016	Solar	A-16	3.0
20989166	4/29/2016	Solar	A-16	3.0
21000169	4/29/2016	Solar	A-16	3.7
21001687	4/29/2016	Solar	A-16	3.4
21077397	4/29/2016	Solar	A-16	7.6
21175012	4/29/2016	Solar	A-16	6.0
21216817	4/29/2016	Solar	A-16	5.0

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
21254213	4/29/2016	Solar	A-16	4.3
21319608	4/29/2016	Solar	A-16	10.0
21357778	4/29/2016	Solar	A-16	3.8
20358751	5/2/2016	Solar	A-16	7.6
20875068	5/2/2016	Solar	A-16	8.0
20921468	5/2/2016	Solar	A-16	11.4
21319819	5/2/2016	Solar	A-16	5.8
21501820	5/2/2016	Solar	A-16	3.0
21590695	5/2/2016	Solar	A-16	3.8
20703941	5/3/2016	Solar	A-16	3.1
21339018	5/3/2016	Solar	A-16	10.0
21296095	5/4/2016	Solar	A-16	5.0
21491735	5/4/2016	Solar	A-16	3.0
21018379	5/5/2016	Solar	A-16	7.6
21254328	5/5/2016	Solar	A-16	8.0
21431640	5/6/2016	Solar	A-16	6.0
21517689	5/6/2016	Solar	A-16	3.9
20984302	5/9/2016	Solar	A-16	8.3
21022474	5/9/2016	Solar	A-16	15.0
21174877	5/9/2016	Solar	A-16	3.9
21338996	5/9/2016	Solar	A-16	5.0
21503435	5/9/2016	Solar	A-16	5.0
21507523	5/9/2016	Solar	A-60	5.0
21369359	5/10/2016	Solar	A-16	8.3
21502082	5/10/2016	Solar	A-16	5.0
20451680	5/11/2016	Solar	A-16	9.5
21035754	5/11/2016	Solar	A-16	3.8
21319425	5/11/2016	Solar	A-16	6.5
21481326	5/11/2016	Solar	A-16	6.0
21537469	5/11/2016	Solar	A-16	6.0
21563410	5/11/2016	Solar	A-16	3.0
21621918	5/11/2016	Solar	A-16	7.6
20977131	5/12/2016	Solar	A-16	6.0
21018216	5/12/2016	Solar	A-16	7.6
21087181	5/12/2016	Solar	A-16	6.0
21089905	5/12/2016	Solar	A-16	2.5
21338918	5/12/2016	Solar	A-16	8.0
21443513	5/12/2016	Solar	A-16	5.0
21516666	5/12/2016	Solar	A-16	10.0
21605202	5/12/2016	Solar	A-16	4.5
21622260	5/12/2016	Solar	A-16	7.6
20581809	5/13/2016	Solar	G-02	56.0
20584637	5/13/2016	Solar	A-16	3.7
20646923	5/13/2016	Solar	A-16	5.0
20862922	5/13/2016	Solar	A-16	7.6
21027242	5/13/2016	Solar	A-16	1.8
21068770	5/13/2016	Solar	A-16	5.0
21240373	5/13/2016	Solar	A-16	7.3
21319675	5/13/2016	Solar	A-16	5.4
21438781	5/13/2016	Solar	A-16	6.7
21439515	5/13/2016	Solar	A-16	4.6
21462428	5/13/2016	Solar	A-16	8.7
21466787	5/13/2016	Solar	A-16	7.3
21466932	5/13/2016	Solar	A-16	3.5
21488330	5/13/2016	Solar	A-16	4.5
21565334	5/13/2016	Solar	A-16	5.0
21629670	5/13/2016	Solar	A-16	7.6
21293511	5/16/2016	Solar	A-16	4.8
21408016	5/16/2016	Solar	A-16	10.0
21439165	5/16/2016	Solar	A-16	5.6
21673730	5/16/2016	Solar	A-16	11.4
20995821	5/18/2016	Solar	A-16	7.6
21068383	5/18/2016	Solar	A-16	5.0
21677900	5/18/2016	Solar	A-16	3.0
20729347	5/19/2016	Solar	A-16	3.0
20913808	5/19/2016	Solar	A-16	6.3
20972754	5/19/2016	Solar	A-16	10.0
21028022	5/19/2016	Solar	A-16	2.7
21295921	5/19/2016	Solar	A-16	6.0
21407877	5/19/2016	Solar	A-16	5.0
21426382	5/19/2016	Solar	A-16	7.5
21451728	5/19/2016	Solar	A-16	3.8
21462264	5/19/2016	Solar	A-16	9.0
21548455	5/19/2016	Solar	A-16	5.0
21659263	5/19/2016	Solar	A-16	5.0
21698404	5/19/2016	Solar	A-16	5.0
20944253	5/20/2016	Solar	A-16	5.6
20995242	5/20/2016	Solar	A-16	3.8
21233089	5/20/2016	Solar	A-16	5.0
21297430	5/20/2016	Solar	A-16	5.8
21427804	5/20/2016	Solar	A-16	7.6
21496005	5/20/2016	Solar	A-16	10.0
21582423	5/20/2016	Solar	A-16	5.0
21643675	5/20/2016	Solar	A-16	5.0
21661794	5/20/2016	Solar	A-16	5.0
18803453	5/23/2016	Solar	G-02	264.0
21397752	5/23/2016	Solar	A-16	7.7
21723474	5/23/2016	Solar	A-16	5.0

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20800630	5/24/2016	Solar	A-16	5.0
21094026	5/24/2016	Solar	A-16	7.6
21157335	5/24/2016	Solar	A-16	3.8
21293050	5/24/2016	Solar	A-16	3.0
21319759	5/24/2016	Solar	A-16	6.8
21431542	5/24/2016	Solar	A-16	5.0
21431594	5/24/2016	Solar	A-16	10.0
21510259	5/24/2016	Solar	A-16	6.2
21661732	5/24/2016	Solar	A-16	6.0
21677070	5/24/2016	Solar	A-16	3.0
21170036	5/25/2016	Solar	A-16	2.5
21208519	5/25/2016	Solar	A-16	5.0
21295739	5/25/2016	Solar	A-16	5.0
21315115	5/25/2016	Solar	A-16	3.0
21510285	5/25/2016	Solar	A-16	5.0
21524274	5/25/2016	Solar	A-16	7.6
21643742	5/25/2016	Solar	A-16	11.4
21716986	5/25/2016	Solar	A-16	6.0
21334450	5/26/2016	Solar	A-16	5.3
21685303	5/26/2016	Solar	C-06	4.0
21702728	5/26/2016	Solar	A-16	3.8
21747038	5/26/2016	Solar	A-16	3.0
21808408	5/26/2016	Solar	A-16	3.0
21018193	5/27/2016	Solar	A-16	6.0
21026123	5/27/2016	Solar	C-06	11.4
21339100	5/27/2016	Solar	A-16	3.0
21723505	5/27/2016	Solar	A-16	3.0
20536913	6/1/2016	Solar	A-16	6.0
20630501	6/1/2016	Solar	C-06	27.3
20751063	6/1/2016	Solar	A-16	6.0
21466879	6/2/2016	Solar	A-16	5.4
21481305	6/2/2016	Solar	A-16	7.3
21496001	6/2/2016	Solar	A-16	3.0
21746773	6/2/2016	Solar	A-16	5.0
21397846	6/3/2016	Solar	A-16	7.6
21802559	6/3/2016	Solar	A-16	5.0
20025770	6/7/2016	Solar	G-02	70.0
21026761	6/7/2016	Solar	A-16	3.9
21093997	6/7/2016	Solar	A-16	10.0
21123884	6/7/2016	Solar	A-16	6.2
21129095	6/7/2016	Solar	A-16	5.2
21240453	6/7/2016	Solar	A-16	7.6
21339121	6/7/2016	Solar	A-16	7.6
21371410	6/7/2016	Solar	A-16	6.9
21408288	6/7/2016	Solar	A-16	3.8
21426511	6/7/2016	Solar	A-16	7.6
21427991	6/7/2016	Solar	A-16	9.0
21456377	6/7/2016	Solar	A-16	7.4
21456487	6/7/2016	Solar	A-16	7.6
21462203	6/7/2016	Solar	A-16	7.6
21481560	6/7/2016	Solar	A-16	1.8
21509201	6/7/2016	Solar	A-16	4.5
21518376	6/7/2016	Solar	A-16	3.0
21587534	6/7/2016	Solar	A-16	5.0
21636217	6/7/2016	Solar	A-16	4.9
21666349	6/7/2016	Solar	A-16	5.3
20494995	6/8/2016	Solar	A-16	8.0
20723947	6/8/2016	Solar	A-16	5.0
20862270	6/8/2016	Solar	A-16	3.5
20943947	6/8/2016	Solar	A-16	5.2
21240344	6/8/2016	Solar	A-16	8.3
21427161	6/8/2016	Solar	A-16	5.5
21438881	6/8/2016	Solar	A-16	10.0
21438916	6/8/2016	Solar	A-16	3.8
21443595	6/8/2016	Solar	A-16	10.0
21449988	6/8/2016	Solar	A-16	10.3
21462703	6/8/2016	Solar	A-16	7.6
21462771	6/8/2016	Solar	A-16	8.0
21466670	6/8/2016	Solar	A-16	7.0
21481288	6/8/2016	Solar	A-16	4.1
21516406	6/8/2016	Solar	A-16	5.0
21530750	6/8/2016	Solar	A-16	5.2
21546922	6/8/2016	Solar	A-16	7.6
21587577	6/8/2016	Solar	A-16	7.6
21599017	6/8/2016	Solar	A-16	7.5
21629189	6/8/2016	Solar	A-16	4.8
21802505	6/8/2016	Solar	A-16	3.0
20798647	6/9/2016	Solar	A-16	5.0
20863463	6/9/2016	Solar	A-16	5.4
21254126	6/9/2016	Solar	A-16	7.6
21267377	6/9/2016	Solar	A-16	11.5
21431403	6/9/2016	Solar	A-16	7.6
21431574	6/9/2016	Solar	A-16	5.0
21466679	6/9/2016	Solar	A-16	2.9
21509393	6/9/2016	Solar	A-16	7.5
21530490	6/9/2016	Solar	A-16	3.8
21539866	6/9/2016	Solar	A-16	10.0
21610429	6/9/2016	Solar	A-16	6.0

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21746809	6/9/2016	Solar	A-16	6.0
21983641	6/9/2016	Solar	A-16	5.0
21122714	6/10/2016	Solar	A-16	6.3
21319506	6/10/2016	Solar	A-16	10.0
21319632	6/10/2016	Solar	A-16	12.0
20606424	6/13/2016	Solar	A-16	7.6
21263312	6/13/2016	Solar	A-16	6.5
21428785	6/13/2016	Solar	A-16	4.3
21481297	6/13/2016	Solar	A-16	4.0
21481311	6/13/2016	Solar	A-16	4.5
21495995	6/13/2016	Solar	A-16	7.6
21518355	6/13/2016	Solar	A-16	3.0
21545960	6/13/2016	Solar	A-60	5.0
21659307	6/13/2016	Solar	C-06	14.4
21665486	6/13/2016	Solar	A-16	7.6
20943834	6/14/2016	Solar	A-16	7.6
21735161	6/14/2016	Solar	A-16	10.0
21087233	6/15/2016	Solar	A-16	5.0
21215305	6/15/2016	Solar	A-16	10.0
21371015	6/15/2016	Solar	A-16	5.1
21407812	6/15/2016	Solar	A-16	7.6
21590665	6/15/2016	Solar	A-16	5.0
21651105	6/15/2016	Solar	A-16	3.0
21779161	6/15/2016	Solar	A-16	6.0
21913764	6/15/2016	Solar	A-16	3.0
21267615	6/16/2016	Solar	A-16	3.9
21516999	6/16/2016	Solar	A-16	6.5
21518308	6/16/2016	Solar	A-16	3.9
21533487	6/16/2016	Solar	A-16	6.0
21563850	6/16/2016	Solar	A-16	3.8
21716015	6/16/2016	Solar	A-16	8.3
21744771	6/16/2016	Solar	A-16	3.0
21750597	6/16/2016	Solar	A-16	3.8
21889789	6/16/2016	Solar	A-16	5.0
21094331	6/17/2016	Solar	A-16	7.8
21122497	6/17/2016	Solar	A-16	5.0
21439070	6/17/2016	Solar	A-16	7.6
21462236	6/17/2016	Solar	A-16	7.6
21565419	6/17/2016	Solar	A-16	5.0
21662135	6/17/2016	Solar	A-16	3.8
21151356	6/20/2016	Solar	A-16	6.0
21400619	6/20/2016	Solar	A-16	3.0
21625651	6/20/2016	Solar	A-16	3.8
21723098	6/20/2016	Solar	A-16	5.0
21747005	6/20/2016	Solar	A-16	3.0
21813523	6/20/2016	Solar	A-16	7.6
21900572	6/20/2016	Solar	A-16	3.8
21822583	6/21/2016	Solar	A-16	6.0
21913363	6/21/2016	Solar	A-16	5.0
21082098	6/22/2016	Solar	A-16	3.4
21122332	6/22/2016	Solar	A-16	6.5
21485169	6/22/2016	Solar	A-16	3.0
21509991	6/22/2016	Solar	A-16	14.5
21533424	6/22/2016	Solar	A-16	6.2
21533443	6/22/2016	Solar	A-16	9.0
21747155	6/22/2016	Solar	A-16	7.6
21774435	6/22/2016	Solar	A-16	3.8
21788868	6/22/2016	Solar	A-16	7.5
21791782	6/22/2016	Solar	A-16	5.0
21924490	6/22/2016	Solar	A-16	3.8
21235619	6/23/2016	Solar	A-16	5.0
21240291	6/23/2016	Solar	A-16	2.5
21410737	6/23/2016	Solar	A-16	4.3
21438851	6/23/2016	Solar	A-16	5.0
21488345	6/23/2016	Solar	A-16	6.2
21502665	6/23/2016	Solar	A-16	5.0
21516523	6/23/2016	Solar	A-16	3.0
21531782	6/23/2016	Solar	A-16	5.0
21573808	6/23/2016	Solar	A-16	5.0
21622166	6/23/2016	Solar	A-16	11.0
21629405	6/23/2016	Solar	A-16	5.6
22116881	6/23/2016	Solar	A-16	10.0
21273327	6/24/2016	Solar	A-16	7.6
21545281	6/24/2016	Solar	A-16	11.8
20186983	6/27/2016	Solar	A-16	7.6
21533467	6/28/2016	Solar	A-16	4.5
21552258	6/28/2016	Solar	A-16	10.3
21361150	6/29/2016	Solar	A-16	11.0
21371622	6/29/2016	Solar	A-16	7.2
21371644	6/29/2016	Solar	A-16	7.8
21371645	6/29/2016	Solar	A-16	7.2
21371663	6/29/2016	Solar	A-16	4.2
21371665	6/29/2016	Solar	A-16	8.6
21371667	6/29/2016	Solar	A-16	3.0
21396589	6/29/2016	Solar	A-16	4.2
21396600	6/29/2016	Solar	A-16	4.2
21396610	6/29/2016	Solar	A-16	6.0
21396615	6/29/2016	Solar	A-16	6.0

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21396676	6/29/2016	Solar	A-16	4.2
21396679	6/29/2016	Solar	A-16	6.0
21396689	6/29/2016	Solar	A-16	6.0
21431173	6/29/2016	Solar	A-16	9.0
21431248	6/29/2016	Solar	A-16	8.4
21431288	6/29/2016	Solar	A-16	3.0
21431293	6/29/2016	Solar	A-16	9.2
21431299	6/29/2016	Solar	A-16	7.2
21431306	6/29/2016	Solar	A-16	6.0
21431313	6/29/2016	Solar	A-16	6.0
21431316	6/29/2016	Solar	A-16	7.2
21465875	6/29/2016	Solar	A-16	3.0
21466081	6/29/2016	Solar	A-16	8.4
21469352	6/29/2016	Solar	A-16	3.0
21469361	6/29/2016	Solar	A-16	4.2
21469363	6/29/2016	Solar	A-16	8.0
21496003	6/29/2016	Solar	A-16	7.6
21509580	6/29/2016	Solar	A-16	8.0
21524008	6/29/2016	Solar	A-16	7.5
21524550	6/29/2016	Solar	A-16	3.8
21573818	6/29/2016	Solar	A-16	8.6
21645528	6/29/2016	Solar	A-16	5.2
21745758	6/29/2016	Solar	A-16	5.9
21778725	6/29/2016	Solar	A-16	5.3
21867724	6/29/2016	Solar	A-16	5.0
21899462	6/29/2016	Solar	A-16	3.8
22098823	6/29/2016	Solar	A-16	3.0
21018249	6/30/2016	Solar	A-16	10.0
21094132	6/30/2016	Solar	A-16	5.0
21361814	6/30/2016	Solar	A-16	6.0
21361879	6/30/2016	Solar	A-16	6.0
21361891	6/30/2016	Solar	A-16	7.2
21362166	6/30/2016	Solar	A-16	6.0
21362403	6/30/2016	Solar	A-16	6.0
21362617	6/30/2016	Solar	A-16	6.0
21362631	6/30/2016	Solar	A-16	6.0
21362635	6/30/2016	Solar	A-16	5.0
21362639	6/30/2016	Solar	A-16	6.0
21362642	6/30/2016	Solar	A-16	6.0
21362654	6/30/2016	Solar	A-16	6.0
21362661	6/30/2016	Solar	A-16	6.0
21362666	6/30/2016	Solar	A-16	6.0
21362673	6/30/2016	Solar	A-16	6.0
21362691	6/30/2016	Solar	A-16	6.0
21371639	6/30/2016	Solar	A-16	3.0
21371654	6/30/2016	Solar	A-16	4.2
21371656	6/30/2016	Solar	A-16	6.0
21371657	6/30/2016	Solar	A-16	6.0
21371660	6/30/2016	Solar	A-16	3.0
21371664	6/30/2016	Solar	A-16	3.0
21396564	6/30/2016	Solar	A-16	3.0
21396581	6/30/2016	Solar	A-16	6.0
21396622	6/30/2016	Solar	A-16	6.0
21396635	6/30/2016	Solar	A-16	3.6
21396658	6/30/2016	Solar	A-16	6.0
21396694	6/30/2016	Solar	A-16	6.0
21396708	6/30/2016	Solar	A-16	6.0
21431266	6/30/2016	Solar	A-16	5.0
21431280	6/30/2016	Solar	A-16	4.2
21431281	6/30/2016	Solar	A-16	4.2
21431282	6/30/2016	Solar	A-16	6.0
21465894	6/30/2016	Solar	A-16	8.6
21573775	6/30/2016	Solar	A-16	10.0
22136361	6/30/2016	Solar	A-16	7.6
21040900	7/1/2016	Solar	A-16	5.4
21122527	7/1/2016	Solar	A-16	3.4
21160810	7/1/2016	Solar	A-16	5.6
21269257	7/1/2016	Solar	A-16	5.4
21362676	7/1/2016	Solar	A-16	4.2
21396646	7/1/2016	Solar	A-16	12.0
21417449	7/1/2016	Solar	A-16	6.5
21466076	7/1/2016	Solar	A-16	5.0
21625851	7/1/2016	Solar	A-16	10.0
21746721	7/1/2016	Solar	A-16	7.6
21761881	7/1/2016	Solar	A-16	7.6
20589037	7/5/2016	Solar	A-16	10.0
20871668	7/5/2016	Solar	A-16	2.7
21303909	7/5/2016	Solar	A-16	3.0
21371550	7/5/2016	Solar	A-16	7.3
21552921	7/5/2016	Solar	A-16	3.9
21580761	7/5/2016	Solar	A-16	15.0
21692934	7/5/2016	Solar	A-16	3.8
21698278	7/5/2016	Solar	A-16	3.0
21812219	7/5/2016	Solar	A-16	7.6
21822660	7/5/2016	Solar	A-16	5.0
21933005	7/5/2016	Solar	A-16	12.0
21516222	7/6/2016	Solar	A-16	3.0
21788762	7/6/2016	Solar	A-16	5.0

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
21800042	7/6/2016	Solar	A-16	5.0
21912035	7/6/2016	Solar	A-16	6.0
21983526	7/6/2016	Solar	A-16	3.0
22008433	7/6/2016	Solar	C-06	86.4
20649631	7/7/2016	Solar	A-16	3.0
21417561	7/7/2016	Solar	A-16	6.7
21548524	7/7/2016	Solar	A-16	3.8
21606648	7/7/2016	Solar	A-16	5.0
21625881	7/7/2016	Solar	A-16	5.5
21903402	7/7/2016	Solar	A-16	5.0
15640455	7/8/2016	Wind	C-06	1500.0
15772951	7/8/2016	Wind	C-06	1500.0
21018348	7/8/2016	Solar	A-16	10.0
21955909	7/8/2016	Solar	A-16	6.0
20613934	7/11/2016	Solar	A-16	5.0
21018410	7/11/2016	Solar	A-16	5.0
21282146	7/11/2016	Solar	A-16	5.0
21495996	7/11/2016	Solar	A-16	5.0
21626139	7/11/2016	Solar	A-16	6.0
21709200	7/11/2016	Solar	A-16	5.0
21803904	7/12/2016	Solar	A-16	3.0
21829658	7/12/2016	Solar	A-16	10.0
21837448	7/12/2016	Solar	A-16	6.0
21900772	7/12/2016	Solar	A-16	3.0
22237510	7/12/2016	Solar	A-16	3.0
20734935	7/13/2016	Solar	A-16	6.0
21001536	7/13/2016	Solar	A-16	2.6
21094292	7/13/2016	Solar	A-16	5.3
21267477	7/13/2016	Solar	A-16	5.0
21338633	7/13/2016	Solar	A-16	1.8
21338767	7/13/2016	Solar	A-16	7.6
21338966	7/13/2016	Solar	A-16	4.0
21339186	7/13/2016	Solar	A-16	6.0
21368594	7/13/2016	Solar	A-16	13.0
21488356	7/13/2016	Solar	A-16	14.5
21488424	7/13/2016	Solar	A-16	3.2
21496004	7/13/2016	Solar	A-16	6.0
21508842	7/13/2016	Solar	A-16	9.3
21547300	7/13/2016	Solar	A-16	4.5
21552371	7/13/2016	Solar	A-16	7.5
21573797	7/13/2016	Solar	A-16	3.8
21611537	7/13/2016	Solar	A-16	6.0
21628898	7/13/2016	Solar	A-16	6.9
21630107	7/13/2016	Solar	A-16	7.0
21643690	7/13/2016	Solar	A-16	8.1
21661758	7/13/2016	Solar	A-16	6.0
21661823	7/13/2016	Solar	A-16	3.0
21762675	7/13/2016	Solar	A-16	5.9
21784055	7/13/2016	Solar	A-16	6.0
21913756	7/13/2016	Solar	A-16	3.8
21976631	7/13/2016	Solar	A-16	6.0
21988465	7/13/2016	Solar	A-16	3.0
22101278	7/13/2016	Solar	A-16	7.6
22137806	7/13/2016	Solar	A-16	3.8
21258025	7/14/2016	Solar	C-06	20.0
21439451	7/14/2016	Solar	A-16	2.9
21625678	7/14/2016	Solar	A-16	6.0
22043175	7/14/2016	Solar	A-16	11.4
21911058	7/15/2016	Solar	A-16	5.0
21912952	7/15/2016	Solar	A-16	7.6
20638389	7/18/2016	Solar	A-16	3.8
21002008	7/18/2016	Solar	A-16	4.5
21219875	7/18/2016	Solar	A-16	10.0
21240444	7/18/2016	Solar	A-16	10.0
21462630	7/18/2016	Solar	A-16	11.1
21533404	7/18/2016	Solar	A-16	6.0
21582429	7/18/2016	Solar	A-16	10.0
21645355	7/18/2016	Solar	A-16	6.1
22226359	7/18/2016	Solar	A-16	7.1
20512809	7/19/2016	Solar	A-16	3.0
21129181	7/19/2016	Solar	A-16	8.4
21362683	7/19/2016	Solar	A-16	5.0
21371646	7/19/2016	Solar	A-16	6.0
21371648	7/19/2016	Solar	A-16	4.2
21552190	7/19/2016	Solar	A-16	7.7
21699822	7/19/2016	Solar	A-16	5.0
21817981	7/19/2016	Solar	A-16	6.0
21830070	7/19/2016	Solar	A-16	5.1
21830219	7/19/2016	Solar	A-16	3.5
21837897	7/19/2016	Solar	A-16	7.6
21909166	7/19/2016	Solar	A-16	5.0
21966799	7/19/2016	Solar	A-16	4.0
22100819	7/19/2016	Solar	A-16	3.8
20986914	7/20/2016	Solar	A-16	19.8
21292984	7/20/2016	Solar	A-16	4.5
21524722	7/20/2016	Solar	A-16	5.2
21587652	7/20/2016	Solar	A-16	5.0
22041469	7/20/2016	Solar	A-16	5.5

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21341542	7/21/2016	Solar	A-16	4.1
21397790	7/21/2016	Solar	A-16	5.0
21488404	7/21/2016	Solar	A-16	4.8
21644595	7/21/2016	Solar	A-16	6.0
21684866	7/21/2016	Solar	A-16	6.8
21699225	7/21/2016	Solar	A-16	5.3
21763209	7/21/2016	Solar	A-16	7.6
21818175	7/21/2016	Solar	A-16	9.5
21912079	7/21/2016	Solar	A-16	5.0
21972269	7/21/2016	Solar	A-16	8.8
21097043	7/22/2016	Solar	A-16	4.7
21184331	7/22/2016	Solar	A-16	9.0
21240483	7/22/2016	Solar	A-16	5.0
21467363	7/22/2016	Solar	A-16	6.0
21481320	7/22/2016	Solar	A-16	8.0
21488371	7/22/2016	Solar	A-16	2.8
21536399	7/22/2016	Solar	A-16	6.2
21552447	7/22/2016	Solar	A-16	6.3
21750464	7/22/2016	Solar	A-16	3.2
21922981	7/22/2016	Solar	A-16	3.0
22073623	7/22/2016	Solar	A-16	3.0
21466961	7/25/2016	Solar	A-16	8.4
21802475	7/26/2016	Solar	A-16	10.0
22111118	7/26/2016	Solar	A-16	6.0
21407784	7/27/2016	Solar	A-16	4.6
21410687	7/27/2016	Solar	A-16	8.0
21536678	7/27/2016	Solar	A-16	4.1
21547964	7/27/2016	Solar	A-16	6.8
21587683	7/27/2016	Solar	A-16	5.0
21668595	7/27/2016	Solar	C-06	11.4
21723677	7/27/2016	Solar	A-16	3.8
21945526	7/27/2016	Solar	A-16	7.6
22191471	7/27/2016	Solar	A-60	5.0
21010786	7/28/2016	Solar	A-16	3.9
21450730	7/28/2016	Solar	A-16	5.0
21465371	7/28/2016	Solar	A-16	12.0
21625725	7/28/2016	Solar	A-16	3.0
21924484	7/28/2016	Solar	A-16	6.0
21643719	7/29/2016	Solar	A-60	11.4
22054139	7/29/2016	Solar	A-16	3.8
22111385	7/29/2016	Solar	A-60	3.8
21417647	8/1/2016	Solar	A-16	6.9
21546732	8/1/2016	Solar	A-16	3.0
21573832	8/1/2016	Solar	A-16	6.7
21659291	8/1/2016	Solar	A-16	10.0
21857769	8/1/2016	Solar	A-16	7.6
22130545	8/1/2016	Solar	A-16	6.0
21240512	8/2/2016	Solar	A-16	7.6
21293011	8/2/2016	Solar	A-16	6.5
21462360	8/2/2016	Solar	A-16	5.2
21480609	8/2/2016	Solar	A-16	0.8
21518739	8/2/2016	Solar	A-16	10.0
21601525	8/2/2016	Solar	A-16	12.0
21668412	8/2/2016	Solar	A-16	13.8
21797506	8/2/2016	Solar	A-16	5.0
21829811	8/2/2016	Solar	A-16	8.1
21840850	8/2/2016	Solar	A-16	8.3
21859391	8/2/2016	Solar	A-16	6.0
21963625	8/2/2016	Solar	A-16	10.0
22111086	8/2/2016	Solar	A-16	5.8
22200345	8/2/2016	Solar	A-16	6.6
21145608	8/3/2016	Solar	A-16	7.7
21518718	8/3/2016	Solar	A-16	4.3
21557829	8/3/2016	Solar	A-16	9.0
21685349	8/3/2016	Solar	C-06	6.5
21818515	8/3/2016	Solar	A-16	6.5
21860431	8/3/2016	Solar	A-16	10.0
21877194	8/3/2016	Solar	A-16	10.0
21975266	8/3/2016	Solar	A-16	8.0
21985243	8/3/2016	Solar	A-16	7.5
21431213	8/4/2016	Solar	A-16	7.2
21844095	8/4/2016	Solar	A-16	5.0
21863659	8/4/2016	Solar	A-16	5.0
22198349	8/4/2016	Solar	A-16	5.0
14462941	8/5/2016	Wind	G-32	4500.0
20475295	8/8/2016	Solar	A-16	6.0
21314676	8/8/2016	Solar	A-16	3.4
21357756	8/8/2016	Solar	A-16	3.0
21450409	8/8/2016	Solar	A-16	10.0
21539691	8/8/2016	Solar	A-16	3.0
21625631	8/8/2016	Solar	A-16	5.0
21933015	8/8/2016	Solar	A-16	3.8
22118859	8/8/2016	Solar	A-16	7.6
16757744	8/10/2016	Solar	C-06	1170.0
18094044	8/10/2016	Solar	C-06	878.4
21439389	8/10/2016	Solar	A-16	7.6
21698917	8/10/2016	Solar	A-16	7.0
22177028	8/10/2016	Solar	A-16	7.5

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16721813	8/11/2016	Solar	C-06	1000.0
20174457	8/11/2016	Wind	C-06	1500.0
21338819	8/11/2016	Solar	A-16	7.6
21339034	8/11/2016	Solar	A-16	3.8
21339152	8/11/2016	Solar	A-16	7.6
21438615	8/11/2016	Solar	A-16	6.5
21545086	8/11/2016	Solar	A-16	2.5
21577717	8/11/2016	Solar	A-16	15.0
21848228	8/11/2016	Solar	A-16	3.8
21889043	8/11/2016	Solar	A-16	3.8
21998983	8/11/2016	Solar	A-16	5.0
22005277	8/11/2016	Solar	A-16	2.3
22255947	8/11/2016	Solar	A-16	7.6
20761194	8/12/2016	Solar	A-16	5.0
21339969	8/12/2016	Solar	C-06	14.6
21518766	8/12/2016	Solar	A-16	2.9
21540039	8/12/2016	Solar	A-16	2.8
21545778	8/12/2016	Solar	A-16	4.8
21644121	8/12/2016	Solar	A-16	6.0
21645685	8/12/2016	Solar	A-16	7.6
21801976	8/12/2016	Solar	A-16	5.0
21849989	8/12/2016	Solar	A-16	3.2
21985561	8/12/2016	Solar	A-16	3.0
22006183	8/12/2016	Solar	A-16	7.6
22029986	8/12/2016	Solar	A-16	8.8
22147318	8/12/2016	Solar	A-16	4.1
22197879	8/12/2016	Solar	A-16	8.8
21653352	8/15/2016	Solar	A-16	3.8
21913051	8/15/2016	Solar	A-16	3.8
21943760	8/15/2016	Solar	A-16	9.0
22037488	8/15/2016	Solar	A-16	3.0
22060347	8/15/2016	Solar	A-16	3.0
22180249	8/15/2016	Solar	A-16	7.6
22191456	8/15/2016	Solar	A-16	3.0
22244862	8/15/2016	Solar	C-06	7.6
22356311	8/15/2016	Solar	C-06	9.0
21240522	8/16/2016	Solar	A-16	3.0
22148145	8/16/2016	Solar	A-16	2.8
21986892	8/17/2016	Solar	A-16	5.5
22005920	8/17/2016	Solar	A-16	6.0
22112331	8/17/2016	Solar	A-16	5.8
22188314	8/17/2016	Solar	A-16	10.0
22224039	8/17/2016	Solar	A-16	3.8
19307209	8/18/2016	Solar	G-02	39.9
21761918	8/18/2016	Solar	A-16	5.0
21766788	8/18/2016	Solar	C-06	15.0
21921655	8/18/2016	Solar	A-16	7.6
22218618	8/18/2016	Solar	A-16	7.6
22303147	8/18/2016	Solar	A-16	7.6
21901187	8/22/2016	Solar	A-16	7.6
22258418	8/22/2016	Solar	A-16	10.0
22387290	8/22/2016	Solar	A-16	3.8
21097182	8/23/2016	Solar	A-16	10.0
21293074	8/23/2016	Solar	A-16	5.6
21427523	8/23/2016	Solar	G-32	37.8
21843852	8/23/2016	Solar	A-16	3.8
21911783	8/23/2016	Solar	A-16	6.9
21953730	8/23/2016	Solar	A-16	5.0
22087230	8/23/2016	Solar	A-16	3.0
22110988	8/23/2016	Solar	A-16	6.0
22304237	8/23/2016	Solar	A-16	11.4
22313678	8/23/2016	Solar	A-16	7.6
22229301	8/24/2016	Solar	A-16	3.0
22236588	8/24/2016	Solar	A-16	3.0
21078568	8/25/2016	Solar	A-16	8.0
21093966	8/25/2016	Solar	A-16	7.6
21097400	8/25/2016	Solar	A-16	7.6
21371635	8/25/2016	Solar	A-16	4.2
21375069	8/25/2016	Solar	A-16	3.0
21431251	8/25/2016	Solar	A-16	5.0
21431296	8/25/2016	Solar	A-16	7.8
21465595	8/25/2016	Solar	A-16	3.6
21502279	8/25/2016	Solar	A-16	6.5
21547686	8/25/2016	Solar	A-16	7.5
21590802	8/25/2016	Solar	A-16	3.0
21764163	8/25/2016	Solar	A-16	7.3
21869777	8/25/2016	Solar	A-16	4.0
21870162	8/25/2016	Solar	A-16	6.3
21877476	8/25/2016	Solar	A-16	5.0
21880768	8/25/2016	Solar	A-16	9.0
21919155	8/25/2016	Solar	A-16	9.0
21922438	8/25/2016	Solar	A-16	6.0
21938655	8/25/2016	Solar	A-16	6.0
21953365	8/25/2016	Solar	A-16	7.6
21964126	8/25/2016	Solar	A-16	6.0
21965510	8/25/2016	Solar	A-16	6.0
21974154	8/25/2016	Solar	A-16	10.0
21998640	8/25/2016	Solar	A-16	5.8

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22120267	8/25/2016	Solar	A-16	10.0
22148898	8/25/2016	Solar	A-16	7.1
22158272	8/25/2016	Solar	A-16	3.0
22198795	8/25/2016	Solar	A-16	7.6
22200328	8/25/2016	Solar	A-16	10.0
22285088	8/25/2016	Solar	A-16	5.0
21625913	8/26/2016	Solar	A-16	5.0
21629833	8/26/2016	Solar	A-16	2.9
21745481	8/26/2016	Solar	A-16	11.0
21763744	8/26/2016	Solar	A-16	8.1
22000966	8/26/2016	Solar	A-16	3.8
22050355	8/26/2016	Solar	A-16	5.0
22360330	8/26/2016	Solar	A-16	7.6
21462328	8/29/2016	Solar	A-16	5.7
21302626	8/30/2016	Solar	A-16	5.0
21626190	8/30/2016	Solar	A-16	5.0
22111345	8/30/2016	Solar	A-16	10.0
22223454	8/30/2016	Solar	A-16	3.8
22295026	8/30/2016	Solar	A-16	5.0
22418331	8/30/2016	Solar	A-16	3.8
21626204	8/31/2016	Solar	A-16	6.0
21653406	8/31/2016	Solar	A-16	3.8
21976652	8/31/2016	Solar	A-16	6.0
22318627	8/31/2016	Solar	A-16	3.8
21329279	9/1/2016	Solar	A-16	3.8
21533497	9/1/2016	Solar	A-16	6.9
21552830	9/1/2016	Solar	A-16	3.2
21552989	9/1/2016	Solar	A-16	5.5
21744455	9/1/2016	Solar	A-16	3.8
21898941	9/1/2016	Solar	A-16	3.0
21909787	9/1/2016	Solar	A-16	10.0
21913068	9/1/2016	Solar	A-16	3.8
22050420	9/1/2016	Solar	A-16	7.6
22050850	9/1/2016	Solar	A-16	5.6
22128245	9/1/2016	Solar	A-16	7.1
22137112	9/1/2016	Solar	A-16	3.8
22157583	9/1/2016	Solar	A-16	6.8
22178613	9/1/2016	Solar	A-16	8.8
22200681	9/1/2016	Solar	A-16	2.5
22214033	9/1/2016	Solar	A-16	4.5
22319320	9/1/2016	Solar	A-16	5.6
21184290	9/2/2016	Solar	A-16	6.0
22043151	9/2/2016	Solar	A-16	6.2
22100838	9/2/2016	Solar	A-16	3.0
21254341	9/6/2016	Solar	A-16	7.0
21410519	9/6/2016	Solar	A-16	10.0
21439292	9/6/2016	Solar	A-16	10.0
21439324	9/6/2016	Solar	A-16	3.0
21439425	9/6/2016	Solar	A-16	5.5
21439531	9/6/2016	Solar	A-16	10.7
21466915	9/6/2016	Solar	A-16	6.1
21552555	9/6/2016	Solar	A-16	7.6
21603327	9/6/2016	Solar	A-16	7.3
21719373	9/6/2016	Solar	A-16	3.0
21791810	9/6/2016	Solar	A-16	3.8
21913005	9/6/2016	Solar	A-16	6.0
21913341	9/6/2016	Solar	A-16	10.0
21929463	9/6/2016	Solar	A-16	8.8
21965204	9/6/2016	Solar	A-16	9.0
22050319	9/6/2016	Solar	A-16	5.0
22089953	9/6/2016	Solar	A-16	7.6
22092138	9/6/2016	Solar	A-16	8.8
22096743	9/6/2016	Solar	A-16	8.8
22120922	9/6/2016	Solar	A-16	13.6
22139826	9/6/2016	Solar	A-16	5.5
22145384	9/6/2016	Solar	A-16	5.5
22158897	9/6/2016	Solar	A-16	3.8
22187433	9/6/2016	Solar	A-16	8.8
22199686	9/6/2016	Solar	A-16	7.6
22213651	9/6/2016	Solar	A-16	9.3
22214478	9/6/2016	Solar	A-16	10.0
22227774	9/6/2016	Solar	A-16	3.8
22264143	9/6/2016	Solar	A-16	6.0
22264350	9/6/2016	Solar	A-16	8.8
22335114	9/6/2016	Solar	A-16	10.0
20157367	9/7/2016	Solar	A-16	14.0
21292847	9/8/2016	Solar	A-16	5.9
21407790	9/8/2016	Solar	A-16	6.9
21552632	9/8/2016	Solar	A-16	3.8
21771359	9/8/2016	Solar	A-16	6.0
22228031	9/8/2016	Solar	A-16	3.0
22364352	9/8/2016	Solar	A-16	7.3
22415139	9/8/2016	Solar	A-16	3.8
17600293	9/9/2016	Wind	C-06	4500.0
21626003	9/9/2016	Solar	A-16	3.8
22191436	9/10/2016	Solar	A-16	10.0
22199258	9/12/2016	Solar	A-16	13.6
21439350	9/13/2016	Solar	A-16	3.5

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
21840717	9/13/2016	Solar	A-16	3.7
21974870	9/13/2016	Solar	A-16	7.6
22436976	9/13/2016	Solar	A-60	3.2
21296045	9/14/2016	Solar	A-16	4.5
21410560	9/14/2016	Solar	A-16	5.0
21553668	9/14/2016	Solar	A-16	7.6
21581637	9/14/2016	Solar	A-16	20.0
21626231	9/14/2016	Solar	A-16	6.0
21407756	9/15/2016	Solar	A-16	3.5
21410539	9/15/2016	Solar	A-16	5.0
21410600	9/15/2016	Solar	A-16	6.0
21552708	9/15/2016	Solar	A-16	6.0
21692843	9/15/2016	Solar	A-16	13.1
21913090	9/15/2016	Solar	A-16	6.0
22017882	9/15/2016	Solar	A-16	8.0
22264506	9/15/2016	Solar	A-16	5.0
22271754	9/15/2016	Solar	A-16	5.0
22275629	9/15/2016	Solar	A-16	6.0
22284040	9/15/2016	Solar	A-16	8.8
22335004	9/15/2016	Solar	A-16	9.3
22403645	9/15/2016	Solar	A-16	3.8
22418324	9/15/2016	Solar	A-16	10.0
22532094	9/15/2016	Solar	A-16	6.0
22520644	9/16/2016	Solar	A-16	5.2
21026617	9/20/2016	Solar	A-16	3.8
21626098	9/20/2016	Solar	A-16	3.8
21888326	9/20/2016	Solar	A-16	10.1
22146191	9/20/2016	Solar	A-16	4.5
22165962	9/20/2016	Solar	A-16	8.3
22304987	9/20/2016	Solar	A-16	3.4
22331602	9/20/2016	Solar	A-16	11.4
22383639	9/20/2016	Solar	A-16	6.0
22387319	9/20/2016	Solar	A-16	5.0
22444929	9/20/2016	Solar	A-16	5.0
22527672	9/20/2016	Solar	A-16	7.3
21093878	9/21/2016	Solar	A-16	5.0
21488382	9/21/2016	Solar	A-16	3.5
21508154	9/21/2016	Solar	A-16	6.0
21610760	9/21/2016	Solar	A-16	6.6
21989616	9/21/2016	Solar	A-16	8.8
22211368	9/21/2016	Solar	A-16	7.6
22322609	9/21/2016	Solar	A-16	8.0
22329954	9/21/2016	Solar	A-16	10.0
22346288	9/21/2016	Solar	A-16	3.8
21507912	9/23/2016	Solar	C-06	10.0
21518232	9/23/2016	Solar	A-16	8.8
21531129	9/23/2016	Solar	C-06	9.0
21545608	9/23/2016	Solar	A-16	7.7
21943591	9/23/2016	Solar	A-16	5.0
22019433	9/23/2016	Solar	C-06	98.0
22135019	9/23/2016	Solar	A-16	6.7
22235781	9/23/2016	Solar	A-16	6.0
22275332	9/23/2016	Solar	A-16	6.0
22433239	9/23/2016	Solar	A-16	6.0
22454143	9/23/2016	Solar	A-16	9.0
22578413	9/23/2016	Solar	A-16	3.0
22631385	9/23/2016	Solar	A-16	6.0
21215161	9/23/2016	Natural Gas	G-32	75
22149924	9/27/2016	Solar	A-16	5.0
22388866	9/27/2016	Solar	A-16	3.0
22436853	9/27/2016	Solar	A-16	6.0
22509203	9/27/2016	Solar	A-16	5.2
21912811	9/28/2016	Solar	A-16	10.0
21964950	9/28/2016	Solar	A-16	3.0
21975643	9/28/2016	Solar	A-16	6.0
21989665	9/28/2016	Solar	A-16	10.0
22211429	9/28/2016	Solar	A-16	3.8
22224010	9/28/2016	Solar	A-16	3.0
22443690	9/28/2016	Solar	A-16	11.4
22541786	9/28/2016	Solar	A-16	5.2
21462593	9/29/2016	Solar	A-16	7.0
21495960	9/29/2016	Solar	A-16	5.5
21821833	9/29/2016	Solar	A-16	11.4
21839517	9/29/2016	Solar	A-16	7.3
22436105	9/29/2016	Solar	A-16	10.0
22318571	10/3/2016	Solar	A-16	5.0
22433653	10/3/2016	Solar	A-16	5.2
21625957	10/4/2016	Solar	A-16	3.8
21909466	10/4/2016	Solar	A-16	5.8
22224711	10/4/2016	Solar	A-16	4.8
22356970	10/4/2016	Solar	A-16	5.2
22364139	10/4/2016	Solar	A-16	5.2
22474912	10/4/2016	Solar	A-16	10.0
22528767	10/4/2016	Solar	A-16	3.4
22586271	10/4/2016	Solar	A-16	3.0
22619931	10/4/2016	Solar	A-16	6.8
22291477	10/5/2016	Solar	A-16	3.8
22468694	10/5/2016	Solar	A-16	7.6

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
20872734	10/6/2016	Solar	A-16	5.4
21180821	10/6/2016	Solar	A-16	5.0
21338941	10/6/2016	Solar	A-16	5.0
21438743	10/6/2016	Solar	A-16	3.0
21517357	10/6/2016	Solar	A-16	8.2
21626120	10/6/2016	Solar	A-16	2.3
21929111	10/6/2016	Solar	A-16	3.0
21933017	10/6/2016	Solar	A-16	7.6
22134618	10/6/2016	Solar	A-16	4.5
22243070	10/6/2016	Solar	A-16	10.0
22285497	10/6/2016	Solar	A-16	9.0
22335577	10/6/2016	Solar	A-16	7.7
22372688	10/6/2016	Solar	A-16	6.0
19539750	10/10/2016	Solar	C-06	384.0
22697334	10/10/2016	Solar	A-16	10.4
21319849	10/12/2016	Solar	A-16	6.0
21387686	10/12/2016	Solar	A-16	7.0
21410620	10/12/2016	Solar	A-16	10.0
21541931	10/12/2016	Solar	A-16	6.3
21553168	10/12/2016	Solar	A-16	4.8
21554158	10/12/2016	Solar	A-16	7.6
21590526	10/12/2016	Solar	A-16	6.5
22090087	10/12/2016	Solar	A-16	8.0
22136240	10/12/2016	Solar	A-16	9.6
22225098	10/12/2016	Solar	A-16	3.0
22385891	10/12/2016	Solar	A-16	4.7
22492995	10/12/2016	Solar	A-16	6.0
22520753	10/12/2016	Solar	A-16	3.8
22527078	10/12/2016	Solar	A-16	7.6
22556590	10/12/2016	Solar	A-16	6.9
22568790	10/12/2016	Solar	A-16	8.3
22579207	10/12/2016	Solar	A-16	6.2
22595468	10/12/2016	Solar	A-16	3.8
22686963	10/12/2016	Solar	A-16	10.0
14319785	10/13/2016	Wind	G-32	1500.0
21985594	10/13/2016	Solar	A-16	7.6
22318594	10/13/2016	Solar	A-16	3.9
22482485	10/13/2016	Solar	A-16	5.0
22509254	10/13/2016	Solar	A-16	3.8
22666456	10/13/2016	Solar	A-16	6.0
21090149	10/14/2016	Solar	A-16	4.3
22270892	10/14/2016	Solar	A-16	6.5
22341531	10/14/2016	Solar	A-16	7.1
22526485	10/14/2016	Solar	A-16	4.8
22531265	10/14/2016	Solar	A-16	3.8
22589604	10/14/2016	Solar	A-16	3.8
22595548	10/14/2016	Solar	A-16	6.6
22363206	10/17/2016	Solar	A-16	7.6
22577961	10/17/2016	Solar	A-16	3.0
22588880	10/17/2016	Solar	A-16	6.6
22723562	10/17/2016	Solar	A-16	5.2
22855682	10/17/2016	Solar	A-16	6.0
22672941	10/19/2016	Solar	A-16	10.0
21611815	10/20/2016	Solar	G-02	45.0
21361630	10/24/2016	Solar	A-16	3.0
21362283	10/24/2016	Solar	A-16	6.0
21371652	10/24/2016	Solar	A-16	6.0
21431185	10/24/2016	Solar	A-16	12.0
21469354	10/24/2016	Solar	A-16	3.0
21469356	10/24/2016	Solar	A-16	7.8
21469357	10/24/2016	Solar	A-16	7.8
21469358	10/24/2016	Solar	A-16	3.6
21469362	10/24/2016	Solar	A-16	7.8
21626241	10/24/2016	Solar	A-16	10.0
22124097	10/24/2016	Solar	A-16	4.2
22127648	10/24/2016	Solar	A-16	8.3
22154974	10/24/2016	Solar	A-16	6.0
22237811	10/24/2016	Solar	A-16	7.6
22270467	10/24/2016	Solar	A-16	3.3
22341736	10/24/2016	Solar	A-16	5.0
22406625	10/24/2016	Solar	A-16	7.6
22130568	10/25/2016	Solar	A-16	3.8
22224090	10/25/2016	Solar	A-60	3.0
22672966	10/26/2016	Solar	A-16	10.4
22814140	10/26/2016	Solar	A-16	10.4
21387746	10/27/2016	Solar	A-16	3.3
21438797	10/27/2016	Solar	A-16	8.7
21438820	10/27/2016	Solar	A-16	5.8
21466857	10/27/2016	Solar	A-16	4.6
21495993	10/27/2016	Solar	A-16	5.7
21912770	10/27/2016	Solar	A-16	6.0
21927921	10/27/2016	Solar	A-16	7.3
22233182	10/27/2016	Solar	A-16	7.6
22270326	10/27/2016	Solar	A-16	4.5
22406660	10/27/2016	Solar	A-60	5.0
22421422	10/27/2016	Solar	A-16	3.8
22433671	10/27/2016	Solar	A-16	6.0
22444367	10/27/2016	Solar	A-16	7.6

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
22558175	10/27/2016	Solar	A-16	5.0
22574338	10/27/2016	Solar	A-16	5.0
22651829	10/27/2016	Solar	A-60	6.6
22671815	10/27/2016	Solar	A-16	3.0
22697301	10/27/2016	Solar	A-16	3.0
21553211	10/28/2016	Solar	A-16	4.3
22159343	10/28/2016	Solar	A-16	6.0
22225977	10/28/2016	Solar	A-16	5.5
22360288	10/28/2016	Solar	A-16	6.0
22365214	10/28/2016	Solar	A-16	4.1
22557191	10/28/2016	Solar	A-16	3.5
22741810	10/28/2016	Solar	A-16	5.4
22742604	10/28/2016	Solar	A-16	3.0
21371640	10/31/2016	Solar	A-16	8.6
21466807	10/31/2016	Solar	A-16	9.0
21552993	10/31/2016	Solar	A-16	7.7
21912892	10/31/2016	Solar	A-16	7.6
22217676	10/31/2016	Solar	A-16	3.8
22377544	10/31/2016	Solar	A-16	10.0
22472402	10/31/2016	Solar	A-16	3.8
22480462	10/31/2016	Solar	A-16	4.1
22493111	10/31/2016	Solar	A-16	5.2
22642029	10/31/2016	Solar	A-16	9.0
22651808	10/31/2016	Solar	A-16	3.0
22690382	10/31/2016	Solar	A-16	3.9
22722153	10/31/2016	Solar	A-16	3.8
22723603	10/31/2016	Solar	A-16	10.4
22728813	10/31/2016	Solar	A-16	7.6
22733319	10/31/2016	Solar	A-16	6.0
22770917	10/31/2016	Solar	A-16	3.8
22873899	10/31/2016	Solar	A-16	7.6
21625940	11/1/2016	Solar	A-16	10.0
22499379	11/1/2016	Solar	A-16	4.5
22643207	11/1/2016	Solar	A-16	6.6
22148720	11/2/2016	Solar	A-16	5.0
22780407	11/2/2016	Solar	A-16	5.2
22824606	11/2/2016	Solar	A-16	7.6
22891472	11/3/2016	Solar	A-16	5.2
23022999	11/3/2016	Solar	A-16	4.0
21788851	11/4/2016	Solar	A-16	5.0
22934847	11/4/2016	Solar	A-16	3.5
22595566	11/7/2016	Solar	A-16	5.0
21166448	11/8/2016	Solar	A-16	4.8
21627097	11/8/2016	Solar	A-16	7.3
22468717	11/8/2016	Solar	A-16	11.4
22814108	11/8/2016	Solar	A-16	7.6
22937440	11/8/2016	Solar	A-16	7.6
21462391	11/9/2016	Solar	A-16	8.3
21462799	11/9/2016	Solar	A-16	5.8
21507552	11/9/2016	Solar	A-16	5.0
21553429	11/9/2016	Solar	A-16	7.1
21557769	11/9/2016	Solar	A-16	7.6
21563771	11/9/2016	Solar	A-16	2.8
21577754	11/9/2016	Solar	A-16	10.0
22237304	11/9/2016	Solar	A-16	5.0
22435183	11/9/2016	Solar	A-16	3.8
22435792	11/9/2016	Solar	A-16	3.8
22577428	11/9/2016	Solar	A-16	10.0
22623386	11/9/2016	Solar	A-16	4.5
22639862	11/9/2016	Solar	A-16	5.5
22640769	11/9/2016	Solar	A-16	10.9
22643187	11/9/2016	Solar	A-16	7.6
22730660	11/9/2016	Solar	A-16	3.8
22760971	11/9/2016	Solar	A-16	5.2
22811983	11/9/2016	Solar	A-16	8.2
22812411	11/9/2016	Solar	A-16	7.6
22901220	11/9/2016	Solar	A-16	6.0
21235785	11/10/2016	Solar	A-16	5.4
21431279	11/10/2016	Solar	A-16	4.2
21435879	11/10/2016	Solar	A-16	6.5
21466023	11/10/2016	Solar	A-16	11.0
21541932	11/10/2016	Solar	A-16	7.6
21552298	11/10/2016	Solar	A-16	7.5
22318525	11/10/2016	Solar	A-16	5.0
22732269	11/10/2016	Solar	A-16	10.0
22771101	11/10/2016	Solar	A-16	3.0
22903502	11/10/2016	Solar	A-16	7.6
22872788	11/11/2016	Solar	A-16	7.5
21913402	11/14/2016	Solar	A-16	5.8
21282259	11/15/2016	Solar	A-16	5.0
22224023	11/15/2016	Solar	A-16	4.3
22306506	11/15/2016	Solar	A-16	7.6
22509233	11/15/2016	Solar	A-16	5.0
22676976	11/15/2016	Solar	A-16	5.0
22800196	11/15/2016	Solar	A-16	5.2
21466888	11/16/2016	Solar	A-16	7.6
21501593	11/16/2016	Solar	A-16	3.0
21553596	11/16/2016	Solar	A-16	6.3

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21929854	11/16/2016	Solar	A-16	2.8
22051779	11/16/2016	Solar	A-16	2.8
22443862	11/16/2016	Solar	A-16	3.8
22576793	11/16/2016	Solar	A-16	7.6
22601487	11/16/2016	Solar	A-16	3.8
22610771	11/16/2016	Solar	A-16	7.6
22641988	11/16/2016	Solar	A-16	5.2
22671141	11/16/2016	Solar	A-16	7.6
22751052	11/16/2016	Solar	A-16	3.8
22788699	11/16/2016	Solar	A-16	10.0
22800637	11/16/2016	Solar	A-16	7.6
22800664	11/16/2016	Solar	A-16	5.2
22814166	11/16/2016	Solar	A-16	3.8
22824642	11/16/2016	Solar	A-16	5.2
22824752	11/16/2016	Solar	A-16	7.6
22825016	11/16/2016	Solar	A-16	3.4
22261814	11/17/2016	Solar	A-16	6.0
22323197	11/17/2016	Solar	A-16	6.0
22741653	11/17/2016	Solar	A-16	3.8
22773000	11/17/2016	Solar	A-16	7.6
22869498	11/17/2016	Solar	A-16	10.0
21552596	11/18/2016	Solar	A-16	5.0
21913378	11/18/2016	Solar	A-16	3.0
22443414	11/18/2016	Solar	A-16	10.0
22535875	11/18/2016	Solar	A-16	7.6
22611108	11/18/2016	Solar	A-16	7.6
22633231	11/18/2016	Solar	A-16	10.0
22699999	11/18/2016	Solar	A-16	6.0
22730047	11/18/2016	Solar	A-16	5.0
22770715	11/18/2016	Solar	A-16	3.8
22923286	11/18/2016	Solar	A-16	10.0
21335310	11/21/2016	Solar	A-16	3.0
21371658	11/21/2016	Solar	A-16	7.8
22903636	11/21/2016	Solar	A-16	6.6
21321481	11/22/2016	Solar	A-16	12.7
21557757	11/22/2016	Solar	A-16	6.8
22090925	11/22/2016	Solar	A-16	6.0
22672959	11/22/2016	Solar	A-16	3.0
22749394	11/22/2016	Solar	A-16	6.7
22878357	11/22/2016	Solar	A-16	7.6
22196531	11/23/2016	Solar	A-16	3.8
22535770	11/23/2016	Solar	A-16	5.0
22824952	11/23/2016	Solar	A-16	6.0
22944094	11/23/2016	Solar	A-60	3.0
22972982	11/23/2016	Solar	A-16	7.6
22285620	11/25/2016	Solar	A-16	7.6
22424869	11/25/2016	Solar	A-16	3.0
22672944	11/25/2016	Solar	A-16	5.2
22742096	11/25/2016	Solar	A-16	3.8
22814152	11/25/2016	Solar	A-16	3.8
22964644	11/25/2016	Solar	A-16	3.0
21467378	11/28/2016	Solar	A-16	7.8
21488397	11/28/2016	Solar	A-16	7.5
21502791	11/28/2016	Solar	A-16	10.0
21517137	11/28/2016	Solar	A-16	5.0
21553916	11/28/2016	Solar	A-16	10.0
21557780	11/28/2016	Solar	A-16	10.0
22148111	11/28/2016	Solar	A-16	7.5
22413798	11/28/2016	Solar	A-16	5.0
22529543	11/28/2016	Solar	A-16	9.5
22633590	11/28/2016	Solar	A-16	10.0
22676892	11/28/2016	Solar	A-16	3.0
22767981	11/28/2016	Solar	A-16	8.3
22769778	11/28/2016	Solar	A-16	5.4
22771839	11/28/2016	Solar	A-60	10.0
22800158	11/28/2016	Solar	A-16	3.0
22803922	11/28/2016	Solar	A-16	3.9
22873974	11/28/2016	Solar	A-16	5.2
22934344	11/28/2016	Solar	A-16	3.0
21985521	11/29/2016	Solar	A-16	5.6
22096593	11/29/2016	Solar	A-16	5.0
22492835	11/29/2016	Solar	A-16	6.0
22766816	11/29/2016	Solar	A-16	6.5
22901924	11/29/2016	Solar	A-16	6.0
22935055	11/29/2016	Solar	A-16	8.4
22984213	11/29/2016	Solar	A-16	5.2
19731630	11/30/2016	Solar	C-06	150.0
21400742	11/30/2016	Solar	A-16	3.0
22630128	11/30/2016	Solar	A-16	5.0
22856948	11/30/2016	Solar	A-16	4.8
22900308	11/30/2016	Solar	A-16	7.6
22493397	12/1/2016	Solar	A-16	3.0
22770779	12/1/2016	Solar	A-16	5.2
22364888	12/2/2016	Solar	A-16	3.8
22621588	12/2/2016	Solar	A-16	6.0
22910034	12/2/2016	Solar	A-16	10.0
22970310	12/2/2016	Solar	A-16	10.0
22972788	12/2/2016	Solar	A-16	7.6

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23061878	12/2/2016	Solar	A-16	7.6
23148651	12/4/2016	Solar	A-16	6.0
23148703	12/4/2016	Solar	A-16	7.2
23148743	12/4/2016	Solar	A-16	6.0
23182004	12/4/2016	Solar	A-16	2.5
23183695	12/4/2016	Solar	C-06	6.0
22224363	12/5/2016	Solar	A-16	3.6
22634273	12/5/2016	Solar	A-16	10.0
22651600	12/5/2016	Solar	A-16	6.0
21771122	12/6/2016	Solar	A-16	5.0
22577770	12/6/2016	Solar	A-16	5.0
21466718	12/7/2016	Solar	A-16	7.5
21553973	12/7/2016	Solar	A-16	6.0
22411527	12/7/2016	Solar	A-16	3.5
22954618	12/7/2016	Solar	A-16	3.0
21553039	12/8/2016	Solar	A-16	7.0
22741674	12/8/2016	Solar	A-16	5.2
22800162	12/8/2016	Solar	A-16	5.2
22956453	12/8/2016	Solar	A-16	6.0
21462675	12/9/2016	Solar	A-16	7.6
21541927	12/9/2016	Solar	A-16	3.8
21552129	12/9/2016	Solar	A-16	2.8
22687078	12/9/2016	Solar	A-16	5.0
22766703	12/9/2016	Solar	A-16	4.5
22804237	12/9/2016	Solar	A-16	10.8
22825658	12/9/2016	Solar	A-16	3.8
22912946	12/9/2016	Solar	A-16	4.0
22951964	12/9/2016	Solar	A-16	5.0
22333720	12/12/2016	Solar	A-16	5.2
22632558	12/12/2016	Solar	A-16	4.3
22667052	12/12/2016	Solar	A-16	9.9
22801909	12/12/2016	Solar	A-60	7.6
22925665	12/12/2016	Solar	A-16	5.0
23013139	12/12/2016	Solar	A-16	7.6
23013444	12/12/2016	Solar	A-16	3.8
23048906	12/12/2016	Solar	A-16	7.6
23060943	12/12/2016	Solar	A-16	7.6
23070378	12/12/2016	Solar	A-16	11.4
23107163	12/12/2016	Solar	A-16	6.0
21878022	12/13/2016	Solar	A-16	5.8
21913258	12/14/2016	Solar	A-16	7.6
22418340	12/14/2016	Solar	A-16	10.0
22549384	12/14/2016	Solar	A-16	7.6
22982943	12/14/2016	Solar	A-16	6.0
23051315	12/14/2016	Solar	A-16	7.6
22225316	12/15/2016	Solar	A-16	7.6
23088743	12/15/2016	Solar	A-60	3.8
21488393	12/16/2016	Solar	A-16	7.6
21540472	12/16/2016	Solar	A-16	5.5
21541929	12/16/2016	Solar	A-16	3.0
21552669	12/16/2016	Solar	A-16	3.8
21553356	12/16/2016	Solar	A-16	5.3
21684652	12/16/2016	Solar	A-16	6.5
21921604	12/16/2016	Solar	A-16	5.0
22233935	12/16/2016	Solar	C-06	8.4
22271269	12/16/2016	Solar	A-16	7.6
22285639	12/16/2016	Solar	A-16	3.0
22483348	12/16/2016	Solar	A-16	5.0
22634002	12/16/2016	Solar	A-16	7.6
22680186	12/16/2016	Solar	A-16	5.0
22802814	12/16/2016	Solar	A-16	5.0
22903710	12/16/2016	Solar	A-16	3.0
22934639	12/16/2016	Solar	A-16	7.6
22945145	12/16/2016	Solar	A-16	6.0
22954889	12/16/2016	Solar	A-16	10.0
23132179	12/16/2016	Solar	A-16	8.0
21910177	12/19/2016	Solar	A-16	3.8
23018287	12/19/2016	Solar	A-16	10.4
22623478	12/20/2016	Solar	A-16	20.0
23137059	12/20/2016	Solar	A-16	7.6
22538816	12/21/2016	Solar	A-16	7.1
22767100	12/21/2016	Solar	A-16	7.3
22803291	12/21/2016	Solar	A-16	7.6
22809693	12/21/2016	Solar	A-16	3.0
22835283	12/21/2016	Solar	A-16	4.3
22856389	12/21/2016	Solar	A-16	6.7
22910955	12/21/2016	Solar	A-16	3.0
22911444	12/21/2016	Solar	A-16	2.5
22959516	12/21/2016	Solar	A-16	7.6
22974578	12/21/2016	Solar	A-16	6.3
23059077	12/21/2016	Solar	A-16	6.0
23059533	12/21/2016	Solar	A-16	7.6
23250649	12/21/2016	Solar	A-16	6.0
21733037	12/22/2016	Solar	A-16	5.0
21746844	12/22/2016	Solar	A-16	5.3
21880664	12/22/2016	Solar	A-16	5.3
22215307	12/22/2016	Solar	A-16	5.3
22287188	12/22/2016	Solar	A-16	5.0

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22630686	12/22/2016	Solar	A-16	6.0
22639918	12/22/2016	Solar	A-16	3.8
22689771	12/22/2016	Solar	A-16	7.5
22731935	12/22/2016	Solar	A-16	3.8
22793556	12/22/2016	Solar	A-60	3.0
22879217	12/22/2016	Solar	A-16	3.3
22962142	12/22/2016	Solar	A-16	3.0
23096550	12/22/2016	Solar	A-16	8.2
19847966	12/23/2016	Solar	C-06	196.0
19864640	12/23/2016	Solar	C-06	196.0
19868760	12/23/2016	Solar	C-06	196.0
22873958	12/23/2016	Solar	A-16	3.8
22998477	12/23/2016	Solar	A-16	10.4
22633563	12/27/2016	Solar	C-06	28.8
22943676	12/27/2016	Solar	A-16	5.4
21439481	12/28/2016	Solar	A-16	3.1
21878676	12/28/2016	Solar	A-16	3.5
22109973	12/28/2016	Solar	A-16	4.3
22273146	12/28/2016	Solar	G-02	15.8
22747476	12/28/2016	Solar	A-16	5.0
22911664	12/28/2016	Solar	A-16	5.0
22912997	12/28/2016	Solar	A-16	5.0
22926120	12/28/2016	Solar	A-16	8.0
22960871	12/28/2016	Solar	A-16	3.8
22994349	12/28/2016	Solar	A-16	3.8
23070392	12/28/2016	Solar	A-16	5.0
23107565	12/28/2016	Solar	A-16	7.6
23141079	12/28/2016	Solar	A-16	3.8
23192543	12/28/2016	Solar	A-16	10.0
23259867	12/28/2016	Solar	A-16	6.5
21488413	12/29/2016	Solar	A-16	9.9
22454845	12/29/2016	Solar	A-16	3.8
22790466	12/29/2016	Solar	A-16	6.0
22836453	12/29/2016	Solar	A-16	2.9
22925872	12/29/2016	Solar	A-60	5.5
23010453	12/29/2016	Solar	A-16	8.8
23079483	12/29/2016	Solar	A-16	7.6
19732103	12/30/2016	Solar	G-02	375.0
22782167	12/30/2016	Solar	A-16	9.0
22793300	12/30/2016	Solar	A-16	5.0
23097049	12/30/2016	Solar	A-16	10.0
23107336	12/30/2016	Solar	A-16	13.2
22803168	1/3/2017	Solar	A-16	3.8
21094178	1/4/2017	Solar	A-16	7.6
21149148	1/4/2017	Solar	A-16	3.4
22127996	1/4/2017	Solar	A-16	9.8
22651787	1/4/2017	Solar	A-16	9.0
22723577	1/4/2017	Solar	A-16	3.8
22873009	1/4/2017	Solar	A-16	8.5
22878767	1/4/2017	Solar	A-16	5.8
22958816	1/4/2017	Solar	A-16	7.6
22974260	1/4/2017	Solar	A-16	7.6
23077318	1/4/2017	Solar	A-16	7.6
22823934	1/5/2017	Solar	A-16	5.2
22973032	1/5/2017	Solar	A-16	3.8
22998438	1/5/2017	Solar	A-16	10.0
23223712	1/5/2017	Solar	A-16	5.2
21478602	1/6/2017	Solar	C-06	10.0
21557890	1/6/2017	Solar	A-16	5.6
21776871	1/6/2017	Solar	A-16	4.3
22090264	1/6/2017	Solar	A-16	5.0
22287197	1/6/2017	Solar	A-16	6.0
22576151	1/6/2017	Solar	A-16	7.6
22835078	1/6/2017	Solar	A-16	10.0
22880685	1/6/2017	Solar	A-16	5.0
23063247	1/6/2017	Solar	A-16	3.0
23072755	1/6/2017	Solar	A-16	7.6
23089191	1/6/2017	Solar	A-16	9.0
23127792	1/6/2017	Solar	A-16	5.0
23269798	1/6/2017	Solar	A-16	3.0
23120336	1/9/2017	Solar	A-16	3.8
22211321	1/10/2017	Solar	A-16	8.3
22847061	1/10/2017	Solar	A-16	7.6
23285854	1/10/2017	Solar	A-16	5.2
21027108	1/11/2017	Solar	A-16	6.9
21941259	1/11/2017	Solar	A-16	6.3
21964432	1/11/2017	Solar	A-16	6.0
22050395	1/11/2017	Solar	A-16	8.3
22050450	1/11/2017	Solar	A-16	6.0
22198223	1/11/2017	Solar	A-16	6.0
22330568	1/11/2017	Solar	A-16	5.8
22502168	1/11/2017	Solar	A-16	7.6
22719358	1/11/2017	Solar	A-16	3.5
22793003	1/11/2017	Solar	A-16	5.0
22953215	1/11/2017	Solar	A-16	10.0
23031469	1/11/2017	Solar	A-16	10.0
23081979	1/11/2017	Solar	A-16	3.8
23135710	1/11/2017	Solar	A-16	5.0

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23153424	1/11/2017	Solar	A-16	7.6
23156500	1/11/2017	Solar	A-16	5.0
23184861	1/11/2017	Solar	A-16	5.0
23251948	1/11/2017	Solar	A-16	5.2
23268106	1/11/2017	Solar	A-16	3.8
23295195	1/11/2017	Solar	A-16	9.0
21820502	1/12/2017	Solar	A-16	8.6
23186733	1/12/2017	Solar	A-60	5.2
22799604	1/13/2017	Solar	A-16	6.0
22835670	1/13/2017	Solar	A-16	6.0
22883868	1/13/2017	Solar	A-16	10.0
23063259	1/13/2017	Solar	A-16	7.6
23219602	1/13/2017	Solar	A-16	5.0
23223722	1/13/2017	Solar	A-16	10.4
23308270	1/13/2017	Solar	A-16	11.8
22293277	1/16/2017	Solar	A-16	5.3
22633075	1/16/2017	Solar	A-16	5.2
23051353	1/16/2017	Solar	A-16	10.0
22964607	1/17/2017	Solar	A-16	11.4
21587494	1/18/2017	Solar	A-16	4.3
22792061	1/18/2017	Solar	A-16	5.0
22905129	1/18/2017	Solar	A-16	6.0
22910335	1/18/2017	Solar	A-16	7.6
23050622	1/18/2017	Solar	A-16	6.0
23074322	1/18/2017	Solar	A-16	7.6
23133315	1/18/2017	Solar	A-16	3.0
23223727	1/18/2017	Solar	A-16	3.8
23286370	1/18/2017	Solar	A-16	6.0
20986340	1/18/2017	Natural Gas	G-32	1590
21237356	1/19/2017	Solar	A-16	7.3
21557742	1/19/2017	Solar	A-16	6.0
23088893	1/19/2017	Solar	A-16	7.6
21552333	1/20/2017	Solar	A-16	7.3
21870525	1/20/2017	Solar	A-16	5.0
22263918	1/20/2017	Solar	A-16	7.0
22945457	1/20/2017	Solar	A-16	3.8
23175952	1/20/2017	Solar	A-16	10.0
23192427	1/20/2017	Solar	A-16	6.0
22118833	1/23/2017	Solar	A-16	5.0
22623019	1/23/2017	Solar	A-16	7.6
22801732	1/23/2017	Solar	A-16	5.0
21747178	1/24/2017	Solar	A-16	3.8
22697055	1/24/2017	Solar	A-16	5.2
22956255	1/24/2017	Solar	A-16	10.4
23125125	1/24/2017	Solar	A-16	7.6
23261292	1/24/2017	Solar	A-16	5.2
23287720	1/24/2017	Solar	A-16	5.0
23327473	1/24/2017	Solar	A-16	7.6
21466703	1/25/2017	Solar	A-16	10.1
21554091	1/25/2017	Solar	A-16	10.0
21826046	1/25/2017	Solar	A-16	3.0
22090479	1/25/2017	Solar	A-16	5.0
22528082	1/25/2017	Solar	A-16	2.6
22792649	1/25/2017	Solar	A-16	3.8
22932931	1/25/2017	Solar	A-16	5.3
22952280	1/25/2017	Solar	A-16	3.0
22956830	1/25/2017	Solar	A-16	5.0
22959234	1/25/2017	Solar	A-16	3.8
22960506	1/25/2017	Solar	A-16	10.0
22984773	1/25/2017	Solar	A-16	11.4
22991725	1/25/2017	Solar	A-16	6.5
23096372	1/25/2017	Solar	A-16	5.0
23115320	1/25/2017	Solar	A-16	10.0
23160027	1/25/2017	Solar	A-16	5.0
23173954	1/25/2017	Solar	A-16	6.0
23223707	1/25/2017	Solar	A-16	7.6
23309558	1/25/2017	Solar	A-16	7.6
23356778	1/25/2017	Solar	C-06	10.0
20948067	1/26/2017	Solar	A-16	6.5
22733212	1/26/2017	Solar	A-16	10.4
23118174	1/26/2017	Solar	A-16	14.3
23129840	1/26/2017	Solar	A-16	5.0
23130311	1/26/2017	Solar	A-16	5.0
23382105	1/26/2017	Solar	A-16	5.2
21900858	1/27/2017	Solar	A-16	7.3
22396867	1/27/2017	Solar	A-16	6.0
22961337	1/27/2017	Solar	A-16	6.0
23044327	1/27/2017	Solar	A-16	7.6
23155138	1/27/2017	Solar	A-16	7.0
23202141	1/27/2017	Solar	A-16	7.3
23207715	1/27/2017	Solar	A-16	2.7
23236074	1/27/2017	Solar	A-16	3.8
23321754	1/27/2017	Solar	A-16	2.5
23339294	1/27/2017	Solar	A-16	10.4
22215451	1/30/2017	Solar	A-16	3.6
22782614	1/30/2017	Solar	A-16	9.2
23053749	1/30/2017	Solar	A-16	3.8
21626152	1/31/2017	Solar	A-16	10.0

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21841458	1/31/2017	Solar	A-16	2.4
22686874	1/31/2017	Solar	A-16	10.0
22861318	1/31/2017	Solar	A-16	10.0
23131469	1/31/2017	Solar	A-16	10.0
22900361	2/1/2017	Solar	A-60	3.8
23106167	2/1/2017	Solar	A-16	5.8
23266872	2/1/2017	Solar	A-16	3.0
23023622	2/2/2017	Solar	A-16	12.3
22455598	2/3/2017	Solar	A-16	7.6
13352530	2/6/2017	Wind	C-06	10.0
22200121	2/6/2017	Solar	A-16	3.8
22670246	2/7/2017	Solar	A-16	7.6
23071780	2/7/2017	Solar	A-16	4.3
23088779	2/7/2017	Solar	A-16	3.0
23155904	2/7/2017	Solar	A-16	3.0
23259371	2/7/2017	Solar	A-16	9.8
23292616	2/7/2017	Solar	A-16	4.0
23300592	2/7/2017	Solar	A-16	4.1
23356547	2/7/2017	Solar	A-16	6.0
23358018	2/7/2017	Solar	A-16	7.6
23420908	2/7/2017	Solar	A-16	7.6
22666390	2/8/2017	Solar	A-16	7.6
23160724	2/8/2017	Solar	A-16	3.8
23243230	2/8/2017	Solar	A-16	7.6
23248716	2/8/2017	Solar	A-16	13.6
23392839	2/8/2017	Solar	A-16	10.4
22118735	2/9/2017	Solar	A-16	6.8
22462076	2/9/2017	Solar	A-16	9.0
22648465	2/9/2017	Solar	A-16	3.8
22834811	2/9/2017	Solar	A-16	5.0
22900591	2/9/2017	Solar	A-16	8.3
22955164	2/9/2017	Solar	A-16	5.8
23005708	2/9/2017	Solar	A-16	6.3
23169581	2/9/2017	Solar	A-16	3.8
23277727	2/9/2017	Solar	A-16	7.3
23325806	2/9/2017	Solar	A-16	5.2
23399003	2/9/2017	Solar	A-16	3.0
22690438	2/14/2017	Solar	A-16	7.6
22980817	2/14/2017	Solar	A-16	10.0
23045174	2/14/2017	Solar	A-16	6.0
23048901	2/14/2017	Solar	A-16	3.8
23070655	2/14/2017	Solar	A-16	6.0
23072502	2/14/2017	Solar	A-16	8.0
23080635	2/14/2017	Solar	A-16	6.0
23129478	2/14/2017	Solar	A-16	6.0
23160893	2/14/2017	Solar	A-16	3.8
23174464	2/14/2017	Solar	A-16	3.8
23186735	2/14/2017	Solar	A-16	5.2
23247567	2/14/2017	Solar	A-16	5.0
23273287	2/14/2017	Solar	A-16	7.6
23299967	2/14/2017	Solar	A-16	7.6
23332605	2/14/2017	Solar	A-16	4.5
23333815	2/14/2017	Solar	A-16	3.8
23390798	2/14/2017	Solar	A-60	5.2
23415073	2/14/2017	Solar	A-16	5.0
22322347	2/15/2017	Solar	A-16	6.8
22631921	2/15/2017	Solar	A-16	4.5
22670615	2/15/2017	Solar	A-16	8.3
22913905	2/15/2017	Solar	A-16	10.0
23023476	2/15/2017	Solar	A-16	6.8
23173704	2/15/2017	Solar	A-16	3.2
23174689	2/15/2017	Solar	A-16	3.0
23264569	2/15/2017	Solar	A-16	1.0
23300765	2/15/2017	Solar	A-16	5.3
23312115	2/15/2017	Solar	A-16	3.8
23363544	2/15/2017	Solar	A-16	3.0
23365995	2/15/2017	Solar	A-16	5.2
23370819	2/15/2017	Solar	A-16	3.8
23370820	2/15/2017	Solar	A-16	7.6
23376335	2/15/2017	Solar	A-16	3.8
23448866	2/15/2017	Solar	A-16	7.6
23454334	2/15/2017	Solar	A-16	3.8
21317586	2/16/2017	Solar	C-06	180.0
22578660	2/16/2017	Solar	A-16	2.8
22578841	2/16/2017	Solar	A-16	7.6
23009522	2/16/2017	Solar	A-16	4.3
23114590	2/16/2017	Solar	A-16	5.0
23306751	2/16/2017	Solar	A-16	7.6
23405378	2/16/2017	Solar	A-16	5.0
22707954	2/17/2017	Solar	A-60	5.8
17599370	2/20/2017	Wind	C-06	1500.0
20984070	2/20/2017	Solar	A-16	4.3
22998480	2/20/2017	Solar	A-16	6.6
23023361	2/20/2017	Solar	A-16	8.3
23239197	2/20/2017	Solar	A-16	13.2
23309556	2/20/2017	Solar	A-16	5.2
23375180	2/20/2017	Solar	A-16	10.0
23486143	2/20/2017	Solar	A-16	10.0

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22530570	2/21/2017	Solar	A-16	5.0
23089718	2/21/2017	Solar	A-16	7.5
23106877	2/21/2017	Solar	A-16	10.0
23468519	2/21/2017	Solar	C-06	69.0
23271151	2/22/2017	Solar	A-16	5.0
23300086	2/22/2017	Solar	A-16	2.8
23331913	2/22/2017	Solar	A-16	10.0
23364980	2/22/2017	Solar	A-16	5.2
23371009	2/22/2017	Solar	A-16	3.8
23502044	2/22/2017	Solar	A-16	5.0
23508521	2/22/2017	Solar	A-16	5.0
23574434	2/22/2017	Solar	A-16	6.2
22455628	2/23/2017	Solar	A-16	7.6
23309557	2/23/2017	Solar	A-16	4.0
23446766	2/23/2017	Solar	A-16	5.2
23512752	2/23/2017	Solar	A-16	14.2
22902293	2/24/2017	Solar	A-16	7.5
23079004	2/24/2017	Solar	A-16	5.0
23160158	2/24/2017	Solar	A-16	5.0
23203745	2/24/2017	Solar	A-16	7.6
23241944	2/24/2017	Solar	A-16	10.0
23269801	2/24/2017	Solar	A-16	5.2
23270966	2/24/2017	Solar	A-16	6.0
23306977	2/24/2017	Solar	A-16	9.0
23389097	2/24/2017	Solar	A-60	3.6
23411327	2/24/2017	Solar	A-16	3.8
23422019	2/24/2017	Solar	A-16	3.0
23446644	2/24/2017	Solar	A-16	5.0
23447298	2/24/2017	Solar	A-16	3.8
23306841	2/27/2017	Solar	A-16	5.0
22346248	3/1/2017	Solar	A-16	4.3
22472006	3/1/2017	Solar	A-16	8.5
22622421	3/1/2017	Solar	A-60	5.8
22801238	3/1/2017	Solar	A-16	5.0
22992123	3/1/2017	Solar	A-16	5.5
23160434	3/1/2017	Solar	A-16	5.0
23161360	3/1/2017	Solar	A-16	3.8
23161928	3/1/2017	Solar	A-16	7.6
23192907	3/1/2017	Solar	A-16	3.5
23207106	3/1/2017	Solar	A-16	5.0
23251903	3/1/2017	Solar	A-16	5.2
23259923	3/1/2017	Solar	A-16	10.0
23273271	3/1/2017	Solar	A-16	5.0
23299974	3/1/2017	Solar	A-16	3.0
23308276	3/1/2017	Solar	A-16	3.0
23333679	3/1/2017	Solar	A-16	7.6
23355798	3/1/2017	Solar	A-16	5.0
23376302	3/1/2017	Solar	A-16	5.2
23391403	3/1/2017	Solar	A-16	2.8
23449088	3/1/2017	Solar	A-16	3.8
23461825	3/1/2017	Solar	A-16	8.0
23537261	3/1/2017	Solar	A-16	7.6
22783878	3/2/2017	Solar	A-16	10.0
23087430	3/2/2017	Solar	A-16	7.6
23448640	3/2/2017	Solar	A-16	6.0
23469865	3/2/2017	Solar	A-16	7.6
23469946	3/3/2017	Solar	A-16	5.2
23252207	3/6/2017	Solar	A-16	3.8
23566663	3/6/2017	Solar	A-16	5.2
22825801	3/8/2017	Solar	A-16	4.3
21294413	3/9/2017	Solar	G-02	60.0
22649881	3/9/2017	Solar	G-02	119.9
22650339	3/9/2017	Solar	C-06	28.8
23093197	3/9/2017	Solar	A-16	6.5
23162269	3/9/2017	Solar	A-16	7.6
23174971	3/9/2017	Solar	A-16	7.6
23242619	3/9/2017	Solar	A-16	7.6
23367437	3/9/2017	Solar	A-16	5.0
23454355	3/9/2017	Solar	A-16	2.4
23454892	3/9/2017	Solar	A-16	6.5
23495955	3/9/2017	Solar	A-16	1.9
23546977	3/9/2017	Solar	A-16	3.8
23580947	3/9/2017	Solar	A-16	10.4
23493571	3/10/2017	Solar	A-16	5.0
23423055	3/13/2017	Solar	A-60	6.0
23447315	3/13/2017	Solar	A-16	3.8
23578822	3/13/2017	Solar	A-16	5.0
23587725	3/13/2017	Solar	A-16	3.0
23609961	3/13/2017	Solar	A-16	6.0
23642420	3/13/2017	Solar	A-16	3.8
23105695	3/14/2017	Solar	A-16	9.8
23264535	3/14/2017	Solar	A-16	10.0
23419938	3/14/2017	Solar	A-16	7.6
23422143	3/14/2017	Solar	A-16	3.8
21183913	3/16/2017	Solar	A-16	6.7
22803605	3/16/2017	Solar	A-16	3.0
22812582	3/16/2017	Solar	A-16	8.3
22944333	3/16/2017	Solar	A-16	3.8

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
23000648	3/16/2017	Solar	A-16	4.0
23096517	3/16/2017	Solar	A-16	10.0
23198660	3/16/2017	Solar	A-16	10.0
23356898	3/16/2017	Solar	A-16	7.5
23357989	3/16/2017	Solar	A-16	5.2
23359946	3/16/2017	Solar	A-16	3.0
23378991	3/16/2017	Solar	A-16	3.8
23499558	3/16/2017	Solar	A-16	3.8
23516845	3/16/2017	Solar	A-16	6.0
23522068	3/16/2017	Solar	A-16	10.4
23573295	3/16/2017	Solar	A-16	5.0
23668501	3/16/2017	Solar	A-16	6.3
22670638	3/17/2017	Solar	G-02	3.0
23399710	3/17/2017	Solar	A-16	6.0
23517782	3/17/2017	Solar	A-16	3.0
23520379	3/17/2017	Solar	A-16	10.4
19801308	3/20/2017	Solar	A-16	611.8
22893716	3/20/2017	Solar	A-16	5.0
23305786	3/20/2017	Solar	A-16	5.0
23435827	3/20/2017	Solar	A-16	3.0
23469408	3/20/2017	Solar	A-16	5.0
23601472	3/20/2017	Solar	A-16	3.8
23607113	3/20/2017	Solar	A-16	3.8
23607387	3/20/2017	Solar	A-16	5.0
23112023	3/21/2017	Solar	A-16	7.0
23245051	3/21/2017	Solar	A-16	4.5
23485430	3/21/2017	Solar	A-16	6.6
23634730	3/21/2017	Solar	A-16	5.2
22421331	3/22/2017	Solar	G-02	28.8
23392005	3/22/2017	Solar	A-16	10.0
23570204	3/22/2017	Solar	A-16	7.0
21541498	3/23/2017	Solar	A-16	3.8
22286042	3/23/2017	Solar	A-16	4.5
22892633	3/23/2017	Solar	A-16	7.8
22910711	3/23/2017	Solar	A-16	10.0
23236120	3/23/2017	Solar	A-16	4.5
23357936	3/23/2017	Solar	A-16	3.8
23380281	3/23/2017	Solar	A-16	5.0
23381153	3/23/2017	Solar	A-16	3.8
23397677	3/23/2017	Solar	A-16	3.0
23411865	3/23/2017	Solar	A-16	5.0
23414372	3/23/2017	Solar	A-16	2.3
23466688	3/23/2017	Solar	A-16	7.6
23573684	3/23/2017	Solar	A-16	3.8
23578089	3/23/2017	Solar	A-16	3.0
23607668	3/23/2017	Solar	A-16	7.6
23647075	3/23/2017	Solar	A-16	3.0
23669732	3/24/2017	Solar	A-16	3.8
21741373	3/27/2017	Solar	A-16	2.3
23485348	3/27/2017	Solar	A-16	3.6
23687933	3/27/2017	Solar	A-16	10.4
23116243	3/28/2017	Solar	A-16	6.0
23136554	3/28/2017	Solar	A-16	7.6
23319137	3/28/2017	Solar	A-16	9.4
23440330	3/28/2017	Solar	A-16	5.0
23446717	3/28/2017	Solar	A-16	3.0
23508801	3/28/2017	Solar	A-16	5.0
23547408	3/28/2017	Solar	A-16	3.8
23566687	3/28/2017	Solar	A-16	7.6
23577648	3/28/2017	Solar	A-16	8.0
22991361	3/29/2017	Solar	A-16	5.8
23105917	3/29/2017	Solar	A-16	6.0
23299490	3/29/2017	Solar	A-16	9.0
23470902	3/29/2017	Solar	A-16	5.2
23501265	3/29/2017	Solar	A-16	3.8
23537619	3/29/2017	Solar	A-16	10.0
23633552	3/29/2017	Solar	A-16	7.6
23644019	3/29/2017	Solar	A-16	7.6
23707292	3/29/2017	Solar	A-16	7.6
23241390	3/30/2017	Solar	A-16	6.0
23263853	3/30/2017	Solar	A-16	9.3
23301646	3/30/2017	Solar	C-06	11.5
23574453	3/30/2017	Solar	A-16	8.3
23600613	3/30/2017	Solar	A-16	10.0
23605599	3/30/2017	Solar	A-16	7.6
23606991	3/30/2017	Solar	A-16	6.0
23635130	3/30/2017	Solar	A-16	6.6
23002909	3/31/2017	Solar	A-16	7.6
23264409	3/31/2017	Solar	A-16	10.0
23309717	3/31/2017	Solar	A-16	3.5
23326972	3/31/2017	Solar	A-16	6.0
23364551	3/31/2017	Solar	A-60	8.1
23633325	3/31/2017	Solar	A-16	3.0
23647214	3/31/2017	Solar	A-16	5.0
23698059	3/31/2017	Solar	A-16	2.8
23740126	3/31/2017	Solar	A-16	6.6
22681700	4/3/2017	Solar	A-16	4.0
23367450	4/3/2017	Solar	A-16	3.1

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23437603	4/3/2017	Solar	A-16	3.5
23551704	4/3/2017	Solar	A-60	3.0
23729891	4/3/2017	Solar	A-16	6.5
21396555	4/4/2017	Solar	A-16	6.0
23651181	4/4/2017	Solar	A-16	5.0
23695808	4/4/2017	Solar	A-16	3.0
23241747	4/5/2017	Solar	A-16	7.6
23311922	4/5/2017	Solar	A-16	3.6
23340501	4/5/2017	Solar	A-16	6.0
23413093	4/5/2017	Solar	A-16	3.0
23474801	4/5/2017	Solar	A-16	5.0
23501295	4/5/2017	Solar	A-60	5.2
23567875	4/5/2017	Solar	A-16	6.6
23619676	4/5/2017	Solar	A-16	6.6
23659015	4/5/2017	Solar	A-16	3.6
23665558	4/5/2017	Solar	A-16	3.8
23698073	4/5/2017	Solar	A-16	6.6
23745430	4/5/2017	Solar	A-16	3.6
23745859	4/5/2017	Solar	A-16	5.0
23769324	4/5/2017	Solar	A-16	6.0
23791363	4/5/2017	Solar	A-16	7.6
23424567	4/6/2017	Solar	C-06	10.0
23011849	4/7/2017	Solar	A-16	5.0
23079257	4/7/2017	Solar	A-16	9.3
23242382	4/7/2017	Solar	A-16	8.3
23447065	4/7/2017	Solar	A-16	10.4
23578782	4/7/2017	Solar	A-16	7.8
23678093	4/7/2017	Solar	A-16	10.0
23745710	4/7/2017	Solar	A-16	3.0
23615438	4/10/2017	Solar	A-16	3.0
23120337	4/11/2017	Solar	A-16	3.8
23770030	4/11/2017	Solar	A-16	5.0
23057377	4/12/2017	Solar	A-16	3.8
23519944	4/12/2017	Solar	A-16	5.2
23551974	4/12/2017	Solar	A-16	5.0
23573806	4/12/2017	Solar	A-16	7.6
23601955	4/12/2017	Solar	A-16	6.0
23606636	4/12/2017	Solar	A-16	5.0
23686559	4/12/2017	Solar	A-16	7.6
23716051	4/12/2017	Solar	A-16	7.6
23733720	4/12/2017	Solar	A-16	3.6
23819841	4/12/2017	Solar	A-16	3.6
22188121	4/13/2017	Solar	A-16	5.3
22539329	4/13/2017	Solar	A-60	4.5
23219166	4/13/2017	Solar	A-16	8.6
23572442	4/13/2017	Solar	A-16	10.3
23573107	4/13/2017	Solar	A-16	6.0
23577921	4/13/2017	Solar	A-16	6.0
23606476	4/13/2017	Solar	A-60	5.0
23658970	4/13/2017	Solar	A-16	3.6
23681057	4/13/2017	Solar	A-16	3.0
23724672	4/13/2017	Solar	A-16	5.0
23745751	4/13/2017	Solar	A-16	3.8
23770303	4/13/2017	Solar	A-16	7.6
22345884	4/14/2017	Solar	A-16	11.5
22740721	4/14/2017	Solar	A-16	3.8
23259355	4/14/2017	Solar	A-16	6.0
23307089	4/14/2017	Solar	A-16	7.6
23411459	4/14/2017	Solar	A-16	10.0
23478211	4/14/2017	Solar	A-16	6.6
23539554	4/14/2017	Solar	A-16	9.0
23659080	4/14/2017	Solar	A-16	3.8
23670378	4/14/2017	Solar	A-16	3.6
23672764	4/14/2017	Solar	A-16	7.6
23677265	4/14/2017	Solar	A-16	11.4
23680433	4/14/2017	Solar	A-16	5.0
23680649	4/14/2017	Solar	A-16	10.0
23688601	4/14/2017	Solar	A-16	5.2
23726422	4/14/2017	Solar	A-16	3.0
23757470	4/14/2017	Solar	A-16	3.6
22435509	4/18/2017	Solar	A-16	7.5
22845815	4/18/2017	Solar	A-16	6.8
23266268	4/18/2017	Solar	A-16	5.0
23266630	4/18/2017	Solar	A-16	3.5
23306714	4/18/2017	Solar	A-16	6.0
23453248	4/18/2017	Solar	A-16	3.8
23544136	4/18/2017	Solar	A-16	7.6
23544387	4/18/2017	Solar	A-16	5.0
23622754	4/18/2017	Solar	A-16	7.6
23718890	4/18/2017	Solar	A-16	6.6
23742601	4/18/2017	Solar	A-16	6.0
22213823	4/19/2017	Solar	A-60	3.0
23175684	4/19/2017	Solar	A-16	7.8
23587704	4/19/2017	Solar	A-16	5.2
23594882	4/19/2017	Solar	A-16	3.6
23718941	4/19/2017	Solar	A-16	5.2
23785127	4/19/2017	Solar	A-16	6.8
23863177	4/19/2017	Solar	A-16	6.0

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23219477	4/20/2017	Solar	A-16	7.6
23498743	4/21/2017	Solar	A-16	10.0
23718292	4/21/2017	Solar	A-16	3.8
23760513	4/21/2017	Solar	A-16	10.0
23225321	4/24/2017	Solar	A-16	10.0
23572743	4/24/2017	Solar	A-16	5.0
23680990	4/24/2017	Solar	A-16	3.0
23760060	4/24/2017	Solar	A-16	5.0
23799440	4/24/2017	Solar	A-16	2.8
23902853	4/24/2017	Solar	A-16	5.0
23768129	4/25/2017	Solar	A-16	5.2
23783472	4/25/2017	Solar	A-16	5.0
23822771	4/25/2017	Solar	A-16	7.6
22377372	4/26/2017	Solar	A-16	5.0
23264099	4/26/2017	Solar	A-16	7.5
23297143	4/26/2017	Solar	A-16	6.2
23383272	4/26/2017	Solar	A-16	6.0
23503753	4/26/2017	Solar	A-16	3.8
23529371	4/26/2017	Solar	A-16	10.0
23687953	4/26/2017	Solar	A-16	10.0
23688379	4/26/2017	Solar	A-16	10.0
23740042	4/26/2017	Solar	A-16	5.0
23748002	4/26/2017	Solar	A-16	6.0
23756070	4/26/2017	Solar	A-16	7.6
23762490	4/26/2017	Solar	A-16	10.0
23827864	4/26/2017	Solar	A-16	7.6
20360216	4/27/2017	Solar	A-16	6.8
23300811	4/27/2017	Solar	A-16	5.8
23564629	4/27/2017	Solar	A-16	3.0
23681002	4/27/2017	Solar	A-16	3.8
23762806	4/27/2017	Solar	A-16	7.6
23776239	4/27/2017	Solar	A-16	7.6
23790269	4/27/2017	Solar	A-16	8.5
23161552	4/28/2017	Solar	A-16	3.0
23638847	4/28/2017	Solar	A-16	7.5
23656610	4/28/2017	Solar	A-16	6.0
23793429	4/28/2017	Solar	A-16	9.0
23845997	4/28/2017	Solar	A-16	3.6
23543118	5/1/2017	Solar	A-16	7.6
23670344	5/1/2017	Solar	A-16	9.0
23718567	5/1/2017	Solar	A-16	7.6
23359440	5/2/2017	Solar	A-16	3.8
23980748	5/2/2017	Solar	A-16	5.0
21541930	5/3/2017	Solar	A-16	6.0
22738228	5/3/2017	Solar	A-16	5.0
22861151	5/3/2017	Solar	A-16	6.0
23277336	5/3/2017	Solar	A-16	7.5
23387780	5/3/2017	Solar	A-16	3.0
23609337	5/3/2017	Solar	A-16	3.6
23634898	5/3/2017	Solar	A-16	10.0
23641104	5/3/2017	Solar	A-16	5.0
23732851	5/3/2017	Solar	A-16	6.0
23757444	5/3/2017	Solar	A-16	7.6
23757949	5/3/2017	Solar	A-16	3.6
23760147	5/3/2017	Solar	A-16	3.0
23765432	5/3/2017	Solar	A-16	7.6
23769832	5/3/2017	Solar	A-16	3.8
23777944	5/3/2017	Solar	A-16	5.2
23812146	5/3/2017	Solar	A-16	5.0
23586311	5/4/2017	Solar	A-16	12.5
23776545	5/4/2017	Solar	A-16	6.0
23841660	5/4/2017	Solar	A-16	3.8
23842084	5/4/2017	Solar	A-16	3.8
23854372	5/4/2017	Solar	A-16	9.0
23895913	5/4/2017	Solar	A-16	6.6
23357952	5/5/2017	Solar	A-16	7.6
23412811	5/5/2017	Solar	A-16	3.0
23578267	5/5/2017	Solar	A-16	5.0
23623030	5/5/2017	Solar	A-16	2.9
23681620	5/5/2017	Solar	A-16	6.0
23699893	5/5/2017	Solar	A-16	7.6
23717563	5/5/2017	Solar	A-60	5.0
23732045	5/5/2017	Solar	A-16	7.6
23822680	5/5/2017	Solar	A-16	5.2
23826400	5/5/2017	Solar	A-16	2.0
23861484	5/5/2017	Solar	A-16	3.0
23862783	5/5/2017	Solar	A-16	10.0
23274245	5/8/2017	Solar	A-16	17.6
23449013	5/8/2017	Solar	A-16	6.6
23443300	5/9/2017	Solar	A-16	5.7
23537762	5/9/2017	Solar	A-16	10.0
23706445	5/9/2017	Solar	A-16	3.8
23718471	5/9/2017	Solar	A-16	3.0
23724545	5/9/2017	Solar	A-16	10.0
23872006	5/9/2017	Solar	A-16	3.0
22874819	5/10/2017	Solar	A-16	3.5
23566501	5/10/2017	Solar	A-16	3.6
23614621	5/10/2017	Solar	A-16	5.2

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23727501	5/10/2017	Solar	A-16	3.8
23748180	5/10/2017	Solar	A-16	5.0
23748553	5/10/2017	Solar	A-16	3.0
23781857	5/10/2017	Solar	A-16	6.0
23863202	5/10/2017	Solar	A-16	6.6
23871507	5/10/2017	Solar	A-16	6.0
23880952	5/10/2017	Solar	A-16	3.0
23902406	5/10/2017	Solar	A-16	3.0
23704915	5/11/2017	Solar	A-16	5.0
23746256	5/11/2017	Solar	A-16	3.8
23328070	5/12/2017	Solar	A-16	7.6
23389136	5/12/2017	Solar	A-16	10.4
23530042	5/12/2017	Solar	A-16	3.0
23633288	5/12/2017	Solar	A-16	3.8
23758278	5/12/2017	Solar	A-16	3.8
23761854	5/12/2017	Solar	A-16	7.6
23791280	5/12/2017	Solar	A-16	3.8
23806674	5/12/2017	Solar	A-16	6.0
23810422	5/12/2017	Solar	A-16	3.6
23863782	5/12/2017	Solar	A-16	2.3
23607978	5/15/2017	Solar	A-16	3.8
23672923	5/15/2017	Solar	A-16	3.0
23745563	5/15/2017	Solar	A-16	7.6
23434906	5/16/2017	Solar	A-16	5.0
23635308	5/16/2017	Solar	A-16	5.8
23758689	5/16/2017	Solar	A-16	5.0
23766571	5/16/2017	Solar	A-16	3.0
23797310	5/16/2017	Solar	A-16	3.8
23807603	5/16/2017	Solar	A-16	3.0
23520954	5/17/2017	Solar	A-16	6.0
23555425	5/17/2017	Solar	A-16	2.9
23738402	5/17/2017	Solar	A-16	4.5
23747957	5/17/2017	Solar	A-16	3.0
23777055	5/17/2017	Solar	A-16	7.6
23805771	5/17/2017	Solar	A-16	3.0
23690018	5/18/2017	Solar	A-16	6.0
23718378	5/18/2017	Solar	A-16	3.6
23811301	5/18/2017	Solar	A-16	10.0
23834527	5/18/2017	Solar	A-16	3.0
23367128	5/19/2017	Solar	A-16	6.5
23521741	5/19/2017	Solar	A-16	7.7
23608613	5/19/2017	Solar	A-16	10.0
23620104	5/19/2017	Solar	G-62	332.6
23633814	5/19/2017	Solar	A-16	5.0
23726474	5/19/2017	Solar	A-16	8.3
23560809	5/22/2017	Solar	C-06	8.6
23920098	5/22/2017	Solar	A-16	3.8
23290363	5/23/2017	Solar	A-16	5.8
23565599	5/23/2017	Solar	A-16	7.6
23620852	5/23/2017	Solar	A-16	9.3
23705082	5/23/2017	Solar	A-16	5.0
23761482	5/23/2017	Solar	A-16	4.0
23774612	5/23/2017	Solar	A-16	7.6
23777386	5/23/2017	Solar	A-16	7.6
23789824	5/23/2017	Solar	A-16	5.0
23834657	5/23/2017	Solar	A-16	9.5
23970936	5/23/2017	Solar	A-16	9.0
23973842	5/23/2017	Solar	A-16	3.8
22323268	5/24/2017	Solar	A-16	5.2
22812754	5/24/2017	Solar	A-16	7.0
23573596	5/24/2017	Solar	A-16	10.0
23615966	5/24/2017	Solar	A-16	7.0
23672685	5/24/2017	Solar	A-16	6.6
23672702	5/24/2017	Solar	A-16	3.6
23761470	5/24/2017	Solar	A-16	7.6
23770896	5/24/2017	Solar	A-16	6.0
23799660	5/24/2017	Solar	A-16	10.0
23806483	5/24/2017	Solar	A-16	8.8
23826342	5/24/2017	Solar	A-16	6.0
23834544	5/24/2017	Solar	A-16	7.6
23873481	5/24/2017	Solar	A-16	6.0
23881794	5/24/2017	Solar	A-16	7.6
23941050	5/24/2017	Solar	A-16	3.0
23947948	5/24/2017	Solar	A-16	3.0
23982100	5/24/2017	Solar	A-16	3.0
23993730	5/24/2017	Solar	A-16	3.0
23722702	5/25/2017	Solar	A-16	5.0
23764199	5/25/2017	Solar	A-16	3.0
23769577	5/25/2017	Solar	A-16	5.0
23870779	5/25/2017	Solar	A-16	7.6
23881471	5/25/2017	Solar	A-16	5.0
24060003	5/25/2017	Solar	A-16	5.0
23390770	5/26/2017	Solar	A-16	3.0
23623709	5/26/2017	Solar	A-16	4.3
23784705	5/26/2017	Solar	A-16	3.8
23819817	5/26/2017	Solar	A-16	3.0
23873986	5/26/2017	Solar	A-16	6.0
24032093	5/26/2017	Solar	A-16	10.0

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24070955	5/26/2017	Solar	A-16	9.0
23634692	5/30/2017	Solar	A-16	2.6
23635101	5/30/2017	Solar	A-16	6.6
23824029	5/30/2017	Solar	A-16	5.0
23905265	5/30/2017	Solar	A-16	6.6
23915788	5/30/2017	Solar	A-16	4.3
21552098	5/31/2017	Solar	A-16	7.3
23648823	5/31/2017	Solar	A-16	6.5
23765915	5/31/2017	Solar	A-16	7.6
23789762	5/31/2017	Solar	A-16	5.0
23803883	5/31/2017	Solar	A-16	3.8
23862594	5/31/2017	Solar	A-16	10.0
23880713	5/31/2017	Solar	A-16	6.0
23974025	5/31/2017	Solar	A-16	3.8
24037178	5/31/2017	Solar	A-16	5.2
24078351	5/31/2017	Solar	A-16	3.6
23634399	6/1/2017	Solar	A-16	5.5
23951388	6/1/2017	Solar	A-16	5.2
23765427	6/2/2017	Solar	A-16	8.5
23765663	6/2/2017	Solar	A-16	10.0
23766227	6/2/2017	Solar	A-16	3.0
23766669	6/2/2017	Solar	A-16	3.8
23771159	6/2/2017	Solar	A-16	3.8
23777578	6/2/2017	Solar	A-16	7.2
23781596	6/2/2017	Solar	A-16	4.3
23805117	6/2/2017	Solar	A-16	5.0
23837987	6/2/2017	Solar	A-16	5.0
23844141	6/2/2017	Solar	A-16	5.0
23948443	6/2/2017	Solar	A-16	5.0
24060767	6/2/2017	Solar	A-16	3.0
23470015	6/6/2017	Solar	A-16	3.8
23647584	6/6/2017	Solar	A-16	5.0
23658304	6/6/2017	Solar	A-16	10.8
23748457	6/6/2017	Solar	A-16	4.3
23796655	6/6/2017	Solar	A-16	6.0
23800158	6/6/2017	Solar	A-16	3.8
23845045	6/6/2017	Solar	A-16	6.0
23581571	6/7/2017	Solar	A-16	6.6
24078451	6/7/2017	Solar	A-16	5.0
24100619	6/7/2017	Solar	A-16	13.0
23607616	6/8/2017	Solar	A-16	3.8
23771737	6/8/2017	Solar	A-16	5.5
23792743	6/8/2017	Solar	A-16	3.8
23806840	6/8/2017	Solar	A-16	3.0
23846650	6/8/2017	Solar	A-16	7.6
23247144	6/9/2017	Solar	A-16	7.6
23646952	6/9/2017	Solar	A-16	3.0
23677046	6/9/2017	Solar	A-16	2.1
23681443	6/9/2017	Solar	A-16	8.7
23698686	6/9/2017	Solar	A-16	7.6
23797105	6/9/2017	Solar	A-16	5.0
23799599	6/9/2017	Solar	A-16	6.8
23835045	6/9/2017	Solar	A-16	6.3
23838257	6/9/2017	Solar	A-16	4.3
23912296	6/9/2017	Solar	A-16	3.0
23956616	6/9/2017	Solar	A-16	7.6
23581558	6/12/2017	Solar	A-16	11.4
23608544	6/12/2017	Solar	A-16	7.7
23747315	6/12/2017	Solar	A-16	5.0
23271624	6/13/2017	Solar	A-16	5.0
23764525	6/13/2017	Solar	A-16	6.0
23784860	6/13/2017	Solar	A-16	3.8
23796620	6/13/2017	Solar	A-16	7.5
23800544	6/13/2017	Solar	A-16	4.8
23863148	6/13/2017	Solar	A-16	6.0
23989461	6/13/2017	Solar	A-16	3.8
24184058	6/13/2017	Solar	A-16	7.6
24125127	6/14/2017	Solar	A-16	3.6
24209075	6/14/2017	Solar	A-16	3.9
23439089	6/15/2017	Solar	A-16	3.8
24142719	6/15/2017	Solar	C-06	25.0
24209070	6/15/2017	Solar	A-16	10.4
23705203	6/16/2017	Solar	A-16	3.0
23756495	6/16/2017	Solar	A-16	7.6
23804952	6/16/2017	Solar	A-16	3.8
23863741	6/16/2017	Solar	A-16	5.0
23872231	6/16/2017	Solar	A-16	7.6
23940004	6/16/2017	Solar	A-16	7.6
23993565	6/16/2017	Solar	A-16	3.0
23502537	6/19/2017	Solar	A-16	6.0
23803788	6/19/2017	Solar	A-16	7.6
23837319	6/19/2017	Solar	A-16	3.8
24222092	6/19/2017	Solar	A-16	5.2
22879681	6/21/2017	Solar	A-16	5.8
23623290	6/21/2017	Solar	A-16	11.4
23656221	6/21/2017	Solar	A-16	4.5
23669607	6/21/2017	Solar	A-16	8.9
23703715	6/21/2017	Solar	A-60	5.0

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23769768	6/21/2017	Solar	A-16	6.5
23873075	6/21/2017	Solar	A-16	6.0
23880251	6/21/2017	Solar	A-16	5.0
23888467	6/21/2017	Solar	A-16	6.0
23935196	6/21/2017	Solar	A-16	7.6
23955551	6/21/2017	Solar	A-16	3.8
23999281	6/21/2017	Solar	A-16	5.0
24008814	6/21/2017	Solar	A-16	10.0
24009245	6/21/2017	Solar	A-16	5.2
24125316	6/21/2017	Solar	A-16	7.6
24144623	6/21/2017	Solar	A-16	9.0
24230448	6/21/2017	Solar	A-16	5.0
24029599	6/22/2017	Solar	A-16	3.6
24097158	6/22/2017	Solar	A-16	7.6
24222724	6/22/2017	Solar	A-16	5.2
20042214	6/26/2017	Solar	C-06	1116.0
23281107	6/26/2017	Solar	A-16	7.6
23623724	6/26/2017	Solar	A-16	6.7
23918499	6/26/2017	Solar	A-16	5.8
23982621	6/26/2017	Solar	A-16	6.0
24060747	6/26/2017	Solar	A-16	14.2
23675434	6/27/2017	Solar	A-16	6.0
24060539	6/27/2017	Solar	A-16	5.0
22706597	6/28/2017	Solar	G-32	150.0
23475149	6/28/2017	Solar	A-16	7.6
23513223	6/28/2017	Solar	A-16	3.0
23746445	6/28/2017	Solar	A-16	5.0
23826225	6/28/2017	Solar	A-16	7.6
23864829	6/28/2017	Solar	A-16	5.0
23873835	6/28/2017	Solar	A-16	5.0
23955055	6/28/2017	Solar	A-16	3.5
24087085	6/28/2017	Solar	A-16	7.6
24088656	6/28/2017	Solar	A-16	5.0
24146225	6/28/2017	Solar	A-16	6.0
24152786	6/28/2017	Solar	A-16	3.8
24202884	6/28/2017	Solar	A-16	3.8
23292482	6/29/2017	Solar	A-16	5.0
23822135	6/29/2017	Solar	A-16	6.3
24107230	6/29/2017	Solar	A-16	7.6
24146472	6/29/2017	Solar	A-16	3.8
24253665	6/29/2017	Solar	A-16	3.0
23486279	6/30/2017	Solar	A-16	3.8
23698986	6/30/2017	Solar	A-16	3.0
23783129	6/30/2017	Solar	A-16	5.2
23849830	6/30/2017	Solar	A-16	3.9
23882115	6/30/2017	Solar	A-16	6.0
24009469	6/30/2017	Solar	A-16	3.8
24153978	6/30/2017	Solar	A-16	3.0
24226462	6/30/2017	Solar	A-16	6.6
24292081	6/30/2017	Solar	A-16	11.4
23914428	7/3/2017	Solar	A-16	7.6
22883416	7/5/2017	Solar	A-16	2.25
23294045	7/5/2017	Solar	A-16	1.86
23760523	7/5/2017	Solar	A-16	3
23766070	7/5/2017	Solar	A-16	5
24078536	7/5/2017	Solar	A-16	10
24125224	7/5/2017	Solar	A-16	7.6
24160196	7/5/2017	Solar	A-16	6
24209074	7/5/2017	Solar	A-16	6
19836686	7/6/2017	Solar	C-06	196
23358049	7/6/2017	Solar	A-16	5.2
23811468	7/7/2017	Solar	A-16	2.5
23830672	7/7/2017	Solar	A-16	6
23871941	7/7/2017	Solar	A-16	6
23950113	7/7/2017	Solar	A-16	3
24153785	7/7/2017	Solar	A-16	7.6
24193638	7/7/2017	Solar	A-16	7.75
21603045	7/10/2017	Solar	G-02	46
21897530	7/10/2017	Solar	A-16	2.58
23609091	7/10/2017	Solar	A-16	7.6
23807500	7/10/2017	Solar	A-16	3.8
23831050	7/10/2017	Solar	A-16	6
23851185	7/10/2017	Solar	A-16	6
23882929	7/10/2017	Solar	A-16	5
24032575	7/10/2017	Solar	A-16	5
24098516	7/10/2017	Solar	A-16	16.08
24114357	7/10/2017	Solar	A-16	5
24137884	7/10/2017	Solar	A-16	6.5
24211359	7/10/2017	Solar	A-16	5
17665895	7/10/2017	Natural Gas	C-06	4000
23175334	7/11/2017	Solar	A-16	10
23386807	7/11/2017	Solar	G-32	40
23670276	7/11/2017	Solar	A-16	3
23770495	7/11/2017	Solar	A-16	10
23789935	7/11/2017	Solar	A-16	6
23819441	7/11/2017	Solar	A-16	4
23820068	7/11/2017	Solar	A-16	5
23841727	7/11/2017	Solar	A-16	3.8

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23842710	7/11/2017	Solar	A-16	3.8
23870512	7/11/2017	Solar	A-60	3.8
23955953	7/11/2017	Solar	A-16	3
24028822	7/11/2017	Solar	A-16	7
24134656	7/11/2017	Solar	A-16	9
24144238	7/11/2017	Solar	A-16	3.9
24162210	7/11/2017	Solar	A-16	4.2
24195777	7/11/2017	Solar	A-16	7.6
22292711	7/12/2017	Solar	G-02	133.3
23159465	7/12/2017	Solar	A-16	3.25
23699251	7/12/2017	Solar	A-16	3.8
23933627	7/12/2017	Solar	A-16	10.4
24070701	7/12/2017	Solar	A-16	3.8
24377782	7/12/2017	Solar	A-16	6
23906114	7/13/2017	Solar	A-16	6.6
23852921	7/14/2017	Solar	A-16	6
23926665	7/14/2017	Solar	A-16	7.6
24052038	7/14/2017	Solar	A-16	5
24105088	7/14/2017	Solar	A-16	3.8
24203100	7/14/2017	Solar	A-16	3
24244843	7/14/2017	Solar	A-16	4.5
24262754	7/14/2017	Solar	A-16	7.25
23804805	7/17/2017	Solar	A-16	3
23813209	7/17/2017	Solar	A-16	7.6
23817786	7/17/2017	Solar	A-16	10
23836901	7/17/2017	Solar	A-16	5
23850985	7/17/2017	Solar	A-16	10
23881076	7/17/2017	Solar	A-16	3.8
23957556	7/17/2017	Solar	A-16	4.8
24066676	7/17/2017	Solar	A-16	5
24261095	7/17/2017	Solar	A-16	3
24270945	7/17/2017	Solar	A-16	10
24281104	7/17/2017	Solar	A-16	7.6
23572159	7/18/2017	Solar	A-16	8
23585525	7/18/2017	Solar	A-16	7.6
23798468	7/18/2017	Solar	A-16	6.5
23811534	7/18/2017	Solar	A-16	3
24114914	7/18/2017	Solar	A-16	3.8
24251863	7/18/2017	Solar	A-16	3.8
24282503	7/18/2017	Solar	A-16	3.8
24309173	7/18/2017	Solar	A-16	6
23927120	7/19/2017	Solar	A-16	3
24211770	7/19/2017	Solar	A-16	10
23279698	7/21/2017	Solar	A-16	7.6
23766499	7/21/2017	Solar	A-16	6
23776286	7/21/2017	Solar	A-16	2.5
23792964	7/21/2017	Solar	A-16	5
23851614	7/21/2017	Solar	A-16	10
23889973	7/21/2017	Solar	A-60	3
24060487	7/21/2017	Solar	A-16	3.8
24132711	7/21/2017	Solar	A-16	7.25
24174061	7/21/2017	Solar	A-16	5
24184315	7/21/2017	Solar	A-16	3.8
24185390	7/21/2017	Solar	A-16	5
24221012	7/21/2017	Solar	A-16	3
24283340	7/21/2017	Solar	A-16	3
24298301	7/21/2017	Solar	A-16	5
24353135	7/21/2017	Solar	A-16	6
24395426	7/21/2017	Solar	A-16	10
23122698	7/24/2017	Solar	A-16	8
23690266	7/24/2017	Solar	A-16	5
24132642	7/24/2017	Solar	A-16	6.75
24353160	7/24/2017	Solar	A-16	3
24378815	7/24/2017	Solar	A-16	7.6
24381464	7/24/2017	Solar	A-16	5.5
23585600	7/25/2017	Solar	A-16	10
23747440	7/25/2017	Solar	A-16	3
24378879	7/25/2017	Solar	A-16	6
24029972	7/26/2017	Solar	A-16	11.4
24049172	7/26/2017	Solar	A-16	4.08
23831363	7/27/2017	Solar	A-16	10
24039844	7/27/2017	Solar	A-16	5
24088031	7/27/2017	Solar	A-16	5
24160187	7/27/2017	Solar	A-16	3.8
24184499	7/27/2017	Solar	A-16	3.8
24339625	7/27/2017	Solar	A-16	6
24340205	7/27/2017	Solar	A-16	10
24341927	7/27/2017	Solar	A-16	3
24380549	7/27/2017	Solar	A-16	5
24068889	7/28/2017	Solar	A-16	5
23717759	7/31/2017	Solar	A-16	5.04
23769220	7/31/2017	Solar	A-16	5
23771190	7/31/2017	Solar	A-16	7
23784319	7/31/2017	Solar	A-16	7.6
23811870	7/31/2017	Solar	A-16	6
24116317	7/31/2017	Solar	A-16	10
24231429	7/31/2017	Solar	A-16	3
24291022	7/31/2017	Solar	A-16	5

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24349607	7/31/2017	Solar	A-16	3
24367488	7/31/2017	Solar	A-60	7.6
23620314	8/1/2017	Solar	A-16	3.8
23635104	8/1/2017	Solar	A-16	3
23689761	8/1/2017	Solar	C-06	200
23759768	8/1/2017	Solar	A-16	3.8
23761225	8/1/2017	Solar	A-60	5
23798945	8/1/2017	Solar	A-16	2.75
23844097	8/1/2017	Solar	A-16	7.68
23852547	8/1/2017	Solar	A-16	6
24155099	8/1/2017	Solar	A-16	5.8
24204298	8/1/2017	Solar	A-16	7.25
24242354	8/1/2017	Solar	A-16	5
24244595	8/1/2017	Solar	A-16	3.8
24253076	8/1/2017	Solar	A-16	3
24309904	8/1/2017	Solar	A-16	6
24341358	8/1/2017	Solar	A-16	5
24395309	8/1/2017	Solar	A-16	3
24396152	8/1/2017	Solar	A-16	3
24417123	8/1/2017	Solar	A-16	5
23703391	8/2/2017	Solar	A-16	7.6
23797581	8/2/2017	Solar	A-16	1.5
23805458	8/2/2017	Solar	A-16	3
23853643	8/2/2017	Solar	A-16	3
24115352	8/2/2017	Solar	A-16	7.6
24340772	8/2/2017	Solar	A-16	6
24349843	8/2/2017	Solar	A-16	5
24360573	8/2/2017	Solar	A-16	10
24414765	8/2/2017	Solar	A-16	7.6
23257776	8/3/2017	Solar	A-16	6.48
24159334	8/3/2017	Solar	A-16	6
23561175	8/4/2017	Solar	A-16	5.4
23810948	8/4/2017	Solar	A-16	9.25
24059014	8/4/2017	Solar	A-16	6
24138768	8/4/2017	Solar	A-16	2.4
24209856	8/4/2017	Solar	A-16	7
24340508	8/4/2017	Solar	A-16	5
24395706	8/4/2017	Solar	A-16	3.5
24405155	8/4/2017	Solar	A-16	7.56
24406636	8/4/2017	Solar	A-16	3.8
23671465	8/7/2017	Solar	A-16	3
23703042	8/7/2017	Solar	A-16	6
23759048	8/7/2017	Solar	A-16	3.8
23826409	8/7/2017	Solar	A-16	6
23863008	8/7/2017	Solar	A-16	6
23863070	8/7/2017	Solar	A-16	6.6
23870357	8/7/2017	Solar	A-16	3.8
23972906	8/7/2017	Solar	A-16	7.6
24096661	8/7/2017	Solar	A-16	6
24182196	8/7/2017	Solar	A-16	3
24262247	8/7/2017	Solar	A-16	5
24319022	8/7/2017	Solar	A-60	7.6
24404977	8/7/2017	Solar	A-16	10
23421022	8/8/2017	Solar	A-16	6.6
23764890	8/8/2017	Solar	A-16	7
23810464	8/8/2017	Solar	A-16	10
23895934	8/8/2017	Solar	A-16	6.6
24077499	8/8/2017	Solar	A-16	7.6
24159830	8/8/2017	Solar	A-16	7.6
24222047	8/8/2017	Solar	A-16	9
22880433	8/9/2017	Solar	A-16	6.25
23608589	8/9/2017	Solar	A-16	10
23821371	8/9/2017	Solar	A-16	4
24128121	8/9/2017	Solar	A-16	2.4
24182711	8/9/2017	Solar	A-16	3
24244024	8/9/2017	Solar	A-16	3
24250816	8/9/2017	Solar	A-16	3.8
24271085	8/9/2017	Solar	A-16	7.6
24348294	8/9/2017	Solar	A-16	6.25
24380774	8/9/2017	Solar	A-16	5
24388596	8/9/2017	Solar	A-16	2.5
24395207	8/9/2017	Solar	A-16	7.6
24407529	8/9/2017	Solar	A-16	5
24409767	8/9/2017	Solar	A-16	11.4
24418366	8/9/2017	Solar	A-16	5
23535312	8/10/2017	Solar	A-16	7.81
23765726	8/10/2017	Solar	C-06	20
23843653	8/10/2017	Solar	A-16	9.28
24235551	8/10/2017	Solar	A-16	6
24252287	8/10/2017	Solar	A-16	5
24349069	8/10/2017	Solar	A-16	4.2
24350599	8/10/2017	Solar	A-16	3.75
24380417	8/10/2017	Solar	A-16	5
24407754	8/10/2017	Solar	A-16	3.8
24407923	8/10/2017	Solar	A-16	10
24409034	8/10/2017	Solar	A-16	5.25
24426688	8/10/2017	Solar	A-16	3
24427790	8/10/2017	Solar	A-16	6.75

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24478938	8/10/2017	Solar	A-16	7.6
24487955	8/10/2017	Solar	A-16	6
24507379	8/11/2017	Solar	A-16	3
23934507	8/14/2017	Solar	A-16	7.68
24573194	8/14/2017	Solar	A-16	6.6
24347005	8/15/2017	Solar	A-16	6
23067345	8/16/2017	Solar	A-16	10
23602677	8/16/2017	Solar	A-16	4.8
23874683	8/16/2017	Solar	A-16	6
24011862	8/16/2017	Solar	A-16	6.5
24087804	8/16/2017	Solar	A-16	3.6
24136364	8/16/2017	Solar	A-16	7.6
24281709	8/16/2017	Solar	A-16	6
24332410	8/16/2017	Solar	A-16	5
24368723	8/16/2017	Solar	A-16	3.8
23461183	8/17/2017	Solar	A-16	6.75
23634716	8/17/2017	Solar	A-16	3.8
23798903	8/17/2017	Solar	A-16	3.5
23862042	8/17/2017	Solar	A-16	7.6
23865250	8/17/2017	Solar	A-16	2.75
23874732	8/17/2017	Solar	A-16	5
23875204	8/17/2017	Solar	A-16	7.6
23881924	8/17/2017	Solar	A-16	7.6
23920030	8/17/2017	Solar	A-16	10.4
24032248	8/17/2017	Solar	A-16	7.6
24059634	8/17/2017	Solar	A-16	6
24280658	8/17/2017	Solar	A-16	6
24282128	8/17/2017	Solar	A-16	3.8
24298260	8/17/2017	Solar	A-16	5
24339626	8/17/2017	Solar	A-16	10
24340151	8/17/2017	Solar	A-16	6
23632668	8/18/2017	Solar	A-16	5
23770430	8/18/2017	Solar	A-16	6
23997997	8/18/2017	Solar	A-16	5
24135297	8/18/2017	Solar	A-16	6
24221960	8/18/2017	Solar	A-16	5
24225950	8/18/2017	Solar	A-16	5.2
24309656	8/18/2017	Solar	A-16	5
24320567	8/18/2017	Solar	A-16	10
24387402	8/18/2017	Solar	A-16	7.6
24425249	8/18/2017	Solar	A-16	5
24497942	8/18/2017	Solar	A-16	3.8
24519553	8/18/2017	Solar	A-60	5
24328448	8/21/2017	Solar	A-16	10
24377254	8/21/2017	Solar	A-16	6
23053065	8/23/2017	Solar	G-02	108
23762158	8/23/2017	Solar	A-16	7.6
23805781	8/23/2017	Solar	A-16	10
23841862	8/23/2017	Solar	A-16	5
23850418	8/23/2017	Solar	A-16	8
24029116	8/23/2017	Solar	A-16	7.6
24115515	8/23/2017	Solar	A-16	6.9
24136180	8/23/2017	Solar	A-16	4.03
24210578	8/23/2017	Solar	A-16	7.6
24262713	8/23/2017	Solar	A-16	6.6
24337622	8/23/2017	Solar	A-16	3.8
24339328	8/23/2017	Solar	A-16	7.6
24395898	8/23/2017	Solar	A-16	6
24428661	8/23/2017	Solar	A-16	3.8
24496963	8/23/2017	Solar	A-16	5
24517712	8/23/2017	Solar	A-16	5
24523891	8/23/2017	Solar	A-16	5
22186386	8/24/2017	Solar	A-16	15
23811362	8/24/2017	Solar	A-16	10
23863429	8/24/2017	Solar	A-16	10
24154214	8/24/2017	Solar	A-60	5.59
24210225	8/24/2017	Solar	A-16	5
24210827	8/24/2017	Solar	A-60	7.6
24251105	8/24/2017	Solar	A-16	6
24341187	8/24/2017	Solar	A-16	3.8
24401609	8/24/2017	Solar	A-16	2.75
24406429	8/24/2017	Solar	A-16	3.8
24494643	8/24/2017	Solar	A-16	3.75
24507048	8/24/2017	Solar	A-16	5
24508864	8/24/2017	Solar	A-16	3.8
24518462	8/24/2017	Solar	A-16	3.8
24534603	8/24/2017	Solar	A-16	7.6
24554362	8/24/2017	Solar	A-16	3
24563573	8/24/2017	Solar	A-16	6
24574200	8/24/2017	Solar	A-16	3
24659596	8/24/2017	Solar	A-16	3.8
23697258	8/25/2017	Solar	A-16	5
24330184	8/25/2017	Solar	A-60	3.6
24370752	8/25/2017	Solar	A-16	3
24414760	8/25/2017	Solar	A-16	6.6
24425356	8/25/2017	Solar	A-16	3
24610455	8/25/2017	Solar	A-16	2.4
24795815	8/25/2017	Solar	A-16	4.75

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19834975	8/28/2017	Solar	C-06	196
24414762	8/28/2017	Solar	A-16	6.6
24519395	8/28/2017	Solar	A-16	7.6
23956319	8/29/2017	Solar	A-16	5.2
24090604	8/29/2017	Solar	A-16	4
24182908	8/29/2017	Solar	A-16	7.6
24405881	8/29/2017	Solar	A-16	5
24488464	8/29/2017	Solar	A-16	3.8
24525839	8/29/2017	Solar	A-16	7.6
24448629	8/30/2017	Solar	A-16	11.8
23003761	8/31/2017	Solar	A-16	9.77
23691973	8/31/2017	Solar	A-16	5
23830621	8/31/2017	Solar	A-16	6.5
23972513	8/31/2017	Solar	A-16	6
24338018	8/31/2017	Solar	A-16	3.8
24401598	8/31/2017	Solar	A-16	10
24487521	8/31/2017	Solar	A-16	6
24545221	8/31/2017	Solar	A-16	7.6
24545609	8/31/2017	Solar	A-16	7.6
24579697	8/31/2017	Solar	A-16	5
24581125	8/31/2017	Solar	A-16	3
24588533	8/31/2017	Solar	A-16	7.6
24597171	8/31/2017	Solar	A-16	5
24609717	8/31/2017	Solar	A-16	5
24657904	8/31/2017	Solar	A-16	5.5
23982252	9/1/2017	Solar	A-16	3.8
24098674	9/1/2017	Solar	A-16	5
24250704	9/1/2017	Solar	A-16	3.8
24339959	9/1/2017	Solar	A-16	6
24347624	9/1/2017	Solar	A-16	5
24347878	9/1/2017	Solar	A-16	5
24458583	9/1/2017	Solar	A-16	5
24477900	9/1/2017	Solar	A-16	7.6
24488718	9/1/2017	Solar	A-16	7.6
24518274	9/1/2017	Solar	A-16	3
24518627	9/1/2017	Solar	A-16	5
24547518	9/1/2017	Solar	A-16	3.8
24564230	9/1/2017	Solar	A-16	7.82
24573313	9/1/2017	Solar	A-16	6
24574517	9/1/2017	Solar	A-16	6
24712953	9/1/2017	Solar	A-16	4.14
23830077	9/6/2017	Solar	A-16	4.5
23837147	9/6/2017	Solar	A-16	4.25
23843118	9/6/2017	Solar	A-16	8.5
24230815	9/6/2017	Solar	A-16	5
24282690	9/6/2017	Solar	A-16	7.6
24320042	9/6/2017	Solar	A-16	10
24370942	9/6/2017	Solar	A-16	3
24401584	9/6/2017	Solar	A-16	7.6
24425454	9/6/2017	Solar	A-16	3
24439763	9/6/2017	Solar	A-16	10
24486250	9/6/2017	Solar	A-16	10
24497559	9/6/2017	Solar	A-16	7.6
24526310	9/6/2017	Solar	A-16	5
24646690	9/6/2017	Solar	A-16	5
24684207	9/6/2017	Solar	A-16	9
13336848	9/7/2017	Wind	G-02	100
23407342	9/7/2017	Solar	A-16	6
23844740	9/7/2017	Solar	A-16	7.5
23999043	9/7/2017	Solar	A-16	3
24127908	9/7/2017	Solar	A-16	6
24260723	9/7/2017	Solar	A-16	10
24401602	9/7/2017	Solar	A-16	5
24405051	9/7/2017	Solar	A-16	7.6
24418144	9/7/2017	Solar	A-16	3.8
24440227	9/7/2017	Solar	A-16	10
24497624	9/7/2017	Solar	A-16	5
24547726	9/7/2017	Solar	A-16	3.8
24563912	9/7/2017	Solar	A-16	5
24580147	9/7/2017	Solar	A-16	3.8
24638367	9/7/2017	Solar	A-16	10
24648743	9/7/2017	Solar	A-16	7.6
24650508	9/7/2017	Solar	A-16	5
24687460	9/7/2017	Solar	A-16	7.6
24880806	9/7/2017	Solar	A-16	3.6
23096602	9/8/2017	Solar	A-16	6
23853156	9/8/2017	Solar	A-16	4.5
24290250	9/8/2017	Solar	A-16	6
24573920	9/8/2017	Solar	A-16	10
24579246	9/8/2017	Solar	A-16	6
24597443	9/8/2017	Solar	A-16	7.6
24599284	9/8/2017	Solar	A-16	5
24670000	9/8/2017	Solar	A-16	6
24706170	9/8/2017	Solar	A-16	3
23836257	9/11/2017	Solar	A-16	9.25
23864125	9/11/2017	Solar	A-16	5.5
24367637	9/11/2017	Solar	A-16	10
24370337	9/11/2017	Solar	A-16	6

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24417741	9/11/2017	Solar	A-16	3
24554061	9/11/2017	Solar	A-16	3.8
24571671	9/11/2017	Solar	A-16	4.32
24590552	9/11/2017	Solar	A-16	5
24496370	9/12/2017	Solar	A-16	5
12798003	9/13/2017	solar	C-06	400
22293088	9/13/2017	Solar	G-02	133.2
23648113	9/13/2017	Solar	A-16	5
24079120	9/13/2017	Solar	A-16	7.6
24379207	9/13/2017	Solar	A-16	7.6
24487078	9/13/2017	Solar	A-16	3.8
24500088	9/13/2017	Solar	A-16	6
24520464	9/13/2017	Solar	A-16	3
24687112	9/13/2017	Solar	A-16	1.74
24702730	9/13/2017	Solar	A-16	6.6
24787534	9/13/2017	Solar	A-16	3.8
21210567	9/14/2017	Solar	G-02	149.5
23517364	9/14/2017	Solar	A-16	5
23846384	9/14/2017	Solar	A-16	3
24359613	9/14/2017	Solar	A-16	10
24435908	9/14/2017	Solar	A-16	4.75
24523990	9/14/2017	Solar	A-16	5
24578591	9/14/2017	Solar	A-16	4.25
23861622	9/15/2017	Solar	A-16	9
23963820	9/15/2017	Solar	A-16	6
24193911	9/15/2017	Solar	A-16	6
24231997	9/15/2017	Solar	A-16	11.8
24409321	9/15/2017	Solar	A-16	4.2
24543655	9/15/2017	Solar	A-16	7.6
24547299	9/15/2017	Solar	A-16	10
24678268	9/15/2017	Solar	A-16	5
24684203	9/15/2017	Solar	A-16	5
24702979	9/15/2017	Solar	A-16	10
24800568	9/15/2017	Solar	A-16	4.32
24099164	9/19/2017	Solar	A-16	5
24153658	9/19/2017	Solar	A-16	4.2
24281390	9/19/2017	Solar	A-16	3.8
24546807	9/19/2017	Solar	A-16	3
24625825	9/19/2017	Solar	A-16	7.82
24703195	9/19/2017	Solar	A-16	7.6
23726012	9/20/2017	Solar	A-16	10
23864666	9/20/2017	Solar	A-16	5.25
24261614	9/20/2017	Solar	A-16	3.8
24311272	9/20/2017	Solar	A-16	4.2
24494405	9/20/2017	Solar	A-16	7.6
24517142	9/20/2017	Solar	A-16	6
24518405	9/20/2017	Solar	A-16	5
24555975	9/20/2017	Solar	A-16	7.6
24564754	9/20/2017	Solar	A-16	7.6
24667216	9/20/2017	Solar	A-16	5
24671054	9/20/2017	Solar	A-16	10
24704064	9/20/2017	Solar	A-16	7.6
24705039	9/20/2017	Solar	A-60	5
24713294	9/20/2017	Solar	A-16	5.04
24753011	9/20/2017	Solar	A-16	7.6
24759300	9/20/2017	Solar	A-16	3
24787241	9/20/2017	Solar	A-16	6
23689233	9/22/2017	Solar	A-16	10
24283168	9/22/2017	Solar	A-16	6.6
24407005	9/22/2017	Solar	A-16	7.6
24555576	9/22/2017	Solar	A-16	5
24562476	9/22/2017	Solar	A-16	8.5
24572118	9/22/2017	Solar	A-16	10
24573093	9/22/2017	Solar	A-16	10
24577402	9/22/2017	Solar	A-16	3
24579450	9/22/2017	Solar	A-16	10.4
24599447	9/22/2017	Solar	A-16	3
24695321	9/22/2017	Solar	A-16	3.6
24833762	9/22/2017	Solar	A-16	3.8
23522525	9/25/2017	Solar	A-16	4.3
23670604	9/25/2017	Solar	A-16	6
23940957	9/25/2017	Solar	A-16	7.6
24231140	9/25/2017	Solar	A-16	3
24319864	9/25/2017	Solar	A-16	5
24439731	9/25/2017	Solar	A-16	3.8
24598483	9/25/2017	Solar	A-60	6
24598876	9/25/2017	Solar	A-16	10
24657687	9/25/2017	Solar	A-16	3.8
24658382	9/25/2017	Solar	A-16	6
24705878	9/25/2017	Solar	A-16	3.8
24739594	9/25/2017	Solar	A-16	10.56
24749309	9/25/2017	Solar	A-16	3.8
24768789	9/25/2017	Solar	A-16	10
24202524	9/26/2017	Solar	A-16	5
24252780	9/26/2017	Solar	A-16	3.8
24346064	9/26/2017	Solar	A-16	6
24447990	9/26/2017	Solar	A-16	3.8
24687740	9/26/2017	Solar	A-16	5

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24816462	9/26/2017	Solar	A-16	6
24849153	9/26/2017	Solar	A-16	5
23418430	9/27/2017	Solar	A-16	6
23927152	9/27/2017	Solar	C-06	19.8
24138605	9/27/2017	Solar	A-16	3.6
24471274	9/27/2017	Solar	A-16	3.8
24619129	9/27/2017	Solar	A-16	5
24659562	9/27/2017	Solar	A-16	7.6
24660646	9/27/2017	Solar	A-16	7.6
24916611	9/27/2017	Solar	A-16	10
24405556	9/28/2017	Solar	A-16	3.5
24580264	9/28/2017	Solar	A-16	7.6
24695939	9/28/2017	Solar	A-16	5
24867621	9/28/2017	Solar	A-16	5
23842336	9/29/2017	Solar	A-16	10
24301415	9/29/2017	Solar	A-16	7.6
24478906	9/29/2017	Solar	A-16	6
24494533	9/29/2017	Solar	A-16	3
24520304	9/29/2017	Solar	A-16	7.6
24543599	9/29/2017	Solar	A-16	2.64
24599090	9/29/2017	Solar	A-16	3.8
24607968	9/29/2017	Solar	A-16	10
24659034	9/29/2017	Solar	A-16	3.8
24696702	9/29/2017	Solar	A-16	10
24573983	9/30/2017	Solar	A-16	3.8
00156659	10/2/2017	Solar	A-16	10
00155217	10/2/2017	Solar	A-16	6
00156148	10/2/2017	Solar	A-16	10
00156221	10/2/2017	Solar	A-16	10
00156533	10/2/2017	Solar	A-16	5
00155998	10/2/2017	Solar	A-16	10
00155507	10/2/2017	Solar	A-16	5
00156618	10/2/2017	Solar	A-16	2.9
00156157	10/2/2017	Solar	A-16	8.25
00156640	10/2/2017	Solar	A-16	3.8
00154352	10/2/2017	Solar	A-16	6
00154749	10/3/2017	Solar	A-60	3.6
00155195	10/3/2017	Solar	A-16	12
24561970	10/3/2017	Solar	C-06	22.8
00155433	10/5/2017	Solar	A-16	5
00156313	10/5/2017	Solar	A-16	10
00156090	10/5/2017	Solar	A-16	7.5
00156314	10/5/2017	Solar	A-16	7.6
00156213	10/5/2017	Solar	A-16	7.6
00156056	10/5/2017	Solar	A-16	3.8
00156624	10/5/2017	Solar	A-16	7.6
00157551	10/5/2017	Solar	A-16	7.44
00156594	10/5/2017	Solar	A-16	3.8
00156006	10/5/2017	Solar	A-16	3.36
00156601	10/5/2017	Solar	A-60	5
00155794	10/5/2017	Solar	A-16	5
19864653	10/9/2017	Solar	C-06	196
00157532	10/10/2017	Solar	A-16	6
00156189	10/10/2017	Solar	A-16	6
00156596	10/10/2017	Solar	A-16	3.8
00156498	10/10/2017	Solar	A-16	6
00156419	10/10/2017	Solar	A-16	5
00153833	10/10/2017	Solar	A-16	6
00156053	10/11/2017	Solar	A-16	5
00155254	10/11/2017	Solar	A-16	4.64
00156288	10/11/2017	Solar	A-16	3
00156623	10/11/2017	Solar	A-16	3.8
00155888	10/11/2017	Solar	A-16	4.75
00156022	10/11/2017	Solar	A-16	3
00156677	10/11/2017	Solar	A-16	6
00156391	10/11/2017	Solar	A-16	3.8
00155907	10/11/2017	Solar	A-16	5
00155591	10/11/2017	Solar	A-16	1.75
00156641	10/11/2017	Solar	A-16	7.6
00155409	10/11/2017	Solar	A-16	6
00156123	10/11/2017	Solar	A-16	5
00156412	10/11/2017	Solar	A-16	9.25
00156315	10/11/2017	Solar	A-16	10
00155904	10/11/2017	Solar	A-16	10
00155759	10/11/2017	Solar	A-16	3
00156302	10/11/2017	Solar	A-16	10
00155115	10/11/2017	Solar	A-16	4.97
00148550	10/11/2017	Solar	A-16	2.46
00155966	10/11/2017	Solar	A-16	6
00156217	10/11/2017	Solar	A-16	3
00156556	10/11/2017	Solar	A-16	10
00155637	10/11/2017	Solar	A-60	5
00156245	10/11/2017	Solar	A-16	3
00156622	10/11/2017	Solar	A-16	5
00157544	10/11/2017	Solar	A-16	3.36
00156044	10/11/2017	Solar	A-16	3.48
00155885	10/11/2017	Solar	A-16	3
00154437	10/11/2017	Solar	A-16	3.8

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00156218	10/11/2017	Solar	A-16	7.6
00154116	10/11/2017	Solar	A-16	4.8
00156626	10/11/2017	Solar	A-16	3.8
00155238	10/12/2017	Solar	A-16	3
00156325	10/12/2017	Solar	A-16	3.8
00154255	10/12/2017	Solar	A-16	10
00155248	10/12/2017	Solar	A-16	3
00155946	10/12/2017	Solar	A-16	3.8
00156642	10/12/2017	Solar	A-16	5
00156124	10/12/2017	Solar	A-16	10
00155496	10/12/2017	Solar	A-16	3.75
00156502	10/12/2017	Solar	A-16	10
00156610	10/12/2017	Solar	A-16	6
00155247	10/12/2017	Solar	A-16	5
00156522	10/12/2017	Solar	A-16	6
00156615	10/12/2017	Solar	A-16	6
00156697	10/12/2017	Solar	A-16	3
00155917	10/12/2017	Solar	A-16	3
00156491	10/12/2017	Solar	A-16	11.4
00157531	10/13/2017	Solar	A-16	8.12
00156660	10/13/2017	Solar	A-16	5.28
00155820	10/13/2017	Solar	A-16	5
00156101	10/16/2017	Solar	A-16	6
00161246	10/16/2017	Solar	A-60	5
00155255	10/16/2017	Solar	A-16	7.6
00156535	10/16/2017	Solar	A-16	3
00161249	10/16/2017	Solar	A-16	3.8
00156534	10/16/2017	Solar	A-16	5
00160951	10/16/2017	Solar	A-16	3
00160895	10/17/2017	Solar	A-16	3
00160952	10/17/2017	Solar	A-16	3
00161159	10/17/2017	Solar	A-16	7.6
00161114	10/17/2017	Solar	A-16	5
00154458	10/17/2017	Solar	A-16	5.2
00161067	10/18/2017	Solar	A-16	3
00160765	10/18/2017	Solar	A-16	7.6
00160818	10/18/2017	Solar	A-16	10
00161119	10/18/2017	Solar	A-16	5
00161128	10/19/2017	Solar	A-16	5
00159906	10/19/2017	Solar	A-16	3.8
00159917	10/19/2017	Solar	A-16	6
00155198	10/19/2017	Solar	A-60	3.8
00159889	10/19/2017	Solar	A-16	6
00151324	10/19/2017	Solar	A-16	3.75
00155156	10/19/2017	Solar	A-16	3
00156464	10/19/2017	Solar	A-16	10
00152995	10/20/2017	Solar	A-16	3
00161243	10/20/2017	Solar	A-16	3
00156545	10/20/2017	Solar	A-16	5
00157443	10/20/2017	Solar	A-16	6
00161080	10/20/2017	Solar	A-16	3.6
00159864	10/20/2017	Solar	A-60	4
00161118	10/23/2017	Solar	A-16	3
00156555	10/23/2017	Solar	A-16	7.6
00161125	10/23/2017	Solar	A-16	4.56
00155964	10/23/2017	Solar	A-16	10
00160610	10/23/2017	Solar	A-16	5
00160946	10/23/2017	Solar	A-16	5
00161631	10/23/2017	Solar	A-16	8
00161103	10/23/2017	Solar	A-16	3.8
00160068	10/23/2017	Solar	A-16	6
00155922	10/23/2017	Solar	A-16	7.6
00160543	10/23/2017	Solar	A-16	10
00160083	10/23/2017	Solar	A-16	7.6
00161121	10/23/2017	Solar	A-16	10
00152543	10/23/2017	Solar	A-16	13.6
00159859	10/25/2017	Solar	A-16	8.75
00160749	10/25/2017	Solar	A-16	3.8
00161064	10/25/2017	Solar	A-16	3
00155678	10/25/2017	Solar	A-16	6
00156324	10/25/2017	Solar	A-16	3
00155406	10/25/2017	Solar	A-16	6
00159206	10/26/2017	Solar	A-16	5.52
00161242	10/26/2017	Solar	A-16	6
00160387	10/26/2017	Solar	A-16	3.8
00160177	10/26/2017	Solar	A-16	5
00159588	10/26/2017	Solar	A-16	6
00161232	10/26/2017	Solar	A-16	7.6
00161730	10/26/2017	Solar	A-16	6
00160716	10/26/2017	Solar	A-16	6
00160898	10/26/2017	Solar	A-16	5
00160473	10/26/2017	Solar	A-16	7.6
00160719	10/26/2017	Solar	A-16	3.8
00160601	10/26/2017	Solar	A-16	6
00161129	10/26/2017	Solar	A-16	3.8
00160448	10/26/2017	Solar	A-16	5
00160599	10/26/2017	Solar	A-16	6
00160614	10/26/2017	Solar	A-16	5

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00160600	10/26/2017	Solar	A-16	7.6
00161066	10/26/2017	Solar	A-16	6
00162384	10/27/2017	Solar	A-16	9
00161037	10/27/2017	Solar	A-16	3.6
00159789	10/27/2017	Solar	C-06	9
00161245	10/30/2017	Solar	A-16	8.5
00160363	10/30/2017	Solar	A-16	5.2
00161694	10/30/2017	Solar	A-16	5
00161447	10/30/2017	Solar	A-16	5
00161126	10/30/2017	Solar	A-16	3.8
00160612	10/30/2017	Solar	A-16	8
00160858	10/30/2017	Solar	A-16	5
00161841	10/30/2017	Solar	A-16	3
00159987	10/30/2017	Solar	A-16	6
00160712	10/30/2017	Solar	A-16	7.6
00159992	10/30/2017	Solar	A-16	3
00160702	10/31/2017	Solar	A-16	3
00160872	10/31/2017	Solar	A-16	6
00159309	10/31/2017	Solar	A-16	5
00159886	10/31/2017	Solar	A-16	6.5
00161247	10/31/2017	Solar	A-16	3.8
00161628	10/31/2017	Solar	A-16	7.6
00160964	10/31/2017	Solar	A-16	10
00160751	10/31/2017	Solar	A-16	3.8
00159865	11/3/2017	Solar	A-16	5
00160454	11/3/2017	Solar	A-16	6
00160368	11/3/2017	Solar	A-16	3.8
00160084	11/3/2017	Solar	A-16	7.6
00161116	11/3/2017	Solar	A-16	5
00159968	11/3/2017	Solar	A-16	3
00160547	11/3/2017	Solar	A-16	7.6
00159177	11/3/2017	Solar	A-16	7.6
00161443	11/3/2017	Solar	A-16	3.8
00160602	11/3/2017	Solar	A-16	6
00161892	11/3/2017	Solar	A-16	3.8
00160014	11/3/2017	Solar	A-16	7.6
00159245	11/3/2017	Solar	A-16	3
00161427	11/3/2017	Solar	A-16	10
00160362	11/3/2017	Solar	A-16	4.5
00160153	11/7/2017	Solar	A-16	10
00159842	11/7/2017	Solar	A-16	3.8
00111440	11/7/2017	Solar	A-16	1.64
00159808	11/7/2017	Solar	A-16	6
00160493	11/7/2017	Solar	A-60	3.8
00160734	11/7/2017	Solar	A-16	7.6
00161854	11/7/2017	Solar	A-16	10
00160425	11/7/2017	Solar	A-16	7.6
00160944	11/7/2017	Solar	A-60	6
00160776	11/7/2017	Solar	A-16	5
00161731	11/7/2017	Solar	A-16	7.6
00160849	11/7/2017	Solar	A-16	7.6
00159482	11/7/2017	Solar	A-16	7.6
00160699	11/7/2017	Solar	A-16	3
00159596	11/7/2017	Solar	A-16	5.76
00160807	11/8/2017	Solar	A-16	8.16
22052774	11/8/2017	Solar	G-02	249.9
00161318	11/9/2017	Solar	A-16	6.6
00161201	11/9/2017	Solar	A-16	7.6
00160945	11/10/2017	Solar	A-16	7.6
00161978	11/13/2017	Solar	A-16	10
00160203	11/13/2017	Solar	A-16	5.2
00160436	11/13/2017	Solar	A-16	10.4
00161314	11/13/2017	Solar	A-16	7.6
00160052	11/13/2017	Solar	A-16	7.6
00161241	11/13/2017	Solar	A-16	3
00160860	11/13/2017	Solar	A-16	7.6
00160544	11/13/2017	Solar	A-16	4.8
00159878	11/13/2017	Solar	A-16	5
00160215	11/13/2017	Solar	A-16	6
00161889	11/13/2017	Solar	A-16	3.77
00161131	11/13/2017	Solar	A-16	7.6
00161917	11/13/2017	Solar	A-16	5
00160373	11/13/2017	Solar	A-16	3
00161814	11/13/2017	Solar	A-16	3.19
00161298	11/13/2017	Solar	A-16	5.8
00160277	11/13/2017	Solar	A-16	3
00160882	11/13/2017	Solar	A-16	3
00160637	11/13/2017	Solar	A-16	7.6
00160942	11/13/2017	Solar	A-16	7.6
00161261	11/13/2017	Solar	A-16	3.8
00159931	11/13/2017	Solar	A-16	10
00159858	11/13/2017	Solar	A-16	9.25
00161802	11/13/2017	Solar	A-16	4.93
23294086	11/13/2017	Solar	G-02	37.8
00159966	11/14/2017	Solar	A-60	5
00161418	11/14/2017	Solar	A-16	3
00161722	11/14/2017	Solar	A-16	10
00161466	11/14/2017	Solar	A-16	3.8

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00161799	11/14/2017	Solar	A-16	3
00161424	11/14/2017	Solar	A-16	4.93
00161809	11/14/2017	Solar	A-16	6
00160605	11/15/2017	Solar	A-16	10
00160590	11/15/2017	Solar	A-16	6.5
00160611	11/15/2017	Solar	A-16	3
00161545	11/15/2017	Solar	A-16	3.8
00161797	11/15/2017	Solar	A-16	2.9
00161919	11/15/2017	Solar	A-16	3
00161818	11/15/2017	Solar	A-16	5
00161670	11/15/2017	Solar	A-16	3
00160809	11/15/2017	Solar	A-16	3
00161821	11/16/2017	Solar	A-16	7.83
00160609	11/17/2017	Solar	A-16	6
00160345	11/17/2017	Solar	A-16	5
00162480	11/17/2017	Solar	A-16	6
00161509	11/17/2017	Solar	A-16	5
00159833	11/17/2017	Solar	A-16	7.6
00159478	11/17/2017	Solar	A-16	7.6
00154312	11/20/2017	Solar	A-16	7.6
00153779	11/20/2017	Solar	A-16	10
00153493	11/20/2017	Solar	A-16	10
00153316	11/20/2017	Solar	A-16	10
00150286	11/20/2017	Solar	A-16	7.6
00151443	11/20/2017	Solar	A-16	7.6
00155167	11/20/2017	Solar	A-16	3
00154227	11/20/2017	Solar	A-16	6
00151421	11/20/2017	Solar	A-16	7.6
00151857	11/20/2017	Solar	A-16	7.6
00151560	11/20/2017	Solar	A-16	8.64
00156683	11/20/2017	Solar	A-16	10
00154311	11/20/2017	Solar	A-16	7.6
00156617	11/20/2017	Solar	A-16	6
00152940	11/20/2017	Solar	A-16	6
00156310	11/20/2017	Solar	A-16	10
00153829	11/20/2017	Solar	A-16	10
00151641	11/20/2017	Solar	A-16	10
00152057	11/20/2017	Solar	A-16	10
00150869	11/20/2017	Solar	A-16	10
00153746	11/20/2017	Solar	A-16	5
00152938	11/20/2017	Solar	A-16	5
00156169	11/20/2017	Solar	A-16	5
00154278	11/20/2017	Solar	A-16	3.8
00156483	11/20/2017	Solar	A-16	10
00156241	11/20/2017	Solar	A-16	7.6
00151944	11/20/2017	Solar	A-16	3
00161599	11/20/2017	Solar	A-16	6
00156219	11/20/2017	Solar	A-16	7.6
00156684	11/20/2017	Solar	A-16	3
00153109	11/20/2017	Solar	A-16	5
00155099	11/20/2017	Solar	A-16	10
00151374	11/20/2017	Solar	A-16	6
00153887	11/20/2017	Solar	A-16	3.92
00156043	11/20/2017	Solar	A-16	6
00153777	11/20/2017	Solar	A-16	7.6
00161888	11/20/2017	Solar	A-16	10
00154415	11/20/2017	Solar	A-16	9
00151737	11/20/2017	Solar	A-16	5
00153402	11/20/2017	Solar	A-16	3
00152542	11/20/2017	Solar	A-16	10
00152687	11/20/2017	Solar	A-16	6
00152875	11/20/2017	Solar	A-16	7.6
00152511	11/20/2017	Solar	A-16	5
00151705	11/20/2017	Solar	A-16	10
00152370	11/20/2017	Solar	A-16	3.8
00152317	11/20/2017	Solar	A-16	3
00153116	11/20/2017	Solar	A-16	7.6
00152893	11/20/2017	Solar	A-16	6
00154086	11/20/2017	Solar	A-16	5
00152980	11/20/2017	Solar	A-16	7.6
00154641	11/20/2017	Solar	A-16	10
00154714	11/20/2017	Solar	A-16	4.32
00155015	11/20/2017	Solar	A-16	3.8
00155007	11/20/2017	Solar	A-16	5
00154781	11/20/2017	Solar	A-16	4.08
00154596	11/20/2017	Solar	A-16	11.4
00156415	11/20/2017	Solar	A-16	7.6
00155824	11/20/2017	Solar	A-16	11.4
00155732	11/20/2017	Solar	A-16	3.8
00156152	11/20/2017	Solar	A-16	7.6
00160977	11/20/2017	Solar	C-06	10
00160698	11/20/2017	Solar	A-16	6
00160422	11/20/2017	Solar	A-16	3
00161440	11/20/2017	Solar	A-16	7.6
00161566	11/20/2017	Solar	A-16	5
00159770	11/20/2017	Solar	A-16	5
00152739	11/20/2017	Solar	A-16	7.6
00161627	11/20/2017	Solar	A-16	5

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00160278	11/20/2017	Solar	A-16	5
00160615	11/20/2017	Solar	A-16	3.8
00161770	11/20/2017	Solar	A-16	5
00161058	11/20/2017	Solar	A-16	3.5
00159775	11/20/2017	Solar	A-16	3
00160675	11/20/2017	Solar	A-16	5.51
00161685	11/20/2017	Solar	A-16	5
00111196	11/20/2017	Solar	A-16	1.72
00161768	11/20/2017	Solar	A-16	3.8
00161612	11/20/2017	Solar	A-16	2.24
00161686	11/20/2017	Solar	A-16	7.6
00130079	11/20/2017	Solar	A-16	7.6
00130082	11/20/2017	Solar	A-16	5
00147600	11/20/2017	Solar	A-16	3
00146766	11/20/2017	Solar	A-16	3.8
00146902	11/20/2017	Solar	A-16	7.6
00147753	11/20/2017	Solar	A-16	6
00147799	11/20/2017	Solar	A-16	5.75
00147540	11/20/2017	Solar	A-16	3.8
00148366	11/20/2017	Solar	A-16	13.6
00146767	11/20/2017	Solar	A-16	3.8
00146764	11/20/2017	Solar	A-16	6
00146770	11/20/2017	Solar	A-16	10
00148177	11/20/2017	Solar	A-16	10
00146768	11/20/2017	Solar	A-16	6
00146763	11/20/2017	Solar	A-16	7.6
00146724	11/20/2017	Solar	A-16	10
00146606	11/20/2017	Solar	A-16	10
00147115	11/20/2017	Solar	A-16	6
00150797	11/20/2017	Solar	A-16	7.6
00146761	11/20/2017	Solar	A-16	7.6
00146723	11/20/2017	Solar	A-16	6
00150440	11/20/2017	Solar	A-16	7.6
00146864	11/20/2017	Solar	A-16	5
00146769	11/20/2017	Solar	A-16	7.6
00151187	11/20/2017	Solar	A-16	7.6
00151587	11/20/2017	Solar	A-16	7.6
00152159	11/20/2017	Solar	A-16	6
00147848	11/20/2017	Solar	A-16	5
00152073	11/20/2017	Solar	A-16	7.6
00161230	11/21/2017	Solar	A-16	3.8
00155538	11/21/2017	Solar	A-16	5
00162634	11/21/2017	Solar	A-16	3
00161244	11/21/2017	Solar	A-16	3.8
00160701	11/21/2017	Solar	A-16	5
00160781	11/21/2017	Solar	A-16	1.61
00160932	11/21/2017	Solar	A-16	5
00161501	11/21/2017	Solar	A-16	3
00160537	11/21/2017	Solar	A-16	5
00161600	11/21/2017	Solar	A-16	5
00161054	11/21/2017	Solar	A-16	3.8
00160386	11/21/2017	Solar	A-16	5
00159829	11/21/2017	Solar	A-16	7.6
00162018	11/21/2017	Solar	A-16	3.8
00161668	11/21/2017	Solar	A-16	5
00161338	11/21/2017	Solar	A-16	9.86
00162635	11/21/2017	Solar	A-16	3
00159222	11/22/2017	Solar	G-02	24.64
00160451	11/22/2017	Solar	A-16	6
00161036	11/22/2017	Solar	A-16	7.6
00160715	11/22/2017	Solar	A-16	3
00160553	11/22/2017	Solar	A-16	4.06
00160793	11/22/2017	Solar	A-16	3.315
00160016	11/22/2017	Solar	A-16	3
00159814	11/22/2017	Solar	A-16	6
00161127	11/22/2017	Solar	A-16	5
00160298	11/27/2017	Solar	A-16	6.6
00159793	11/27/2017	Solar	A-16	4.2
00161283	11/27/2017	Solar	A-16	6.6
00161858	11/27/2017	Solar	A-60	5
00162336	11/27/2017	Solar	A-16	10
00161866	11/27/2017	Solar	A-16	5
00160171	11/27/2017	Solar	A-16	5
00159108	11/27/2017	Solar	A-16	7.25
00161179	11/27/2017	Solar	A-16	3
00161224	11/27/2017	Solar	A-16	6.38
00161806	11/27/2017	Solar	A-16	5
00160189	11/27/2017	Solar	A-16	6
00161637	11/28/2017	Solar	A-16	4.64
00161225	11/28/2017	Solar	A-16	8.41
00160763	11/28/2017	Solar	A-16	7.6
00159322	11/28/2017	Solar	A-16	5
22781991	11/28/2017	Solar	G-02	252
00160596	11/29/2017	Solar	A-16	5
00160043	11/29/2017	Solar	A-16	5
00161759	11/29/2017	Solar	A-16	5
00160552	11/29/2017	Solar	A-16	2.9
00161962	11/29/2017	Solar	A-16	6

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
00161601	11/29/2017	Solar	A-16	7.6
00160510	11/29/2017	Solar	A-16	7.6
00161442	11/29/2017	Solar	A-16	3
00162381	11/29/2017	Solar	A-16	3
00160213	11/29/2017	Solar	A-16	3.8
00161449	11/29/2017	Solar	A-16	3
00160616	11/29/2017	Solar	A-16	5
00159610	11/29/2017	Solar	A-16	6
00159815	11/29/2017	Solar	A-16	5
00154147	11/30/2017	Solar	A-16	7.6
00154657	11/30/2017	Solar	A-16	3.8
00153396	11/30/2017	Solar	A-16	2.85
00150207	11/30/2017	Solar	A-16	5
00150121	11/30/2017	Solar	A-16	3.8
00154181	11/30/2017	Solar	A-16	7.6
00150160	11/30/2017	Solar	A-16	6
00156125	12/1/2017	Solar	A-16	7.6
00160321	12/1/2017	Solar	A-16	10
00161122	12/1/2017	Solar	A-16	3
00161112	12/1/2017	Solar	A-16	3.8
00160381	12/1/2017	Solar	A-16	6
00160062	12/1/2017	Solar	A-16	3.8
00162405	12/1/2017	Solar	A-16	3
00162724	12/1/2017	Solar	A-16	3
00160361	12/1/2017	Solar	A-16	5
00161426	12/1/2017	Solar	A-16	5
00161014	12/1/2017	Solar	A-16	6.96
00162335	12/1/2017	Solar	A-16	3
00160950	12/1/2017	Solar	A-16	7.6
00162368	12/1/2017	Solar	A-16	3
00162015	12/1/2017	Solar	A-16	3.12
00161773	12/1/2017	Solar	A-16	5
00161176	12/1/2017	Solar	A-16	5
00161602	12/1/2017	Solar	A-16	7.6
00161649	12/1/2017	Solar	A-16	7.6
00162011	12/1/2017	Solar	A-16	7.6
00161415	12/1/2017	Solar	A-16	3.8
00161154	12/1/2017	Solar	A-16	6
00120137	12/2/2017	Solar	A-16	5
00162153	12/4/2017	Solar	A-16	3
00160733	12/4/2017	Solar	A-60	5
00162550	12/4/2017	Solar	A-16	6.6
00161717	12/4/2017	Solar	A-16	5
00162089	12/4/2017	Solar	A-16	6.6
00114531	12/4/2017	Solar	A-16	7.96
00161590	12/4/2017	Solar	A-16	4.6
00161425	12/5/2017	Solar	A-16	6
00161876	12/5/2017	Solar	A-16	5
00160302	12/5/2017	Solar	A-16	3.8
00161693	12/5/2017	Solar	A-16	3.8
00161250	12/5/2017	Solar	A-16	7.6
00161190	12/5/2017	Solar	A-16	6
00161849	12/5/2017	Solar	A-16	10
00161342	12/5/2017	Solar	A-16	5
00161961	12/5/2017	Solar	A-16	10
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21773384	12/5/2017	Solar	C-06	196
00161115	12/6/2017	Solar	A-16	5
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00160598	12/6/2017	Solar	A-16	7.6
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00160780	12/6/2017	Solar	A-16	3.8
00161554	12/6/2017	Solar	A-16	3
00160352	12/6/2017	Solar	A-16	3.8
00160540	12/6/2017	Solar	A-60	3.8
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00162394	12/6/2017	Solar	A-16	5
00162073	12/7/2017	Solar	A-16	5
00161671	12/7/2017	Solar	A-16	3
00162361	12/7/2017	Solar	A-16	5
00161421	12/7/2017	Solar	A-16	3
00160752	12/7/2017	Solar	A-60	8.12
00161044	12/7/2017	Solar	A-16	4.06
00159832	12/7/2017	Solar	C-06	4.8
00161446	12/7/2017	Solar	A-16	10
00160207	12/7/2017	Solar	A-16	7.6
00155959	12/11/2017	Solar	A-16	3
00162266	12/11/2017	Solar	A-16	3.8
00160250	12/11/2017	Solar	A-16	3.8
00160078	12/11/2017	Solar	A-16	6.72
00160372	12/11/2017	Solar	A-16	3
00160974	12/11/2017	Solar	A-16	4.35
00161257	12/11/2017	Solar	A-16	4.35
00161248	12/11/2017	Solar	A-16	3.8
00159804	12/11/2017	Solar	A-16	7.6

Facility ID	Date Issued Final Approval to Interconnect	Fuel type	Rate Class	Name Plate Rating kW AC
00160132	12/11/2017	Solar	A-16	6
00160624	12/11/2017	Solar	A-16	5
00161222	12/11/2017	Solar	A-16	5
00161584	12/11/2017	Solar	A-16	3.8
00160053	12/11/2017	Solar	A-16	5.25
00160375	12/11/2017	Solar	A-16	3.8
00159984	12/11/2017	Solar	A-16	10
00160096	12/11/2017	Solar	A-16	3.8
00160168	12/11/2017	Solar	A-16	3
00159907	12/11/2017	Solar	A-16	11.4
00161729	12/11/2017	Solar	A-16	3.8
00160123	12/11/2017	Solar	A-16	7.6
00161635	12/11/2017	Solar	A-16	10
00161417	12/12/2017	Solar	A-16	7.6
00161604	12/12/2017	Solar	A-16	6
00161450	12/12/2017	Solar	A-16	3
00160225	12/12/2017	Solar	A-16	7.6
00160735	12/12/2017	Solar	A-16	2.9
00160263	12/12/2017	Solar	A-16	5
00160597	12/12/2017	Solar	A-16	7.6
00160613	12/12/2017	Solar	A-16	7.6
00160555	12/12/2017	Solar	A-16	10
00160595	12/12/2017	Solar	A-16	11.4
00160989	12/12/2017	Solar	A-16	4.6
00160312	12/12/2017	Solar	A-16	7.6
00161375	12/12/2017	Solar	A-16	11.02
00161890	12/12/2017	Solar	A-16	8.5
00160320	12/12/2017	Solar	A-16	10
23755978	12/13/2017	Solar	G-02	86.4
00155506	12/14/2017	Solar	A-16	5
00154621	12/14/2017	Solar	A-16	5
00155193	12/14/2017	Solar	A-16	10
00155332	12/14/2017	Solar	A-16	6
00155163	12/14/2017	Solar	A-16	5
00155444	12/14/2017	Solar	A-16	3.8
00155407	12/14/2017	Solar	A-60	7.6
00155562	12/14/2017	Solar	A-16	10
00155361	12/14/2017	Solar	A-16	6
00155212	12/14/2017	Solar	A-16	5
00156037	12/15/2017	Solar	A-16	8.75
00161053	12/15/2017	Solar	A-16	5
00159803	12/15/2017	Solar	A-16	3.8
00160122	12/15/2017	Solar	A-16	3
00160708	12/15/2017	Solar	A-60	5
00161857	12/15/2017	Solar	A-16	6
00161856	12/15/2017	Solar	A-16	10
00160284	12/15/2017	Solar	A-16	10
00161185	12/15/2017	Solar	A-16	2.88
00160130	12/15/2017	Solar	A-16	5
00161448	12/15/2017	Solar	A-16	5
00161539	12/15/2017	Solar	A-16	7.6
00161875	12/15/2017	Solar	A-16	5.8
00162363	12/15/2017	Solar	A-16	3
00161478	12/15/2017	Solar	A-16	5
00161523	12/15/2017	Solar	A-16	2.9
00160754	12/15/2017	Solar	A-16	6
00161297	12/15/2017	Solar	A-16	3
00161687	12/15/2017	Solar	A-16	1.61
00162542	12/15/2017	Solar	A-16	6
00159862	12/15/2017	Solar	A-16	3.8
00161721	12/15/2017	Solar	A-16	7.6
00160260	12/15/2017	Solar	A-16	3
00161223	12/15/2017	Solar	A-16	4.93
00162380	12/15/2017	Solar	A-16	3.77
00162627	12/15/2017	Solar	A-16	6
00161499	12/15/2017	Solar	A-16	3
00161522	12/15/2017	Solar	A-16	5
00161805	12/15/2017	Solar	A-16	4.64
00161792	12/15/2017	Solar	A-16	7.6
00162396	12/15/2017	Solar	A-16	5
00160365	12/15/2017	Solar	A-16	6
00161315	12/15/2017	Solar	A-16	7.6
00160170	12/15/2017	Solar	A-16	11.4
00160205	12/15/2017	Solar	A-16	3
00159828	12/15/2017	Solar	A-16	6
00161725	12/15/2017	Solar	A-16	3.8
00161989	12/15/2017	Solar	A-16	6
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00160200	12/15/2017	Solar	A-16	10
00162494	12/15/2017	Solar	A-16	6
00161838	12/15/2017	Solar	A-16	2.9
00162362	12/15/2017	Solar	A-16	7.6
00161328	12/15/2017	Solar	A-16	7.6
00138925	12/18/2017	Solar	A-16	9
00160589	12/18/2017	Solar	A-16	9
00161420	12/18/2017	Solar	A-16	7.6
00159155	12/18/2017	Solar	A-16	7.6
00159342	12/18/2017	Solar	A-16	2.64

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00159209	12/18/2017	Solar	A-16	10.44
00160909	12/18/2017	Solar	A-16	7.6
00159284	12/18/2017	Solar	A-16	3.12
00162063	12/18/2017	Solar	A-16	9.24
00161299	12/18/2017	Solar	A-16	7.84
00161761	12/19/2017	Solar	A-16	4.35
00161855	12/20/2017	Solar	A-16	10
00162665	12/20/2017	Solar	A-16	4.35
00162582	12/20/2017	Solar	A-16	3.12
00162570	12/20/2017	Solar	A-16	5
00161445	12/20/2017	Solar	A-16	7.6
00162357	12/20/2017	Solar	A-16	4.93
00160374	12/20/2017	Solar	A-16	3.8
00162356	12/20/2017	Solar	A-16	7.75
00161572	12/20/2017	Solar	A-16	6.67
00161158	12/20/2017	Solar	A-16	6
00162382	12/20/2017	Solar	A-16	6
00161921	12/20/2017	Solar	A-16	10
00160618	12/20/2017	Solar	A-16	5
00160593	12/20/2017	Solar	A-16	3.8
00161839	12/20/2017	Solar	A-16	6.25
00162722	12/20/2017	Solar	A-16	4.93
00162364	12/20/2017	Solar	A-60	7.6
00161877	12/20/2017	Solar	A-16	3.8
00161969	12/20/2017	Solar	A-16	3.8
00161556	12/20/2017	Solar	A-16	10
00161041	12/20/2017	Solar	A-16	3.8
00161120	12/20/2017	Solar	A-16	3.8
00161918	12/20/2017	Solar	A-16	11.4
00162496	12/20/2017	Solar	A-16	7.5
00162437	12/20/2017	Solar	A-16	7.6
00162495	12/20/2017	Solar	A-16	6.5
00160696	12/21/2017	Solar	A-16	3.8
00160283	12/21/2017	Solar	A-16	3
00162397	12/21/2017	Solar	A-16	3.6
00159985	12/21/2017	Solar	A-16	7.45
00162395	12/21/2017	Solar	A-16	10
00160192	12/21/2017	Solar	A-16	5
00161758	12/21/2017	Solar	A-16	4.2
00161560	12/21/2017	Solar	A-16	3.8
00165846	12/21/2017	Solar	A-16	10.4
00160251	12/21/2017	Solar	A-16	6
00160911	12/22/2017	Solar	A-60	6
00162016	12/22/2017	Solar	A-16	7.6
00161894	12/22/2017	Solar	A-16	5
00161202	12/22/2017	Solar	A-16	3.8
22931079	12/22/2017	Solar	C-06	2000
22234328	12/22/2017	Solar	C-06	180
23374056	12/22/2017	Solar	C-06	1500
22052585	12/22/2017	Solar	C-06	180
18056252	12/22/2017	Solar	C-06	960
21717310	12/22/2017	Solar	C-06	780
00161367	12/27/2017	Solar	A-16	6.38
00160625	12/27/2017	Solar	A-60	7.6
00161800	12/27/2017	Solar	A-16	3.75
00162233	12/28/2017	Solar	A-16	10
00162358	12/28/2017	Solar	A-16	8.5
23846420	12/28/2017	Solar	A-60	20.8
23373767	12/28/2017	Solar	C-06	3000
00160764	12/29/2017	Solar	A-16	5
00162308	12/29/2017	Solar	A-16	4.64
00161513	12/29/2017	Solar	A-16	10
00160779	12/29/2017	Solar	A-16	6
00158560	12/29/2017	Solar	A-16	4.5
00162429	12/29/2017	Solar	A-16	7.6

Division 32-25

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Refer to response to DIV 8-4 (c):

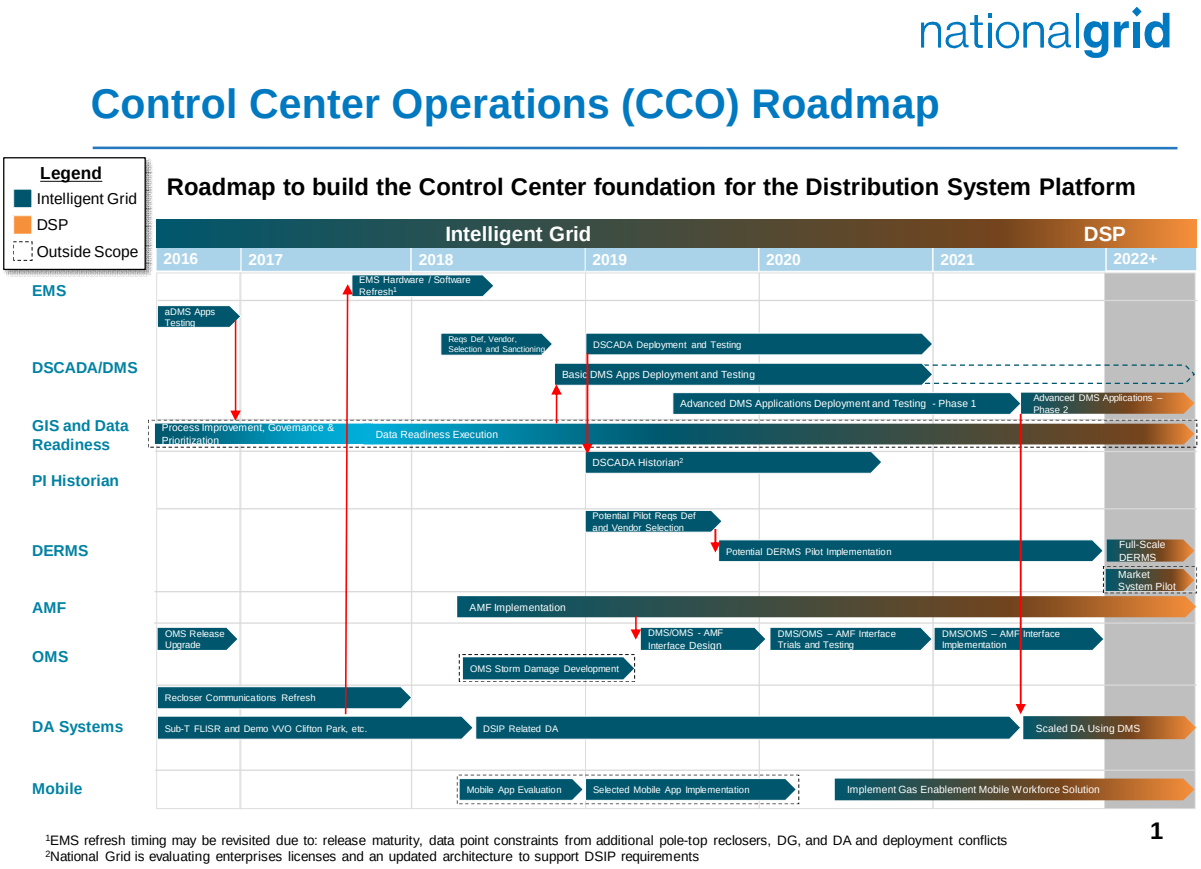
a. Please briefly summarize the responses received from the RFI and RFP for OMS and ADMS, and the rationale for the vendor selected.
b. Please provide the technology roadmap developed by Accenture for the Company's New England and New York Control Centers.
c. Please provide all memoranda, presentations, reports, or written summaries by the Company or its consultants regarding the pilot project with ADMS software and its fit for National Grid, the maturity and usability of the ABB ADMS advanced applications, lessons learned, and survey results from other utilities regarding the use of ADMS.

Response:

a. In the 2009 timeframe, there was an effort by National Grid affiliates to utilize a common vendor platform for both OMS/DMS and Energy Management System (EMS) software in the New England and New York operating regions to provide efficiencies for business resiliency, efficiencies, and administration support. Prior to 2009, the affiliates were using different vendors for their EMS products and different versions for their OMS products from yet another vendor. In moving to a common platform, standard procurement processes were followed, including assembling a team consisting of subject matter experts in our Control Center Operations, EMS/IT, and Corporate IS organizations; defining system requirements; developing a Request for Information (RFI) and Request for Procurement (RFP); and evaluating and selecting a vendor based on its ability to satisfy the functionality, cost, and schedule requirements. ABB was selected as the vendor of choice for the EMS and OMS/DMS solutions. The ABB EMS and OMS systems were placed into service, but a DMS system was not. The Company has continued to evaluate DMS options through such efforts as the technology roadmap and the ADMS Pilot project. These efforts evaluated if our present vendor's product plans align with the Company's future requirements. As indicated in the Power Sector Transformation (PST) Plan currently pending before the Public Utilities Commission in Docket No. 4780, the Company believes it is appropriate now to move forward with the deployment of ADMS applications.

b. Below is the technology roadmap developed by the Company with the support of Accenture for National Grid's New England and New York control centers. Note that this roadmap was created in 2016 and is currently being revised to align with deployment

schedules currently anticipated considering the New York Public Service Commission's recent decision in Niagara Mohawk Power Corporation's rate case and the Company's PST Plan filing in Docket No. 4780.



c. Please see the Company's ADMS Pilot Project Final Report in Attachment DIV 32-25 [REDACTED], which provides details regarding the ADMS pilot project.

(This response is identical to the Company's response to Division 10-25 in Docket No. 4780.)

ADMS Pilot Project Final Report

March 31, 2017

nationalgrid
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1 This Document

This document is the final report for the ADMS Pilot Project prepared for control room operations management. This document will act as a repository for information and knowledge gained during the ADMS Pilot and may be used during any ADMS requirements drafting. Any specific details related to company infrastructure, electric network data, or work methods should not be shared with the general public.

2 Executive Summary

An ADMS (Advanced Distribution Management System) is a group of control room based systems (hardware and software) that allow for greater visibility and situation awareness of our electric distribution grid. The advanced applications included in the system can help the control room operator make more optimal system switching and configuration decisions with respect to power aspects of the grid. An ADMS will also help to incorporate additional real time data into useful solutions from an ever-growing number of field smart devices, DA (distribution automation) and DER's (Distributed Energy Resources) via a DSCADA (Distribution Supervisory Control and Data Acquisition) system. It is a critical platform for the incorporation and management of DER's as required by New York's Reforming the Energy Vision (REV) and supporting Distributed System Implementation Plan (DSIP), as well as the Massachusetts Grid Modernization filing.

This Advanced Distribution Management System (ADMS) pilot project was scoped and funded with the goal of investigating the maturity and usability of the [redacted] Application functionality, usability, and the ability to integrate the system into our present control room operations' processes were reviewed. Work was also done to understand what additional real time data and GIS network data is required for the increasingly complex ADMS application models. The pilot work also included investigation into ABB's ADMS versioning and roadmap as well as establishing high level guidelines for support of a DMS from an internal resource perspective.

2.1 Definitions

Throughout this paper the following terms are used:

- **DMS** – (Distribution Management System) – The DMS includes both the distribution SCADA system and the advanced applications (aDMS)

- **DSCADA** - is Distribution Supervisory Control and Data Acquisition system.
- **ADMS** – (Advanced Distribution Management System) – Advanced applications utilizing increasing amounts of field device data from a distribution SCADA and other sources to solve increasingly detailed predictive analysis.
- **OMS** – (Outage Management System) - The present system used at National Grid for managing outages, trouble calls, and crews. This system manages all outage, trouble call, and crew information and uses an internal algorithm to relate outage calls into a predicted outage for operators to dispatch.
- **EMS/SCADA** – (Energy Management System)/(Supervisory Control and Data Acquisition) - The present SCADA system we have in production at National Grid. This system sends commands and receives information to and from the field devices and RTUs. It also runs the transmission load flow and state estimation.

2.2 What Was Done

- ✓ **Made System Changes Required to Test ABB DMS apps:**
  The pilot project team made the system, database, and network model changes necessary to stand up and test the presently licensed DMS [redacted] applications on 15 feeders in our Eastern NY Region [redacted] utilizing the present NY Quality Assurance (QA) system. Three of the advanced applications were included in the pilot: Load Allocation (LA), Unbalanced Load Flow (UBLF), and Restoration Switching Analysis (RSA). The DMS Simulation Mode functionality was also tested.
- ✓ **Demonstrated the DMS functionality to a group of Control Room Personnel:**
  Once the applications' solutions were stable, demonstrations were carried out for a handful of control room personnel from each of the regional distribution control rooms. These demo participants provided feedback on the ADMS as far as its performance, data presentation, and their thoughts on the future of ADMS in our control rooms.
- ✓ **Viewed and Investigated ABB's Next gen ADMS Products:**
  The project team made a trip to Houston TX to see a demonstration of ABB's next generation ADMS. Analysis was done on the differences between our present solution and the versions we would likely pursue pending a decision to implement a full ADMS.
- ✓ **Surveyed Multiple Utilities and Compiled Information:**
  Multiple utilities were surveyed by the pilot team to gather data on ABBs present production solution and how it is being used by the industry. This included a visit to Centerpoint in Houston, TX to see their operations and production use of ABB's present DMS. The input provided by these utilities will help to drive our roadmap, versioning, and interface decisions.
- ✓ **Investigated Supporting System Changes and Requirements for Full Implementation:**
  Beyond the ADMS pilot implementation much time was spent to help understand efforts involved in pursuing a full implementation that would likely involve a DSCADA and interfaces, GIS enhancements and advanced modeling concepts.

2.3 Overall Outcome

The testing and investigation of the ABB DMS applications covered in this pilot was satisfactory. Overall, the team's assessment and the demo participant's opinion of ABBs DMS solution were positive. From an operations perspective, there is room for an ADMS to help improve situational awareness and to help optimize switching, troubleshooting, DER integration and system configuration decisions.

The proliferation of DERs (Distributed Energy Resources) and the adoption of increasing amounts of DA (Distribution Automation) along with other new energy technologies will require the ability to process exponentially increasing amounts of data. A distribution SCADA system and interface to the ADMS are recommended and will allow the use of this real time data in the applications. The ADMS dependence on increasing quantity and accuracy of model data to support the advanced applications will require us to expand and enhance the GIS model. Additional support staff from both an administrative and operational standpoint would be recommended to support an ADMS.

3 About the ADMS Pilot

3.1 Pilot Investment Description from Budget Exception

From: INV 4379 US Control-Distribution Management System Advanced Applications (aDMS)

This investment is to perform functional testing of the Distribution Management System advanced applications (aDMS). The Distribution Management System (DMS) applications are a foundational platform that will aid Control Center Operations in managing the proliferation of Distributed Energy Resources (DER's) and advanced Distribution Automation (DA) for strategic functionality required by the NY Distributed System Implementation Plan (DSIP). Additionally, as feeder monitoring, distribution automation, and distributed energy resources proliferate the system, Operations' ability to monitor and control will be more challenging. The DMS system will help provide visibility to operate the system in a safe and reliable manner.

This effort includes setup of hardware to support the applications, populating the model data for use with the applications, and procuring necessary support from ABB to setup and test the applications for National Grid to ascertain the usability and suitability of the ABB applications for future deployment. This budget exception request was a six month effort, expected to start around 9/2016 and end around 02/2017.

3.2 What is an Advanced Distribution Management System (ADMS)

The definition of a Distribution Management System (DMS) and an Advanced Distribution Management System (ADMS) can vary throughout the industry. As defined in the executive summary a DMS is the combined ADMS applications and a Distribution Supervisory Control and Data Acquisition (DSCADA) system. An ADMS system is a calculating system including a network model of the electric distribution system, multiple solving algorithms, and interfaces to SCADA, utility data warehouses, advanced

metering infrastructure (AMI), vehicle location services, mobile dispatch, weather interfaces, etc. The system can incorporate multiple data inputs from "smart" type grid devices, DA (Distribution Automation), and an ever growing amount of DERs (Distributed Energy Resources) on our grid. The system is designed to offer a system operator the optimal level of visibility and situational awareness of their present system. The magnitude of "new energy type" devices (present and proposed) that will communicate with our operations centers requires a system that can use this data to provide useful and clear operating options to the operators.

3.3 ADMS Pilot Project Overview

This Advanced Distribution Management System (ADMS) pilot project was scoped and funded with the goal of investigating the maturity and usability of the presently licensed ABB DMS advanced applications. Application functionality, usability, and the ability to integrate the system into our present control room operations' processes were reviewed. Work was also done to understand what additional real time data and GIS network data is required for the increasingly complex ADMS application models. The pilot work also included investigation into ABB's ADMS versioning and roadmap as well as establishing high level guidelines for support of an ADMS from an internal resource perspective.

3.4 Pilot Project Selected Distribution Feeders

The ADMS Pilot Project team made the changes (detailed in this report) required to stand up and test the applications on 15 feeders in our Eastern NY Region. These feeders were chosen for their inclusion in other new energy solutions pilot programs.

Pilot Feeders:

Region	Substation	Feeder
NY Eastern	[redacted]	[redacted]
		[redacted]
		[redacted]
		[redacted]
		[redacted]
		[redacted]
		[redacted]
		[redacted]
NY Eastern	[redacted]	[redacted]
		[redacted]
		[redacted]
		[redacted]
NY Eastern	[redacted]	[redacted]
		[redacted]
		[redacted]

3.5 Applications Tested During Pilot Project

- **Load Allocation (LA)** - Load Allocation is the first step in a process of modeling a power distribution network. Load Allocation distributes a total metered load to individual load points along the entire length of a feeder. The total metered load, therefore, represents the sum of the load measured at these load points. Load Allocation can also be performed from the connected KVA of the loads without the presence of a metered point. Allocated loads distributed over load points are used as input data for load flow calculations.

- **Unbalanced Load Flow (UBLF)** - When executed, UBLF uses the load allocation of a feeder to calculate the voltage, angle, and power flow per phase at each line and node on a feeder. It then automatically presents the results, called Limit Checks, to the user both graphically and in tabular list formats, alerting the user to any loading or voltage violations on lines, devices, or transformers on the feeder. Thresholds can also be customized to show warning and violations at different levels. UBLF can also be configured to run automatically on all sources on a server and can be triggered to run by changes in status of switches or changes in analog values. This can help to give an up-to-date look at the present system state throughout the day. This server side automatically initiated execution was not tested during the pilot.

- **Restoration Switching Analysis (RSA)** - RSA is a function set that enables DMS to analyze an outage on a feeder and provide analysis of possible restoration switching paths. RSA determines how to isolate a fault and provides automatic load flow analysis for multiple restoration plans, displaying how many loading and voltage violations that exist (if any) on the surrounding available tie feeders for each switching plan. The operator can quickly review each possible restoration switching option and determine the most prudent way to proceed with the restoration. Restoration Switching Analysis (RSA) can be launched by the operator manually on a de-energized line within a verified outage or it can be set to automatically run on a server when an outage occurs. This server side automatically initiated execution was not tested during the pilot.

- **Simulation Mode** - Simulation Mode allows the user to take a feeder or multiple feeders into a separate environment for manipulating the feeders and feeder components. Feeders can be switched into abnormal states and component properties can be changed by the user while in simulation mode without affecting the real time model or other users. This allows the operators to use the advanced applications such as Unbalanced Load Flow to experiment with alternate configurations before carrying out the actual switching in a real time environment.

3.6 Applications Not Tested in Pilot

There are additional DMS Advanced Applications that exist in the ABB DMS Product suite. They are; Fault Location (FL), Fault Location, Isolation, and Service Restoration (FLISR), Volt/Var Optimization (VVO), and Switch Order. These applications could not be put in service on our present QA system due to system architecture, interface, or data constraints that are outside the scope of this pilot. Although these applications were not physically tested on the QA system during the ADMS Pilot Project, discussions about the applications and ADMS versioning took place with the vendor.

- **Fault Location (FL)** – Fault Location is used to compute the possible locations of a fault and display those locations graphically to the operator. The Fault Location application uses a fault current measurement to compute the possible fault locations. The fault current is either supplied by the operator or automatically input from SCADA.
  This application requires additional SCADA values that are presently not brought into our production SCADA system. Also, an interface to the SCADA system is required and was not in the scope of the ADMS pilot.

- **Fault Location, Isolation, and Service Restoration (FLISR)** – FLISR is a function set that enables DMS to analyze an outage on a feeder and provide analysis of possible restoration switching paths. FLISR determines how to isolate a fault and provides automatic load flow analysis for multiple restoration plans, displaying how many loading and voltage violations that exist (if any) on the surrounding available tie feeders for each switching plan.
  The FLISR application requires a server side solution and, similar to above, an interface to the SCADA system to function properly. System changes required for this application are outside of the pilot scope.

- **Volt/Var Optimization (VVO);** – Voltage-Var Optimization (VVO) is an advanced optimization module that minimizes system losses and system demand on a network by manipulating capacitor banks and transformer tap settings (voltage regulators, LTCs, etc…), according to operational line loading and voltage constraints.
  This application requires very accurate UBLF results or additional SCADA data from active field components such as cap banks, smart inverters, and line regulators. The scope of work required to obtain an accurate VVO solution for review would take more time than allotted for the ADMS Pilot Project and, thus, was deemed out of scope. Significant enhancements in VVO functionality have been made in newer ADMS versions and more benefit can be seen in pursuing later versions for additional VVO functionality.

- **Switch Order Module** – This functionality provides the ability to write, simulate, and execute electronic switching orders directly in the DMS and have the switching configurations reflected on the network model in real-time.
  The Switch Order application has been modified considerably in DMS versions beyond our current V7.2.5. Due to this, it was determined that little value would be obtained by demonstrating this function as part of the ADMS pilot.

3.7 Budget and Spend Summary

Present spend forecast and accruals were provided to finance monthly during pilot project. Up to date spend and accruals are not included in this report.

4 System Setup and Configuration

The NY Quality Assurance (QA) system was utilized for this ADMS pilot. The present version of the ABB DMS used was [redacted].

The NY Quality Assurance (QA) system is used weekly for the production incremental update (IU) process. Due to the QA system's use for production verification and replication, we were required to come up with a sustainable pilot data process that would not interfere with the required weekly IU for production. After the weekly incremental update supporting our production OMS system the DB changes conflicting with this weekly process would be re-applied.

4.1 License keys for applications

A single license key was required for the load flow application. This key was received from ABB and successfully installed. There were no user based licensing required for the pilot.

4.2 User Privileges for Applications

Specific test user accounts were created on the QA system for the pilot project. These test users had the proper user privileges to execute the advanced applications (proper OpModes specified in DB). For the full ADMS implementation, it will be necessary to change present individual user accounts to have the OpModes necessary to use the advanced applications.

Component/Table	Changes	Note	IU Impact
[redacted]	[redacted]	Enable DMS function of Load flow in ADMS	N
[redacted]	[redacted]	Enable DMS function of Unbalanced Load flow in ADMS	N

4.3 System Display/Annotation Changes

Changes were made to the annotation presets to include the Unbalanced Load Flow results. The loading (Amps) values were annotated on each line section for feeders with valid UBLF solutions. These values were annotated and displayed at a lower level de-clutter visibility so not to over crowd the map when the operator zoomed out to a larger view. Experiments were done to gauge usability and value added by different annotations and visibilities. The voltage (Volts) values were not able to be annotated due to the way that the disconnected nodes are configured in the OMS system. This will require changes to the present DMS extractor and is noted later in this document.

4.4 Architectural, Interface, and Hardware Changes

There were no changes to hardware, architecture or present interfaces made for the ADMS Pilot Project. This was clarified with our Digital Risk & Security group early on in the project.

For future full ADMS implementation utilizing ABB's solution, multiple hardware changes will be required. This may include more robust clients (memory requirements) and additional servers for server side application functions and interfaces from SCADA to DMS. An additional access server is required for versions [redacted]

5 Manual Data Changes Made for the ADMS Pilot

During the ADMS pilot we were required to make changes to the data associated with the 15 pilot feeders in order to get the ADMS applications to function properly. These changes were made in a way that did not require changing the baseline GIS data or the present data extract. Multiple manual additions to a handful of database tables were required to support the ADMS applications. A process was put in place during the pilot project to benchmark progress. A system stability check was performed weekly on the pilot feeders to insure we were not losing ground from the week prior by running a baseline set of load flows on the solving feeders.

Some manual changes required for the pilot did affect the incremental update process, and required that they be re-entered after each weekly IU. This manual update approach should be avoided for a sustainable full implementation.

A full ADMS implementation will require changes to both the GIS base model and the data extract. This approach creates a sustainable way to offer ADMS the additional data types, granularity, and component attributes required by the complex models. (See section 6)

5.1 Manual Data Changes Made for Pilot

During the ADMS pilot, we were required to make changes to the data associated with the 15 pilot feeders in order to get the ADMS applications to yield reliable results. They are listed below.

5.1.1 Table Changes/Additions and Notes

Component/Table	Changes	Note	IU Impact
[redacted]	[redacted]	suggestion from ABB	N
[redacted]	[redacted]	suggestion from ABB	N
[redacted]	[redacted]	data from Cyme	N
[redacted]	[redacted]	data from Cyme	N
[redacted]	[redacted]	data from Cyme	N
[redacted]	[redacted]		N
[redacted]	[redacted]		Y
[redacted]	[redacted]		N

[redacted]	[redacted]	UBLF calculation	Y
[redacted]	[redacted]		Y
[redacted]	[redacted]	Work around	Y
[redacted]	[redacted]	data from Cyme	N
[redacted]	[redacted]	DMS only works on YY connection (contype=1) for single phase ratio. Additional work is required surrounding ratios/delta conversion	N
[redacted]	[redacted]		N
[redacted]	[redacted]		N

6 Data Challenges Identified During the Pilot

This section summarizes the data model challenges that were identified during the implementation of the ADMS pilot.

6.1 Data Model Scrubbing for Increased Accuracy

The team acknowledges that GIS data will need to be continually scrubbed and verified in order to support the applications. Increasingly detailed predictive ADMS applications require more stringent GIS data model accuracy for both connectivity and sizing limitation data. The 15 pilot feeders were closely reviewed and any outstanding data issues were identified and repaired prior to beginning the implementation of the advanced applications in order to provide a solid foundation for testing.

6.2 Data Model Changes and Enhancements for Full Implementation

This pilot work helped to understand additional data requirements needed for the successful implementation of full ADMS. The GIS system provides the base model topology, components, and attributes that build the ADMS model. It will be required that this model data is expended and enhanced in places to support the proposed ADMS implementation. This is the result of the applications requirement for additional data types as well as increased accuracy and granularity to solve detailed operational models. In addition to the base model data it is noted that the ADMS relies on real time data for some calculations. Increasing amounts of data is becoming available due to the increase in new energy technologies and communications. A distribution SCADA system and an interface to the ADMS are recommended and will allow the use of this real time data in the applications to yield more accurate results.

6.3 GIS & Extract Changes Needed to Support ADMS Implementation

The GIS data is systematically "extracted" from the base model and built into a model that the ADMS software can use and understand. The extract, in a way, is a large data manipulation and translation script. This extractor code will require some changes to incorporate additional data enhancements and attributes that support the increasingly detailed models used by ADMS as noted above in data model changes section. An example of this would be the increasing number of DERs. Changes to both the data model and the extractor code are required in order to allow proper incorporation of these elements along with expended attributes into ADMS.

6.4 Load Data and Granularity

Greater granularity into some types of energy data such as spot load demands, peak usage data, and power quality data can also help to yield more accurate ADMS solutions. Power usage/demand can be gathered and used by the applications at multiple levels of granularity, an individual meter level, a transformer peak usage or load profile, or by a larger load region level. More work will be required to understand the added benefit from an application solution standpoint for each level of granularity before the full system data is pursued.

7 ADMS Pilot Demo and Proof of Functionality

An important component of the ADMS Pilot was to gather feedback from potential users in regards to the usability of the advanced applications. Scenarios were scripted to demonstrate the functionality of the three chosen ADMS applications in the pilot. The participants of the demonstrations were walked through the usage of the applications and the results. The pre-scripted scenarios for the applications yielded both passing and failing results (results with loading and or voltage violations) in order to demonstrate the functionality of the applications.

7.1 What was demonstrated

The following DMS Advanced Applications were demonstrated:

- **Load Allocation (LA):** Load Allocation is the first step in a process of modeling a power distribution network. Load Allocation distributes a total metered load to individual load points along the entire length of a feeder. The total metered load, therefore, represents the sum of the load measured at these load points. Load allocation can also be performed from the connected KVA of the loads without the presence of a metered point. Allocated loads distributed over load points are used as input data for load flow calculations.
- **Unbalanced Load Flow (UBLF):** When executed, UBLF uses the load allocation of a feeder to calculate the voltage, angle, and power flow per phase at each line and node on a feeder. It then automatically presents the results, called Limit Checks, to the user both graphically and in tabular list formats, alerting the user to any loading or voltage violations on lines, devices, or transformers on the feeder.

- **Simulation Mode:** Simulation mode allows the user to take a feeder or multiple feeders into a separate environment for manipulating the feeders and feeder components. Feeders can be switched into abnormal states and component properties can be changed by the user while in simulation mode without affecting the real time model or other users. This allows the operators to use the advanced applications such as unbalanced load flow to experiment with alternate configurations before carrying out the actual switching in a real time environment.
- **Restoration Switching Analysis (RSA):** RSA is a function set that enables DMS to analyze an outage on a feeder and provide analysis of possible restoration switching paths. RSA determines how to isolate a fault and provides automatic load flow analysis for multiple restoration plans, displaying how many loading and voltage violations that exist (if any) on the surrounding available tie feeders for each switching plan. The operator can quickly review each possible restoration switching option and determine the most prudent way to proceed with the restoration.

7.2 Who was the Audience

The target audience for the ADMS pilot demo was distribution control center staff from each control center in the Upstate NY and NE Regions. A total of 17 Control Room personnel participated in the demo, consisting of representation from upper management, supervisors, and system operators (both management and represented).

7.3 Survey Results and Opinions

The overall feedback from the users in regards to the layout and use of the DMS advanced applications demonstrated was very positive. The group felt that provided the data in the network model is scrubbed and minimal manual data entry is required by users, the applications would be very useful tools for the control rooms – particularly in the areas of planned switching and prolonged emergency scenarios.

7.4 Mathematical Proof/Verification

The ADMS UBLF (Unbalanced Load Flow) application was also tested for accuracy by comparing its generated results to an up-to-date load flow model from the planning engineering group (using production National Grid planning tools). Overall this proof was satisfactory, yielding close results (voltage and power) at specific locations on the test feeder (voltage and power). The results were then compared by using a spot check of some locations between ADMS and the planning engineering test model. The table below shows the comparison of the results.

Engineering Section Id	Engineering Equipment Id	Code	Test Model Thru Power A (kW)	Test Model Thru Power A (kvar)	Test Model VA (%)	DMS with 29% connected KVA, .92 PF all xfmrs	DMS Thru Power A (kW)	DMS Thru Power A (kvar)	DMS VA (%)
[redacted]	[redacted]	[redacted]	2299.7	755.3	102.71		2162.9	737	102.94

[redacted]	[redacted]	Switch	1153.8	257.6	100.82		1130	280	100.97
[redacted]	[redacted]	Switch	339.6	30.6	100.66		379	60	100.97
[redacted]	[redacted]	Fuse	162.5	-34.3	100.61		123.4	-48.7	100.69
[redacted]	[redacted]	Switch	690.3	179.6	100.67		632	168	100.79
[redacted]	[redacted]	Shunt Capacitor	453.6	187.7	101.3		439	188	101.4

8 Pilot Team Houston, TX Trip

The ADMS pilot team had the opportunity to take a trip to the Houston TX area as part of the pilot research. A visit to ABB and Centerpoint Utility were made.

8.1 ABB visit for PSE demonstration

ABB was able to show us a demonstration of the new Power System Explorer (PSE) ADMS product. A brief explanation of the ABB PSE vs our present product: The ABB OMS/DMS we presently have in production is version [redacted] and uses ABB's [redacted]. Newer ABB OMS/DMS versions now utilize the [redacted]. They refer to their full OMS/DMS, along with an interface to SCADA, as the ADMS. If National Grid does pursue an ABB solution for our future ADMS, it is recommended that an upgrade to the baseline OMS to the [redacted] is pursued. This would allow National Gris to obtain the advanced applications enhancements and any future development in functionality.

8.2 Centerpoint Visit

Centerpoint Utility in Houston, TX is presently using the [redacted]. The ADMS pilot team made a visit to their control room for a tour and a DMS focused Q&A. [redacted] The large take away was that DMS created both a staffing change and a need for continual updates of model data for DMS use.

9 DMS Versioning and Next Steps for Full Implementation

It is understood that for any future implementation of ADMS a full requirements phase will be completed. This requirements phase will clearly define functionality and any enhancements expected in order to satisfy present and future grid operations challenges. Work will be done between National Grid and the vendor to align our operations roadmap and any vendor related software development roadmap. This pilot project helped us understand what may be needed from a functionality standpoint

and also from our own supporting data and will be leveraged during any future DMS requirements phase.

9.1 Interfacing with SCADA

It is noted that a full DMS system will need to integrate with the SCADA system to help with enhanced solutions leveraging real time system data. It is likely that an adoption of a DSCADA (distribution supervisory control and data acquisition) system will be required for full integration and two way communications between ADMS and SCADA. [redacted] Below are some supporting reasons for pursuing these efforts.

- Separation of RTUs will allow us to stand up separate DSCADA system. This system will allow for integration of real time system data with DMS advanced applications. These applications are a foundational platform that will aid Control Center Operations in managing the proliferation of Distributed Energy Resources (DER's) and advanced Distribution Automation (DA) for strategic functionality required by the NY Distributed System Implementation Plan (DSIP).
- The increase in Distributed Energy Resources (DER's) and advanced Distribution Automation (DA) creates an exponential increase in data points (DNP points) also creates need for us to explore alternative protocols/mediums for data transmission.
- [redacted]

A network architect will be required to spec this future system including interfaces to and from the SCADA systems. In depth investigation of the present SCADA system and future architectural options were not included in the scope of this ADMS pilot project. However, time was spent surveying other utilities and learning about the options with ABB DMS and integrating with SCADA.

9.2 Full DMS Support

There will be an RTB cost associated with the implementation of an ADMS system. Based on information gathered during this pilot, additional support from both an administrative and operations standpoint will likely be required. Some of the reasons for this added support are the heavy dependence on enhanced grid model data, increase in frequency of model extracts, and the complexity of applications and their solutions.

10 ADMS Pilot Summary

The testing and investigation of the ABB DMS applications covered in this pilot was satisfactory. Overall, the team's assessment and the demo participant's opinion of ABBs DMS solution were positive. From an operations perspective, there is room for an ADMS to help improve situational awareness and to help optimize switching, troubleshooting, DER integration and system configuration decisions.

The proliferation of DERs (Distributed Energy Resources) and the adoption of increasing amounts of DA (Distribution Automation) along with other new energy technologies will require the ability to process exponentially increasing amounts of data. A distribution SCADA system and interface to the ADMS are recommended and will allow the use of this real time data in the applications. The ADMS dependence on increasing quantity and accuracy of model data to support the advanced applications will require us to expand and enhance the GIS model. Additional support staff from both an administrative and operational standpoint would be recommended to support an ADMS.

Division 32-26

Request:

NOTE: The references to responses to division data requests refer to docket 4770.

Refer to response DIV 19-16. If AMF is not approved in Rhode Island in the next three years, could the Company delay investments in Operational Data Management, Telecommunications, and Cyber Security? Please discuss.

Response:

If AMF is not approved in Rhode Island in the next three years, the Company could not delay investments in Operational Data Management, Telecommunications, and Cyber Security because these investments are necessary prerequisites for both AMF and non-AMF functions, and are not severable between the AMF and non-AMF functions.

More specifically, the Information Services (IS) investments are required to deliver the benefits associated with the Power Sector Transformation (PST) Plan, include Operational Data Management, Telecommunications, and Cyber Security. These three categories of IS investment, however, are foundational to the delivery of both AMF and *non*-AMF functionality and are a prerequisite to the deployment of certain, other upgrades necessary for the PST Plan investment. The financial analysis and estimation of the IS project costs for the PST Plan were developed on a holistic, program-wide basis reflecting the fact that the most efficient and cost-effective approach to project delivery is to implement these IS investments on a fully integrated basis. Although, in theory, some minor aspects of these IS investments may be scalable in circumstances where AMF is delayed, the Company has not evaluated whether these opportunities exist or whether there are "variable" costs that might be possibly avoided if AMF is delayed. However, the Company's expectation is that there are no material development costs that can be avoided because each of the three identified systems must be implemented in whole to meet requirements for *non*-AMF functions.

Notably, the individual project estimates for the IS investments included in the PST Plan incorporate a quotient for service utilization on an AMF/non-AMF basis to serve as a basis for cost allocation. This quotient, however, is not designed to indicate that the delivery of the investments may be phased or otherwise separately attributed to AMI and non-AMI functions. Generally, the entire IS investment must be made to deliver the required functionality and properly support the *non*-AMI requirements. In addition, because the systems deployment plan was created to provide the most efficient and cost-effective approach to delivery, phasing in the delivery of foundational services to accommodate a delay in AMF deployment would very likely result in higher cost of deployment, if it could be achieved in any event.

(This response is identical to the Company's response to Division 10-26 in Docket No. 4780.)