STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

CASE 17-E-0238 – Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Electric Service.

CASE 17-G-0239 – Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Gas Service.

ORDER AUTHORIZING IMPLEMENTATION OF ADVANCED METERING INFRASTRUCTURE WITH MODIFICATIONS

Issued and Effective: November 20, 2020

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At a session of the Public Service Commission held in the City of Albany on November 19, 2020

COMMISSIONERS PRESENT:

John B. Rhodes, Chair
Diane X. Burman
James S. Alesi
Tracey A. Edwards
John B. Howard, dissenting

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(Issued and Effective November 20, 2020)

BY THE COMMISSION:

INTRODUCTION

On November 15, 2018, Niagara Mohawk Power Corporation d/b/a National Grid (National Grid or the Company) filed a report on implementing advanced metering infrastructure (AMI) throughout National Grid's electric and gas service territories in upstate New York (AMI Report). The AMI Report was a requirement in the Rate Order issued in Cases 17-E-0238 and 17-G-0239.[1] The AMI Report included National Grid's business case

[1] Cases 17-E-0238 et al., National Grid – Electric and Gas Rates, Order Adopting Terms of Joint Proposal and Establishing

for implementing AMI (AMI Business Case), a benefit-cost analysis (BCA) model, and a Customer Engagement Plan that discusses the Company's plans for customer outreach and education. Since the November 15, 2018 filing, National Grid provided further updates to various aspects of its AMI Report, with the most recent filing submitted on October 28, 2020 (October 2020 Update).[2] By this Order, the Commission approves National Grid's AMI plan, with modifications.

BACKGROUND

Procedural History

In pre-filed testimony submitted in the above captioned rate proceedings, National Grid proposed implementing AMI across its electric and gas service territories.[3] Department of Public Service Staff (Staff) submitted pre-filed testimony recommending that National Grid engage with interested stakeholders to further develop and revise its AMI Business Case.[4] Ultimately parties to the rate proceedings filed a joint proposal, which the Commission adopted in the Rate Order. The Rate Order required that National Grid conduct a collaborative with interested parties to refine and update National Grid's AMI Business Case. Further, the Rate Order required that National

Electric and Gas Rate Plans (issued March 15, 2018) (Rate Order), page 25.

[2] Cases 17-E-0238 and 17-G-0239, supra, Updated Information and NMPC AMI Capital Cost Cap Scenarios (filed October 28, 2020).

[3] Cases 17-E-0238 and 17-G-0239, supra, Exhibit 129, Pre-filed testimony of the National Grid AMI Panel.

[4] Cases 17-E-0238 and 17-G-0239, supra, Exhibit 361, Pre-filed testimony of the Staff AMI Panel.

Grid file an AMI Report, including an updated AMI Business Case, BCA models, and Customer Engagement Plan.[5]

As required by the Rate Order, National Grid convened the first collaborative meeting to discuss its AMI Business Case on April 27, 2018. Over the next several months, 15 stakeholder groups,[6] in addition to National Grid and Staff, participated in at least one of eight full Collaborative meetings and a number of small group meetings. Taking into account the input from these stakeholder groups, National Grid refined its AMI Business Case, which it filed in the AMI Report on November 15, 2018.[7]

National Grid provided updates to its BCA models on February 22, 2019 (February 2019 Update). The updates reflected the New York Independent System Operator's (NYISO) release of the 2018 Congestion Assessment and Resource Integration Study (CARIS) 2 Base Case Annual Average Locational-Based Marginal

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[5] Rate Order, pages 25, 61-62; Rate Order, Attachment 1 (Joint Proposal), Section 15.4.

[6] The stakeholder groups that participated in at least one collaborative meeting included: The New York Department of State, Utility Intervention Unit (UIU); New York Power Authority; Multiple Intervenors (MI); International Brotherhood of Electrical Workers Local Union No. 97 (IBEW); Pace Energy and Climate Center (Pace); New York State Energy Marketers Coalition; Walmart; Itron; Landis+Gyr; Sunrun; Mission:data Coalition; Empire Advocates; Public Utility Law Project; Aztech Geothermal Heating and Cooling; and Environmental Defense Fund.

[7] The Rate Order provided a deadline of October 1, 2018, to file the AMI Report. National Grid requested, and the Secretary to the Commission granted, two extensions to the deadline, first to November 1, 2018, and ultimately to November 15, 2018. See Cases 17-E-0238 and 17-G-0239, supra, Ruling on Extension Request (issued October 19, 2018).

Prices (LBMPs).[8] On September 4, 2019, National Grid submitted a Supplemental AMI Report (September 2019 Update), incorporating up-to-date information and refined assumptions into its BCA model. On January 22, 2020, National Grid filed a revenue requirement model and incorporated further up-to-date information in a supplemental BCA model (January 2020 Update). On September 21, 2020 (September 2020 Update) and in the October 2020 Update, the Company filed revisions to costs to account for inflation that was filed in the Company's pending rate cases.

AMI Business Case and BCA Model

National Grid has updated its AMI Business Case and BCA multiple times since the Company initially proposed implementing AMI. National Grid developed two scenarios for the operations and maintenance (O&M) costs and projected benefits. The scenarios are referred to as "opt-out" and "opt-in," with reference to how residential time varying pricing (TVP) rates could be implemented. The opt-out scenario refers to having residential TVP rates as the default option, with customers able to opt-out. The opt-in scenario refers to having non-time differentiated rates as the default option, with customers able to opt-in to TVP rates. The Company's November 2018 AMI Report showed that over the expected life of the proposed AMI project, 20 years, and on a net present value (NPV) basis, the benefit-cost ratios for the project is 1.15 and 1.02 based on a TVP rate opt-out and opt-in scenario, respectively.

[8] This information can be found at: https://www.nyiso.com/cspp, by selecting "Planning Studies Supporting Documentation," then "Economic Planning Studies (CARIS)," then "CARIS Study Outputs", and finally "2018 CARIS 2 Base Case Annual Average LBMPs." It can also be accessed directly by the following link: https://www.nyiso.com/documents/20142/1407490/LBMP-Outputs-2018%20CARIS2.xls/78264f1c-e3e1-ca18-b086-4073462f8f70.

The February 2019 Update to National Grid's BCA model reflected an updated CARIS LBMP forecast based on NYISO's release of 2018 CARIS 2 Base Case Annual Average LBMPs. At that time, the Company also identified an additional $15 million benefit related to savings from the Energy Insights tool to account for additional anticipated savings driven by load disaggregation capabilities. These changes resulted in benefit-cost ratios of 1.14 and 1.01 based on the TVP rate opt-out and opt-in scenario, respectively.

The Company's September 2019 Update discussed and added outage reduction benefits, avoided metering cost for Distributed Energy Resource (DER), and avoided Distributed System Platform (DSP) related sensor investments in the benefits category of the AMI Business Case and BCA model. These changes resulted in benefit-cost ratios of 1.36 and 1.23 based on the TVP rate opt-out and opt-in scenario, respectively. Although there was no change to the benefit-cost ratios, the January 2020 Update corrected a misalignment between the BCA model and the information technology (IT) cost schedules and included a revenue requirement model that reflected the revisions provided in the Company's September 2019 Update.

The September 2020 Update clarified the capital costs over the six-year AMI deployment period, which includes inflation to account for the change in start date of the project from April 2019 to April 2021. The October 2020 Update provided the updated BCA model and associated revenue requirement model based on changes identified in the September 2020 Update. The BCA model in the October 2020 Update forecasts that the AMI project has a payback period of approximately 10 years.

According to the October 2020 Update, the AMI project has a projected nominal capital investment of $473.6 million over the first six years of implementation. Further, National

Grid forecasts AMI project O&M nominal costs of $141.9 million and $141.5 million for the TVP rate opt-out and opt-in scenarios, respectively.

For the TVP rate opt-out scenario, over the 20-year life of the project and on an NPV basis, the total capital investment is $384.2 million and O&M costs are projected to be $269.9 million. In addition, National Grid forecasted $542.25 million in cost savings and avoided costs and an additional $343.88 million in customer benefits. On the NPV basis, National Grid estimates net benefits of $232 million, or a benefit-cost ratio of 1.35.

For the TVP rate opt-in scenario, over the 20-year life of the project and on an NPV basis, the total capital investment is $384.2 million and O&M costs are projected to be $250.7 million. In addition, National Grid forecasted $542.25 million in cost savings and avoided costs and an additional $235.98 million in customer benefits. On the NPV basis, National Grid estimates net benefits of $143 million, or a benefit-cost ratio of 1.23.

The Company proposes to implement the back-office IT systems and complete the AMI deployment planning process during the first two years of the project, estimated to start on April 1, 2021. From the third to the sixth year of implementation, estimated to be April 2023 to March 2027, National Grid will deploy roughly 1,690,000 electric AMI meters, 640,000 gas modules, and communications systems. The gas modules communicate with the electric AMI meter to transmit gas usage data back to National Grid. National Grid will target deploying AMI meters to 20% of customers in the third and sixth years of implementation, and 30% of customers in the fourth and fifth years of implementation. Customers would have the opportunity to opt-out of receiving an AMI meter.

The AMI project's major costs fall into four major categories. The Company provided estimates of the NPV of these costs over a 20-year period.

The first major cost category is AMI Meter and Installation, estimated at $301 million. This includes the installation of electric meters and gas modules, related equipment and devices, along with the costs of labor to install such equipment and devices at customers' premises.

The second major cost category is Communications Network Equipment and Installation, estimated at $22 million. This includes the costs of the communication equipment and devices, costs associated with the backhaul network for transmitting meter data, along with the costs for planning, design, and installation of the communication systems.

The third major cost category is Platform and Ongoing IT Operations, estimated at $208 million. This includes IT hardware and software for data collection; monitoring and control of the communication system; cybersecurity systems; meter data management system and head-end system; analytics platform to change meter data into information that can be used by customers and the Company to make decisions; customer engagement solutions; integration and ongoing operational costs; and labor.

The fourth major cost category is Project Management and Ongoing Business Operations, estimated at $122 million for the TVP rate opt-out scenario and $102 million for the TVP rate opt-in scenario. This includes equipment and installation refresh, Critical Peak Pricing (CPP) and TVP rate implementation, and comprehensive customer engagement.

The AMI project's major benefits fall into five major categories. The Company provided estimates of the NPV of these benefits over a 20-year period.

The first major benefit category is Avoided O&M Costs, estimated at $188 million. This includes operational savings from remote customer connects and disconnects, better storm response with the integration of Outage Management Systems (OMS) and AMI, reduced meter reading costs, and reduced meter investigation costs.

The second major benefit category is Avoided Program Costs, estimated at $354 million. This includes avoided costs of replacing automated meter reading (AMR) meters, avoiding additional sensors to support the DSP, and metering for customers eligible for Value of Distributed Energy Resources (VDER) according to the Company's tariff.

The third major benefit category is Customer Benefits, estimated at $251 million for the TVP rate opt-out scenario and $165 million for the TVP rate opt-in scenario. This includes reduced energy from Volt-Var Optimization (VVO); customer response to granular energy usage information communicated via the Company's website and through high-usage alerts, and to the TVP rate; and reduced demand costs for customers who charge electric vehicles during off-peak periods.

The fourth major benefit category is Societal Benefits, estimated at $93 million for the TVP rate opt-out scenario and $71 million for the TVP rate opt-in scenario. This includes the emissions reductions benefits of remote customer connections and disconnections; Energy Insights and high usage alerts; TVP rates; VVO; and reduced truck rolls for meter reading and investigation.

The fifth major category of benefits is Revenue Benefits, estimated at $84 million. These benefits reflect reductions in theft of service and write-offs of unbilled service. These benefit ratepayers by reducing the cost of unbilled energy. However, the societal cost test (SCT)

considers them to be a transfer payment. Thus, the SCT does not count them toward the benefit-cost ratio.

Proposed Cost Allocation

National Grid proposed to assign AMI costs that are discreetly electric or gas costs, such as electric meters and gas modules, to the electric and gas businesses, respectively. Additionally, National Grid proposed to allocate the common costs that support both electric and gas businesses to respective electric and gas businesses based on electric and gas customer counts. Within its electric and gas businesses, National Grid proposed to allocate the costs among the electric and gas service classes using the same cost allocators approved in the Rate Order, with a few exceptions. National Grid proposed using more granular allocators developed based on the cost-causation principles for telecommunications, potential transformers, current transformers, and IT costs.

Time Varying Pricing Rate Structure

National Grid developed a TVP rate structure for mass market customers, i.e., residential and non-demand-metered commercial and industrial (C&I) customers,[9] when developing its forecast of benefits of implementing AMI. However, the Company has not yet proposed tariffs to implement a TVP rate structure. National Grid's TVP structure includes two components for its supply (commodity) rates. First, National Grid devised an on-peak period from 10 a.m. to 9 p.m., excluding weekends and holidays, with higher electricity prices, to be more reflective of the NYISO load zones. Second, National Grid developed a CPP

[9] Non-demand metered commercial customers are also referred to as small C&I customers. Large C&I customers are those that are required to be demand-metered.

period that is designed to recover capacity costs within 70 critical peak hours shown by NYISO conditions during the summer period, i.e., June through September.

National Grid favors implementing TVP rates on an opt-out basis. It stated that research from around the country indicates that participation rates for an opt-out scenario are much higher than in an opt-in scenario, resulting in higher customer benefits from TVP under the opt-out scenario.

The Company proposed a one-year lag between meter installation and customers being charged TVP rates. During the first year, National Grid would provide a 100% bill guarantee, that all customers on TVP rates would not pay more than under non-TVP rates. National Grid proposed additional protections for low-income customers for two additional years. For the second and the third year, low-income customers would pay no more than 5% and 10%, respectively, over their non-TVP rate bills.

Cybersecurity

National Grid stated that it will leverage industry-leading best practices to meet the goals of a robust cybersecurity program. For example, it will use encryption best practices to ensure any data transmitted across the network utilizes nationally recognized standards and protocols. National Grid stated its cyber security approach follows the recognized and widely accepted National Institute of Standards and Technology's (NIST) Cybersecurity Framework to align the Company's IT policies with the business objectives and the technological approaches to manage cybersecurity-related risk. Other measures the Company will employ includes: robust training, change control, configuration management security, access monitoring, incident management, end-to-end encryption,

network segmentation, and firewalls. According to the Company, these measures should enable National Grid to maintain the confidentiality, integrity, and availability of the systems and its information in both the short and long-term future of AMI.

Data Latency

For electric customers, the Company proposed 15-minute interval data delivered to customers every four hours. For gas customers, the Company proposed one-hour interval data available to customers every eight hours. This information will be available to customers on the Customer Energy Management Platform, though it will not yet be verified as "bill quality." National Grid stated that bill quality data will be available within 24 hours of the end of the billing interval. During the collaborative, the Company agreed to reassess reporting intervals one year after deployment to determine whether to deliver to customers electric data every 30 minutes instead of the four hours it initially proposed.

As part of the Company's September 2020 Update, National Grid provided two cost estimates for providing electric customers with usage data every 30-45 minutes through the Customer Energy Management Platform. The first option provides electric residential customers with usage data in 15-minute intervals and electric C&I customers with usage data in five-minute intervals. This is similar to the data availability timeframes that Consolidated Edison Company of New York, Inc. (Con Edison) offers its customers.[10] National Grid estimated this will increase the 20-year NPV cost of the AMI project by $22.71 million, resulting in a benefit-cost ratio of 1.33 for

[10] Cases 15-E-0050 et al., Con Edison – Electric and Gas Rates, Con Edison Advanced Metering Infrastructure Business Plan (filed November 16, 2015), page 66.

the TVP rate opt-out scenario and a benefit-cost ratio of 1.20 for the TVP rate opt-in scenario. The second option provides electric residential and C&I customers with usage data in 15-minute intervals. National Grid estimated that this will increase the 20-year NPV cost of the AMI project by $9.07 million, resulting in a benefit-cost ratio of 1.34 for the TVP rate opt-out scenario and a benefit-cost ratio of 1.22 for the TVP rate opt-in scenario.

Independent of the data provided through the Customer Energy Management Platform, customers may access near real-time data by procuring home-area network technology. In addition, the Company has contracted with a third-party vendor to allow customers to be able to obtain near real-time data through the use of an application on their smart devices, such as mobile phones, that communicates with a customer's meter through the use of a customer's Wi-Fi. Customers are able to use this application and all its features at no additional cost to the customer.

Incentives

National Grid stated that AMI supports implementation of metrics currently linked to Earnings Adjustment Mechanisms (EAM), such as the DER Utilization EAM metric and Peak Reduction EAM metric. The DER Utilization EAM metric incentivizes the Company to use granular data to increase DER interconnections. The Peak Reduction EAM metric incentivizes National Grid to work with customers through increased education and innovative rate designs to shift or reduce energy use during peak periods. In future rate proceedings, the Company stated it will consider AMI when making other EAM proposals.

Secondly, the Company proposed a Capital Expenditure Efficiency Savings sharing mechanism to share a certain amount

of AMI project capital costs saved between National Grid's shareholders and customers. If National Grid's actual capital costs at the end of the six-year AMI deployment period are less than estimated by $10 million or more, excluding costs for the Service Company's shared infrastructure, the Company's shareholders would retain 20% of the savings and provide 80% of the savings to customers. National Grid stated this approach is similar to the Green Button Connect cost efficiency mechanisms in the Company's current rate plan that gives National Grid an opportunity to earn an incentive for managing the level of capital investment. The sharing mechanism would be based on the Company's forecasted capital costs of $426.4 million if National Grid provides electric customers usage data every four hours or $428 million if National Grid provides electric customers usage data every 30-45 minutes through the Customer Energy Management Platform.

Finally, National Grid proposed to convene a collaborative with Staff and interested stakeholders during the pre-deployment phase to develop: a process for identifying and promoting AMI-related platform service revenues (PSRs) for potential sharing between the Company's shareholders and customers; and performance incentives, other than EAMs, that would measure the Company's ability to deliver AMI-related customer benefits.

Metrics

National Grid proposed metrics on customer engagement and operation/ programmatic performance. The Company proposes 19 metrics in total, within eight categories. The Company does not propose any incentives tied to these metrics.

1. Customer Engagement Metrics

The customer engagement metrics and reporting address information under three categories: Awareness, Enablement/ Empowerment/Tools, and Rates. The Awareness category includes three metrics. First, the Customer Knowledge of Smart [AMI] Meters metric, which tracks, through a survey, customers' knowledge of AMI meter technology, features, and benefits. Second, the Targeted Energy Forum Presentations metric, which tracks the number of forums National Grid hosts that provide smart meter information within its service territory. Third, the Low-Income Forum Presentations and Awareness metric, which tracks the number of low income events at which AMI information is presented by the Company.

In the Enablement/Empowerment/Tools category, National Grid proposed three metrics to track customers' use and satisfaction of tools. First, National Grid proposed a metric that track customers using the Customer Energy Management Platform. Second, National Grid proposed a metric that track customers using the various Customer Energy Management Platform functions. Third, the Company proposed a metric tracking customer satisfaction with the Customer Energy Management Platform.

For the final category, Rates, the Company proposed one metric. It proposed to measure the number of customers who opt-out of TVP rates and the reasons for their decisions to opt-out.

The Company stated that the information gained under these three categories will allow National Grid to understand how customers are responding to the Company's education and outreach efforts.

2. Operations/Programmatic Metrics

The operation/programmatic metrics and reporting include the following five categories: Deployment; Billing; Outage Management; System Operation and Environmental Benefits; and AMI Program Progress. Within the Deployment category, National Grid proposed five metrics. The metrics would track the number of electric meters and gas modules installed; the number of meters and modules deemed faulty; the number of gas meters required to be replaced to accommodate gas module installation; the number of AMI network communications devices installed; and the number of customers that opt-out of receiving a new AMI meter.

For the Billing category, National Grid proposed a single metric. The metric would track the percentage of bills estimated for accounts with AMI meters.

Within the Outage Management category, National Grid proposed two metrics. First, the Company would track the number of false outages identified using AMI. Second, the Company would track the associated reduction in fuel use and vehicle emissions from reducing the dispatch of trucks that address false outages.

Within the System Operation and Environmental Benefits category, National grid proposed three metrics. First, the Company proposed to track the feeders with VVO implemented. Second, National Grid proposed to track energy savings from VVO. Third, National Grid proposed to track the corresponding fuel and emissions reductions.

For the AMI Program Progress category, National Grid proposed a metric to track achievement of key project milestones. According to National Grid, this metric will help gauge the Company’s implementation progress.

Customer Engagement Plan

The Company described the Customer Engagement Plan as a guide for engaging customers before and after AMI deployment. The Company explained that it developed the Customer Engagement Plan with input received through the AMI Collaborative. The plan addresses implementation of Green Button Connect, which would enable customers to share energy data directly with third parties; methods of outreach; meter opt-out strategy; an employee training strategy; and a data privacy strategy.

The Company proposed a three-phase approach for customer engagement: a pre-deployment AMI awareness phase (Phase One), deployment of AMI meters (Phase Two), and a post-deployment customer empowerment and enablement phase (Phase Three). The plan states that customer communications, such as messaging, will be tested and updated prior to and during each phase. Proposed forms of outreach include direct mail, bill inserts, email, community/town hall meetings, social media, paid media (radio, newspaper, etc.), customer service support, surveys, and a Mobile Sustainability Hub. At all phases of the deployment, the Company explained, customers will have the choice to decline the installation of an AMI meter. In the Customer Engagement Plan, the Company explained that a customer who declines an AMI meter would be charged a monthly meter-reading fee, as is done to customers that require a manual meter read because the customer has opted-out of the Company's current AMR system. The Company directed readers of the Customer Engagement Plan to the Company's tariff for the applicable fees. Presently, the tariff provides for manual meter reading fees of $8.51 for an electric meter read, $8.87 for gas only, and $12.77 for electric and gas meter reads combined.[11] However, as part of

[11] P.S.C. No. 220 – Electricity, Leaf 120.1; P.S.C. No. 219 - Gas, Leaves 69 and 69.1.

its tariff leaves recently filed in the pending rate proceedings, the Company has proposed to increase the ongoing monthly meter-reading fees to $33.65 for an electric meter, $84.14 for a gas-only meter, and $46.87 for customers with electric and gas meters.[12]

Phase One will include external outreach to stakeholders and customers to address customer concerns and provide customers the choice to opt-out prior to meter installation. Early in Phase One, C&I customers will be educated on smart meter usage, and residential customer awareness of smart meters and the TVP rates will be measured to establish a baseline understanding of customer awareness. The Company proposed to inform customers of program benefits and privacy information via direct mail, email, the National Grid website, community meetings, advocacy groups, social media, paid media, and customer service support to minimize AMI meter opt-out rates.

Phase Two includes a phased deployment of AMI meters and gas modules based on region/territory and a 90-day, 60-day, and 30-day communications plan to coincide with the meter installation. The Company will monitor customer awareness of and satisfaction with AMI meter deployment and test customer communications and messaging post-installation. For enrolled life-support equipment customers who need continuous electricity, meters will not be changed without explicit permission from the customer and will be done at a scheduled,

[12] Cases 20-E-0380 and 20-G-0381, National Grid – Electric and Gas Rates, pending tariff leaves Electric 120.1, Revision 2; and Gas 69, Revision 6, and 69.1, Revision 2. These proposed fees are not being considered for approval in this Order. The fees have been proposed in the pending rate proceedings for National Grid and will be thoroughly analyzed and addressed in those proceedings.

pre-approved time. In Phase Two, the customer can choose to opt-out of receiving an AMI meter when the utility representative makes initial contact on the day of the meter installation. If the customer chooses to opt-out, the technician will not install the new electric meter or gas module at that location and will provide the customer with a meter opt-out form. The Company will seek to understand the customer's reason for opting out of the AMI meter through a phone call with the customer, during which the Company's customer service representative will also provide additional education on the benefits of AMI.

During Phase Three, National Grid anticipates launching a TVP rate if it is approved by that time. Further, during Phase Three, National Grid will deploy the Customer Energy Management Platform. The Company stated it will focus on educating customers on the TVP rate and incentivizing behavioral changes. The purpose of the Customer Energy Management Platform is to connect customers to information on energy management through personalized information, recommendations, products and services to manage and/or reduce energy cost.

The Company plans to provide training for customer service representatives (CSRs), for customer and community managers, for account managers (that communicate with C&I customers), and through corporate communications. Such training will include an overview of the AMI program, objectives, and customer benefits; customer talking points and key messages such as customer benefits, pricing plans, data privacy, and the meter opt-out process that will be utilized when interacting with customers; privacy issues; frequently asked questions brochures for customers; and welcome brochures for customers.

Regarding data privacy, the Company's plan sets forth a three-tiered approach that is in line with the Company's

current data practices. This approach includes regular updates of privacy and security policies and standards for those with legitimate business needs to access customer data; prevention of accidental misuse/loss/exposure of information; and implementation of cybersecurity controls.

NOTICE OF PROPOSED RULE MAKING

Pursuant to the State Administrative Procedure Act (SAPA) §202(1), a Notice of Proposed Rulemaking was published in the State Register on January 2, 2019 (SAPA 17-E-0238SP6). The time for submission of comments pursuant to the Notice expired on March 4, 2019. Comments were received from MI, Pace, and UIU. National Grid filed comments in reply to the comments of UIU, and IBEW filed comments in reply to National Grid's comments.[13]

On September 30, 2019, the Secretary to the Commission issued a Notice Soliciting Comments regarding National Grid's Supplemental AMI Report filed on September 4, 2019. Pursuant to the Secretary's Notice, comments were due no later than November 14, 2019. Comments were received from MI and the Mission:Data Coalition.

COMMENTS

MI

In its initial comments, MI took an agnostic stance as to whether implementing AMI is in the public interest at this

[13] UIU submitted its comments on April 29, 2019. National Grid submitted its reply comments on May 29, 2019. IBEW submitted its reply comments on June 7, 2019. Each of these three sets of comments were submitted after the expiration of the time for submission of comments pursuant to the Notice. However, in the interest of ensuring a complete record, the Commission will exercise its discretion to consider these three sets of comments.

time. MI recognized that AMI is a "superior technology," and that its implementation can produce benefits for customers. However, MI stated that the relative cost-effectiveness of AMI, for National Grid, appears marginal. MI noted that National Grid relies on the implementation of mass market TVP rates for a portion of the forecasted benefits. Overall, MI asserted that the quantification of benefits and costs relies on subjective assumptions that may or may not turn out to be accurate. Given the BCA ratios at the time that MI provided its initial comments, MI expressed concern that if some of the assumptions turn out to be optimistic, National Grid's AMI project could turn out not to be cost-effective. Further, MI expressed concern that, even if AMI is cost-effective, its costs should not be considered in a vacuum, as customers face a number of other pressures on utility rates.

MI also made two recommendations in the event that the Commission does adopt National Grid's AMI proposal, in whole or in part. First, MI recommended that the Commission approve the proposed cost allocation. MI stated that the proposed cost allocation relies appropriately and equitably on cost-causation principles and is generally consistent with the existing allocated cost of service study. Additionally, MI explained that its position, of not opposing implementing AMI, reflects National Grid's equitable and acceptable cost allocation proposal.

Second, MI opined that its proposed large non-residential rate design should be adopted. Specifically, MI recommended that costs related to AMI generally be recovered through an electric customer's customer charge and a gas customer's minimum monthly charge. MI explained that it understands the costs of AMI to be associated with customers and not with those customers' demand or usage.

In its comments responding to the Secretary's November 2019 Notice, MI noted that National Grid revised its BCA analysis to reflect decreases in vendor pricing and the identification of additional benefits to deploying AMI. However, MI characterized the changes to the BCA results as "marginally better" than the values in National Grid's original Report. Further, MI stated that it maintains the positions it took in its initial comments and incorporates those comments by reference.

Pace

Pace explained that it generally supports the deployment of AMI. Pace provided comments related to AMI metrics and the allocation of AMI costs and benefits. Pace stated that the metrics National Grid proposes in the AMI Report are an improvement over the metrics National Grid originally proposed during the 2017 rate proceedings. Pace approvingly noted that National Grid has incorporated metrics previously approved by the Commission with regard to Con Edison's AMI program.

With regard to cost allocation, Pace noted that National Grid did include some more granular cost allocation for several cost categories in the AMI Report, as compared to National Grid's pre-filed testimony in the 2017 rate proceedings. However, Pace recommended that the Commission require a more granular functionalization of costs. Pace stated that the more granular allocations should reflect the non-traditional functions that AMI meters and associated systems can serve in a transformed utility business model. Pace provided several examples, such as supporting the deployment of demand response programs; TVP rates aimed at reducing peaks; customer information portals; the integration and enablement of energy

efficiency, electric vehicles, storage, and other DERs. To develop this more granular functionalization, Pace stated that the Commission "should direct the utility to develop a proposed set of subaccounts and cost categories for tracking grid modernization-related investments."

UIU

UIU asserted that National Grid's AMI Report sets forth a proposal with a low net benefit, as gauged by the BCA result. Similar to MI, UIU explained that the marginal BCA result presented in the AMI Report increases the risk that the AMI investment may prove to be uneconomic. Specifically, UIU stated that it understands the total contingency for the costs portion to be only 5%, or approximately $30 million. Further, UIU noted the subjective, and potentially optimistic, nature of some of the benefit assumptions, such as the Company's calculations for the benefits to be gained from "Energy Insights/High Usage Alerts."

Additionally, UIU recommended recalculating the base case used in National Grid's opt-out scenario to compare the benefits that could be achieved using the Company's current time-of-use rates, if applied on an opt-out basis, using AMR meters. UIU asserted that the comparison of this base case to the Company's forecasted benefits from implementing AMI with TVP rates on an opt-out basis would help to isolate the benefits of implementing AMI.

UIU also provided recommendations for conditions if the Commission does authorize National Grid to implement AMI. First, UIU recommended providing safeguards for customers regarding AMI's costs. Specifically, UIU recommended implementing a "hard cap" on the Company's AMI-related capital expenditures. UIU considered giving National Grid leeway on the

capital expenditure cap could result in the Company changing or adding new investments that could lower the cost-effectiveness of the project. UIU noted that the Commission instituted a "hard cap" in its approval of Con Edison's AMI project. Additionally, UIU recommended requiring National Grid to provide a detailed project schedule, with costs for each project task. UIU recommended requiring National Grid to provide progress reports semi-annually. UIU stated this will enable close monitoring of the project and the implementation of remedial actions if cost overruns are anticipated. Further, UIU opposed National Grid's proposal to share any capital cost savings between shareholders and customers. UIU stated that such a mechanism is not appropriate for the AMI project that has a large investment with a low benefit-cost ratio. UIU emphasized that, even if AMI deployment costs are less than forecasted, the forecasted benefits are not guaranteed.

Second, UIU noted that National Grid does not presently have approval to deploy AMI in Rhode Island or Massachusetts. Thus, stated UIU, "it appears unlikely that New York customers will receive any cross-jurisdictional cost synergies for AMI implementation in the near future." Accordingly, in order to provide "as much financial benefit to the surrounding communities as possible, UIU recommends that all jobs related to the implementation of AMI remain in National Grid's" upstate New York service territory.

Third, if the Commission authorizes National Grid to implement AMI and an opt-out TVP rate, UIU recommended modifying National Grid's proposed bill guarantee for the TVP rate. UIU noted that National Grid proposes a one-year bill guarantee, with an additional two years of a graduated guarantee for low-income customers. UIU explained that National Grid would calculate the customer's bill guarantee on an annual basis. UIU

recommended that there be a full bill guarantee for two years following the introduction of the TVP rate, subject to an analysis of the costs of doing so.

After the second year of a full bill guarantee for low-income customers, UIU recommended that low-income customers be guaranteed that their bills under TVP rates would be no more than 5% higher than their bills under non-TVP rates. Further, UIU would continue the guarantee at that level for the fourth year. Finally, while UIU stated that it supports the Company's proposal to calculate the bill guarantee on an annual basis based on the previous 12 months' usage, UIU proposed that the Company issue customers a credit, where applicable, semi-annually.

National Grid

In response to UIU's comments, National Grid stated that "AMI is a foundational investment" necessary to deliver many benefits of the evolving electric system to customers. Further, National Grid stated that UIU's proposal to compare the AMI project to a base case reflecting opt-out time-of-use rates using AMR meters is flawed. National Grid explained that the AMR meters it has widely deployed cannot support time-of-use rates. National Grid must install different AMR meters with additional functionality for customers who opt-in to the Company's currently offered time-of-use rates. National Grid noted that the AMR meters to track time-of-use rates have a unit cost "comparable" to AMI meters, but lack many of the features of AMI meters, including "actionable energy usage data, outage management, ad DER integration capabilities." Additionally, stated National Grid, AMR meters would not allow it to implement the proposed CPP "or other innovative pricing structures such as those set forth in the Standby Rate Order." Further, National

Grid noted that AMR meters require manual programing for any changes to the time-of-use rate periods. Responding to UIU's statement that the BCA for the AMI project is marginal, National Grid asserted that it used conservative assumptions in its BCA calculations. Similarly, National Grid asserted that its proposed cost cap and capital cost efficiency sharing mechanism are appropriate. Finally, National Grid explained that it has "over 9,500 New York-based employees" that it will leverage to deploy AMI.

IBEW

IBEW noted that UIU recommended that jobs related to implementing AMI be located within National Grid's upstate New York service territory. IBEW explained that its represented workers have the skills and experience to install the back-office systems, meters, and conduct customer education, as required to implement National Grid's AMI project.

Mission:data Coalition

Mission:data Coalition stated that it generally supports the implementation of AMI, as AMI is needed "for high penetrations of" DERs. Further, Mission:data Coalition opined that National Grid's AMI proposal benefits exceed the costs and supports aspects of the proposal, such as the home-area network connectivity and National Grid's commitment to provide Green Button Connect. Mission:data Coalition recommended that the Commission take measures to ensure that the benefits of AMI flow to customers.

Specifically, Mission:data Coalition noted that customer benefits have been slow to materialize in other AMI projects. To address this, Mission:data Coalition recommended that the Commission "condition some portion of AMI cost recovery

upon the realization of customer-side benefits, particularly" energy efficiency and demand response benefits. Mission:data Coalition suggested requiring National Grid to explain how AMI can contribute to energy efficiency and demand response adoption in a way that the existing meters cannot. Further, stated Mission:data Coalition, the Commission should require National Grid to estimate AMI's direct benefits with regard to energy efficiency and demand response. Then, with this information in hand, stated Mission:data Coalition, it recommends linking "a portion of cost recovery to the enablement of such programs."

Mission:data Coalition also explained that National Grid proposes that its AMI meters can receive over-the-air firmware updates. Mission:data Coalition recommended requiring that such over-the-air firmware updates be done at zero cost to energy efficiency and demand response providers.

DISCUSSION

In 2016, the Commission authorized Con Edison to implement AMI.[14] In doing so, the Commission noted that AMI will contribute to the modernization of Con Edison's electric system and gas distribution system. The same is true for National Grid. The implementation of its AMI Business Plan will provide National Grid with increased visibility into and control of its system. Additionally, the deployment and use of AMI can be harnessed to transform the relationship between National Grid and its electric and gas customers. With AMI, National Grid can improve its response to power outages, as the Company will have more accurate and granular information regarding the voltage and current status of customers' services. AMI can empower

[14] Cases 15-E-0050 et al., supra, Order Approving Advanced Metering Infrastructure Business Plan Subject to Conditions (issued March 17, 2016).

customers by providing them with information about their energy usage and allowing them to take action to manage their electric and gas costs. The AMI meter and communication system can be used to enhance the safety of the electric and gas system by allowing National Grid to remotely monitor facilities and receive alerts when abnormal conditions are detected. Moreover, AMI is an important and valuable contribution to enabling the Company to assume the role of the DSP, to increasing use of DERs to support system operation, to increasing the use of measures such as VVO to reduce energy use and emissions, and to facilitating customer access to products and services provided by third-parties.

In considering National Grid's AMI Business Case, the Commission is mindful of the conditions required of utilities with approved AMI projects in the State and of the experiences of numerous utilities across the country as they implemented AMI. Accordingly, while this Order authorizes National Grid to implement AMI, it also creates guardrails to help ensure that National Grid can successfully implement AMI and produce the benefits it forecasts.

National Grid's AMI proposal presents net benefits. As adjusted, the benefit-cost ratio is 1.10. To guide National Grid in realizing the forecasted net benefits, this Order: caps the recoverable capital costs for the work set forth in the Company's planned six-year AMI deployment at $475.2 million; approves the Company's planned six-year AMI deployment period; requires the filing of an implementation plan for benefits identified in National Grid's AMI Business Case; allows the Company to propose appropriate positive and negative incentives regarding the AMI deployment in Cases 20-E-0380 and 20-G-0381, in which the Commission is considering the Company's recent rate requests; approves metrics to be used to track the Company's AMI

deployment; shorten data latency for customer data available on National Grid's customer portal; identifies other opportunities that National Grid shall consider to improve customer benefits; and requires improvements to the Company's Customer Engagement Plan.

The following discussion addresses the Commission's consideration of the: economic analysis; infrastructure and implementation plan; treatment of costs; incentives and metrics; the AMI Benefits Implementation Plan; and, customer education and engagement (including their opportunity to opt- out of receiving an AMI meter).

Economic Analysis

1. Customer and Company Benefits

Customer benefits are driven by the use of the granular data provided by AMI meters. National Grid has identified $249 million and $163 million in customer benefits for the TVP rate opt-out and opt-in scenarios, respectively, from reduced energy loads from VVO, and a shift in customer behavior after receiving energy usage information, tips on how to reduce usage, high-bill alerts, information and participation in TVP rates.

National Grid proposed implementing TVP rates on an opt-out basis for customers with AMI meters. Since customers will not receive AMI meters until the third year of deployment and there are multiple filings and procedures that can impact the design of the TVP rates before the Commission, no determination regarding the design of TVP rates is necessary in this Order. The Commission is currently considering proposals for rate designs in multiple cases such as in: (1) Case 15-E-0751, in which the Commission is considering TVP rate design

that may be applicable for all major utilities;[15] (2) Case 17-E-0238, in which National Grid proposed a Beneficial Electrification rate in a separate petition;[16] and, (3) Case 19-E-0111, in which National Grid has proposed TVP rates for its Clifton Park Demonstration Project.[17] National Grid is and can continue to participate in the other pending cases and can learn from developments there. National Grid can then make a refined TVP rate proposal as may be directed in one of the pending proceedings, in Case 20-E-0380 or the next base rate proceeding for the Company, or in a stand-alone petition. National Grid should file the proposal with sufficient time for an appropriate comment process and Commission consideration before National Grid anticipates enrolling customers in the proposed TVP rate.

The Commission, however, anticipates that National Grid's AMI project will enable more widespread use of TVP Rates. Accordingly, the BCA for National Grid's AMI project should

[15] Case 15-E-0751, In the Matter of the Value of Distributed Energy Resources, Order Establishing Net Metering Successor Tariff (issued July 16, 2020), page 29 (The Commission directed the continuation of the Rate Design Working Group to "craft rate options that enable new technology adoption and meet State policy goals in an economically efficient manner.").

[16] Case 17-E-0238, supra, Proposal of National Grid for Voluntary Residential Rate Structure to Further Adoption of Beneficial Electrification Technologies (filed September 18, 2018).

[17] Case 19-E-0111, National Grid – Clifton Park Demonstration Project, Petition for Approval of Tariff Leaves Modifying the Clifton Park Demand Reduction REV Demonstration Project to Test Innovative Pricing Proposals on an Opt-Out Basis (filed February 15, 2019); Case 19-E-0111, supra, Petition to Increase REV Demonstration Projects Budget Cap to Implement Innovative Pricing Demonstration, and Request for Approval of Tariff Leaves Modifying the Clifton Park Demand Reduction REV Demonstration Project to Test Innovative Pricing Proposals on an Opt-out Basis (October 22, 2019).

reflect the benefits that can accrue from TVP Rates. Accordingly, the accepted BCA for the AMI project includes a TVP opt-in rate with a conservative participation rate, as discussed below in the Benefit Cost Analysis section.

One of the major benefits of AMI is increased customer engagement, understanding of their energy usage, and energy management. This energy monitoring and management will be achieved through customer use of the various energy solutions and tools, such as the Company's Customer Energy Management Platform application, Green Button Connect My Data, and smart thermostats/home networks.

Regarding Green Button Connect, National Grid shall not begin Green Button Connect implementation until the statewide Green Button Connect collaborative focusing on developing the standardized terms and conditions of Green Button Connect implementation and application is finalized and the Commission determines how to proceed with Green Button Connect implementation.[18]

Additionally, the Commission recognizes the importance of minimizing data latency to provide customers with as close to real-time data as feasible through the Company's web portal. This improves customer benefits and experiences, enabling customers in their efforts to control energy usage and costs. National Grid proposed providing data through its online portal to customers every four hours. National Grid has also provided two options to provide data through the Customer Energy Management Platform every 30-45 minutes. For a 20-year NPV cost of $22.71 million, National Grid can provide 15-minute interval data for residential customers, and five-minute interval data

[18] Case 18-M-0084, In the Matter of a Comprehensive Energy Efficiency Initiative, Order Adopting Accelerated Energy Efficiency Targets (issued December 13, 2018), page 44.

for C&I customers. Alternatively, for a 20-year NPV cost of $9.07 million, National Grid can provide all customers with 15-minute interval data. The 15-minute interval data is similar to what is presently provided to large C&I time-of-use customers. Thus, the Commission selects this option as it should be sufficient and is the more economical choice. Additionally, customers will have the ability to access on demand, real-time data through home-area network devices and a mobile device application. There is no additional cost to customers to use the mobile device application. This application is a valuable innovation as it eliminates the financial burden of a customer needing to purchase a home-area network device to receive real-time granular usage data.

The Company's operational benefits of $542 million includes O&M cost savings mainly from avoided truck-rolls for meter reading, investigations, service connections and disconnections, damage claims, and outages; AMR replacement cost savings; and alternative metering costs to support VDER savings. The Company can expeditiously activate electric service for customers who are moving, or who had been disconnected for non-payment, without the need for manual service reconnection. With this Order, National Grid is directed to investigate the reduced costs and customer fees for electric service reconnections stemming from termination for non-payment and customer-initiated connections and disconnections as a result of the ability to accomplish this remotely through AMI, while in compliance with Section 11.9 of the Home Energy Fair Practices Act. The Company shall work with Staff to provide the updated service reconnection and disconnection fees in updated tariff leaves to be filed 90 days after system deployment.

Prompt outage detection and service restoration is a vital function of the utility. Within the last decade, New York

has experienced an ever-increasing number of storms growing in severity, causing prolonged outages across the State and prompting the Commission to initiate several investigations into utility performance.[19] AMI provides utilities with a way to quickly and more accurately identify outages, determine the amount of resources needed to address outages, deploy resources to resolve the outage, confirm power restoration, and use this information to improve customer communication during an outage event. However, the ability to complete these activities timely, depends on the continued operation of the AMI communication system, as an extended outage may impact the ability for a utility to receive information from the meter.

Therefore, National Grid is to assess its ability to increase the resiliency of its AMI communication system through the use of extended batteries that can last days without power, solar, mobile access points, and/or other solutions. The results of this assessment and proposed solutions shall be provided by National Grid in its rebuttal/update testimony to be filed in Cases 20-E-0380 and 20-G-0381 no later than December 16, 2020.[20]

The Commission is aware of instances where AMI-enabled methane detectors are being utilized to alert utilities to

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[19] Matter 20-01633, Utilities' Preparation and Response to August 2020 Tropical Storm Isaias and Resulting Electric Power Outages; Case 19-M-0285, Utility Preparation and Response to Power Outages During the March 2018 Winter and Spring Storms, Report on 2018 Winter and Spring Storms Investigation (issued April 18, 2019); Case 11-M-0595, Outages Caused by the October 2011 Nor'easter, Utility Performance Report Following the October 2011 Northeaster (issued June 21, 2012); Case 11-M-0481, Outages Caused by Hurricane Irene and Tropical Storm Lee, Utility Performance Report Following Hurricane Irene And Tropical Storm Lee (issued June 28, 2012).

[20] Cases 20-E-0380 and 20-G-0381, supra, Procedural Ruling (issued September 3, 2020).

potentially hazardous leaks, instances of theft of service, and improper piping. For example, the use of the AMI network could enable quicker response times which may prevent potentially unsafe conditions; even when not notified by the customer directly. Alerts of these types of potentially unsafe conditions are transmitted through the AMI network to the utility's control room, which allows the utility to immediately dispatch emergency personnel. In Cases 20-E-0380 and 20-G-0381, National Grid has made a proposal for deploying AMI-enabled methane detectors.[21] Therefore, this should be addressed in those pending rate cases.

The Commission recognizes advancements to AMI meters that allow for grid-edge computing at the meter. Analytics of what is occurring at the customer and distribution system level, which was historically done at the back-office, can now be done at the meter. Such capabilities allow for a more dynamic and flexible operation of the electric system. The Commission supports cost-effective implementation of grid-edge computing capabilities.

2. Benefit Cost Analysis

On January 21, 2016, the Commission issued an Order Establishing the Benefit Cost Analysis Framework (BCA Order).[22] The BCA Order states that the BCA Analysis will be applied to "investments in Distributed System Platform (DSP) capabilities" and "energy efficiency programs." National Grid's AMI proposal

[21] Cases 20-E-0380 and 20-G-0381, supra, Pre-filed Direct Testimony of the Gas Safety Panel (filed July 31, 2020), pages 41-46.

[22] Case 14-M-0101, Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Establishing the Benefit Cost Analysis Framework (issued January 21, 2016), page 1.

fits within these categories and, thus, should be evaluated as described in the BCA Order. Applying the BCA Framework to the Company's AMI proposal enables a comparison of the NPV of the benefits expected to be obtained through the project with a quantification of the NPV of the project's costs.

In the BCA Order, the Commission adopted an SCT as the primary measure of cost effectiveness.[23] An SCT, like a total resource cost test, evaluates saving resources and, thus, does not recognize measures that only change the allocation of resources. Measures that do not save resources, such as revenue protection, meter accuracy, and bad debt, should not be included in the SCT analysis.

This Order does not adopt TVP rates for National Grid; however, the BCA for the TVP rate opt-in scenario is included in the numbers discussed here to reflect the impact such a rate could have with a conservative customer participation level. Here, the TVP opt-in rate approach represents the "minimum benefit" scenario or benefit-cost ratio floor for the Company's AMI proposal.

There were numerous updates to the benefits and costs information for this project since the filing of the Company's November 2018 AMI Report to appropriately account for changes in CARIS LBMP forecast; additional benefits identified from the Energy Insights tool, outage reduction, avoided metering cost for DERs, and avoided DSP-related sensor investments; and refinement of costs information as vendor contract negotiations progressed. These changes have resulted in an increase to the benefit-cost ratio from 1.01 to 1.23 for the TVP rate opt-in scenario and electric customers receiving usage data with a four-hour lag through National Grid's online portal. Accounting

[23] BCA Order, page 12.

for residential and C&I customers receiving data in 15-minute intervals with a 30-45 minutes lag, National Grid calculated a benefit-cost ratio of 1.22.

National Grid's BCA model was compared with previous models used to justify the AMI systems of Con Edison, Orange & Rockland Utilities, Inc. (O&R), and PSEG Long Island to evaluate assumptions and proposed costs and benefits.[24] The model was also compared to the model provided by New York State Electric & Gas Corporation (NYSEG) and Rochester Gas and Electric Corporation (RG&E).[25] To the extent utilities across the nation have reported results of AMI implementations, Staff has tried to review those results to benchmark against New York utilities' AMI plans. Compared to other BCA models, National Grid's model is reasonable. However, certain adjustments must be made to the Company's assumptions to make them more conservative.

Based on studies of similar opt-in TVP rates in the country,[26] the opt-in participation rate should be reduced to

[24] Cases 15-E-0050 et al., supra, Order Approving Advanced Metering Infrastructure Business Plan Subject to Conditions (issued March 17, 2016); Cases 14-E-0493 and 14-G-0494, O&R – Electric and Gas Rates, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plans (issued October 16, 2015); Matter 14-01299, In the Matter of PSEG-LI Utility 2.0 Long Range Plan, Annual Update (filed June 29, 2018).

[25] Cases 19-E-0378 et al., NYSEG and RG&E – Electric and Gas Rates, Joint Proposal (filed June 22, 2020), Appendix O (AMI-1).

[26] Electric Power Research Institute, "Characterizing and Quantifying the Societal Benefits Attributable to Smart Metering Investments," 2008, available at: https://www.epri.com/#/pages/product/1017006/; Department of Energy, "Distribution Automation: Results from the Smart Grid Investment Grant Program," 2016, available at: https://www.energy.gov/sites/prod/files/2016/11/f34/Distribution%20Automation%20Summary%20Report_09-29-16.pdf.

15%, from the Company's more aggressive assumption of 20%. This reduces the benefit cost ratio by 0.02, from 1.22 to 1.20.

Additionally, to be more in line with studies of opt-in TVP rates across the country, the BCA should incorporate an energy usage reduction of 1.5% from the Energy Insights program instead of the Company's more aggressive assumption of 2.5%. This further reduces the benefit cost ratio by 0.09, to 1.11.

The use of conservative benefit assumptions helps to determine the likelihood that the AMI project will be cost beneficial for customers. Thus, while MI and UIU commented that the benefit-cost ratio is close to one, the use of conservative benefit assumptions suggests that the benefit-cost ratio is durably above one. Furthermore, this is a static analysis that looks at past results, it does not take into account dynamic changes to the edge-computing power of the new AMI meters that could unlock more benefits than have been quantified here.

Infrastructure and Implementation Plan

1. Deployment

The Company claims that implementing AMI in the near future would align with the replacement of the Company's existing AMR metering infrastructure, which National Grid states is approaching its end-of-life. Failure of the batteries powering the AMR gas modules would result in the inability of National Grid to receive meter readings without going to customers' homes and buildings. Therefore, National Grid will likely need to invest funds in its metering infrastructure in the near future, whether to replace AMR meters and gas modules in kind, or to upgrade to AMI. This presents an opportune time to upgrade to AMI while avoiding the costs of replacing the existing AMR meters in kind. The Commission is aware that it may appear that the present COVID-19 pandemic and associated

economic impacts could be reasons against moving forward with AMI at this time. However, revenue requirement impacts of implementing AMI will be small during the next two years and savings from implementing AMI will begin to accumulate once the system is in place. Using the TVP rate opt-in scenario with the reduced data latency discussed above, the anticipated revenue requirement impacts of implementing AMI will be approximately $20.1 million and $20.2 million in fiscal years 2022 and 2023, respectively.

2. Meter Testing

Modern electric meters are capable of a high level of accuracy, but they must be monitored through annual utility meter test programs to verify proper calibration and to ensure commodity flow is properly monitored. Meter testing occurs when a utility accepts meters from the manufacturer, and during the time the meters are in service.

Acceptance testing of new meter shipments must be done by National Grid prior to installation to ensure meter performance of the population. In performing such tests, National Grid shall adhere to the acceptance test schedule identified in Section 5, page 12, of 16 NYCRR Part 92 Operating Manual (Operating Manual).[27]

Previously for National Grid's in-service meter testing, the Statistical Sampling test method segmented the meter population by technology (e.g., electromechanical and electronic) and type, and ensured a high level of transparency in determining the performance of specific meter populations. The aforementioned testing method allowed for easier

[27] The Operating Manual can be accessed on the Commission's website at: http://www.dps.state.ny.us/Part92-Operating-Manual.pdf.

identification of performance issues and remediation of impacted meter populations. The Commission requires a high level of assurance that meter performance issues can continue to be clearly identified in National Grid's homogenous AMI meter population. Therefore, within 120 days of this Order, National Grid shall file a plan with the Secretary to the Commission that addresses: (1) how National Grid will determine the performance of National Grid's homogeneous AMI meter population, through attributes of the individual meters tested; (2) how National Grid will sort the results of each test sample by meter type; and, (3) how National Grid will evaluate the performance of its homogeneous AMI meter population and identify specific meters that need further investigation and remediation. National Grid shall provide a draft of this testing plan to Staff and interested stakeholders at least 45 days before the plan will be filed with the Secretary.

Additionally, National Grid shall select up to 20% more meters above the required amount to account for locations where meters are inaccessible. To ensure the performance of new in-service AMI equipment, in the first calendar year, National Grid shall test 200 of the AMI meter population in each of its AMI deployment regions. If the percentage of out-of-limit meters exceeds the Selective Test Plan matrix in the Operating Manual, National Grid will discontinue the installation of AMI equipment until the cause of failure is determined and corrections have been made. The number of in-service meters selected for testing in each subsequent year shall be determined by the requirements set forth in the Operating Manual.[28] Testing shall be conducted on a random sample of the in-service AMI meter population in accordance with American National Standards

[28] Operating Manual, page 16.

Institute provision Z1.4, American National Standard Sampling Procedures and Tables for Inspection by Attributes.

Additionally, the Commission reminds National Grid that, during AMI deployment, National Grid must continue with its annual statistical and variable meter test programs for its existing electric AMR meter population, unless it requests an exemption from this requirement and is granted one by the Commission.

3. Cybersecurity

Regarding cybersecurity protection of customer data, National Grid shall comply with the recently adopted cybersecurity and data privacy requirements for third-party energy suppliers and companies that electronically receive and exchange utility-housed customer data with the utilities' information technology systems.[29] These cybersecurity and data privacy requirements are part of the Data Security Agreement that a utility and a third-party must execute prior to the transfer of data between the two entities.

Furthermore, National Grid is obligated to comply with the Commission's Order in Case 13-M-0178[30] and thus must meet the order's nine requirements for protecting customer Personally Identifiable Information (PII). The PII Order required National Grid, among other utilities, to develop an Implementation Plan for meeting the following requirements: develop response and

[29] Case 18-M-0376, Proceeding on Motion of the Commission Regarding Cyber Security Protocols and Protections in the Energy Market Place, Order Establishing Minimum Cybersecurity and Privacy Protections and Making Other Findings (issued October 17, 2019).

[30] Case 13-M-0178, A Comprehensive Review of Security for the Protection of Personally Identifiable Customer Information, Order Directing the Creation of an Implementation Plan (issued August 19, 2013) (PII Order).

recovery drills, establish a digital forensics program, improve inventory control of PII, provide credit monitoring services in the event of a PII breach, conduct frequent PII security training for employees and contractors, improve inventory control of PII data, segregate PII data from less sensitive data, upgrade physical security controls for PII, employ next generation protection systems, and undergo annual third-party audit of the utilities compliance with the requirements of the order. Staff's annual review of the third-party audit reports has found that National Grid has met the requirements of the PII Order.[31]

In an evolving technology landscape, there are growing cybersecurity risks. National Grid's proposed cybersecurity policies, procedures, and protocols for protecting AMI and customer data meet the National Institute of Standards and Technology's (NIST) Cybersecurity Framework and satisfy Commission requirements for protecting sensitive customer data.

Treatment of Costs

1. Capital Cost Cap

National Grid forecasts spending approximately $515.7 million in capital costs for its AMI system. The Company proposes to cap its total capital costs[32] through the first six years of AMI implementation to $475.2 million. However, the Company indicates that, in future rate proceedings, it may seek to recover prudently incurred costs in excess of the cap. The Company indicates an overall capital cost cap will afford it the

[31] Staff of the Office of Resiliency and Emergency Preparedness conducted its most recent review of the third-party audit reports on October 14, 2020.

[32] Total capital costs include the capital expenditures both at the operating utility level and the Service Company level.

flexibility to substitute, change, or modify the timing of AMI related capital expenditures. In contrast, UIU proposes establishing a hard cap on AMI related expenditures. MI also raises concerns related to the Company's proposed capital cost cap and the Company's request to be able to seek recovery of incremental costs above the cap. MI contends there is uncertainty regarding the final cost to customers and that unanticipated cost increases could result in the project being uneconomical.

Due to the magnitude of the capital expenditures associated with AMI deployment it is necessary to establish appropriate cost controls. Therefore, the Company's capital expenditures for work scheduled to be completed during the first six years of AMI implementation, as shown in National Grid's updated BCA model, will be capped at $475.2 million. In the event National Grid prudently incurs costs above the capital cost cap, if it chooses to seek recovery of such costs in a future rate proceeding, it must demonstrate how these additional costs provide incremental benefits to customers and produce results that are different in scope from what is already included in its AMI Business Case.

2. Cost Recovery

National Grid anticipates a ramp-up period before beginning its AMI program deployment in earnest in April 2021. For the first three months of AMI deployment, i.e., April 1, 2021, to June 30, 2021,[33] the Company has proposed to defer the revenue requirement impact of the AMI-related expenditures for future recovery in its pending base rate proceedings. During the three-month period, the Company anticipates incurring

[33] In Cases 20-E-0380 and 20-G-0381, the Company has sought new rates for a rate year beginning July 1, 2021.

operations and maintenance expense project costs related to back-office system operating expenses, information technology discovery work, momentum services provided by the down-selected vendor, and legal costs associated with completing vendor contract negotiations. The Company forecasted the three-month operations and maintenance expenses to be $3.335 million. The Commission has traditionally applied a three-step process in examining requests for deferred accounting treatment. To qualify for deferred accounting treatment, an item must be incremental to current rates; the amount must be material to the utility's earnings and extraordinary in nature; and the utility cannot be overearning. The AMI-related operations and maintenance expenses the Company is requesting to defer, for the three-month period, are incremental to current rates and the utility is not overearning.[34] However, the forecasted level of incremental expenses for the three month period does not meet the Commission's current policy on materiality. The Commission's current policy is that an item must exceed 5% of the company's net income, available for common shareholders, to qualify for deferred accounting treatment. However, the Commission has deviated from this standard for public policy reasons. Given, the fact that the Company's AMI proposal will directly benefit customers (i.e., provide customers with energy usage information that can be used to manage their costs, improve response times to power outages, enable the Company to assume the role of the DSP, and will facilitate customer access to third-party products and services to help conserve energy usage) and the BCA indicates the benefits of deploying AMI

[34] For the 12-month period ended March 31, 2020, the Company earned a return on equity of 8.08% and 7.88% for its electric operations and gas operations, respectively, which is below its authorized return on equity of 9.00%.

exceed the costs over the life of the project, the Commission finds the Company's proposal to defer the incremental operations and maintenance expenses projected to be incurred for the AMI project before July 1, 2021, to be reasonable and is authorized. The deferral authorized here will be capped at the Company's updated forecast of $3.335 million for the three-month period of April 1, 2021, through June 30, 2021. AMI deployment operations and maintenance costs that the Company anticipates incurring after July 1, 2021, should be addressed in Cases 20-E-0380 and 20-G-0381, or future base rate proceedings, as appropriate. In the pending and future base rate proceedings, AMI capital and O&M costs will be assessed for prudence and accuracy before the Company is authorized to include them in base rates.

In addition, the Company has proposed to amortize, the unrecovered investment associated with its AMR meters and gas modules. In Cases 20-E-0380 and 20-G-0381, the Company provides forecasts of the unrecovered investment associated with its AMR meters and gas modules of $100.2 million and $19.5 million, respectively, and proposes to amortize these costs over a 10-year period. It is reasonable in concept for the Company to be able to recover costs associated with prudently incurred investments. However, at this time the Commission is not making a determination regarding the appropriate amount of unrecovered investments or any recovery mechanism for their recovery. This issue can be resolved in the pending or future base rate proceedings.

3. Cost Allocation and Rate Design

National Grid states that it generally uses the allocators from its Traditional Allocated Cost of Service Study provided during the consideration of its rate case filing in Cases 17-E-0238 and 17-G-0239. To allocate certain costs,

National Grid proposes to rely on cost-causation principles. MI supports the Company's cost allocation proposals. As summarized above, MI also recommends a rate design for large non-residential service classes. UIU proposes that if the Commission approves the Company's AMI proposal, rate design issues should be deferred to a future base rate proceeding. Pace proposes that AMI cost allocation should be more granularly functionalized to better reflect advanced functionalities of the AMI system than the traditional electric and gas meters. Pace also proposes the Commission direct National Grid to develop a set of subaccounts and cost categories for tracking grid modernization-related investments.

Only MI supports determining cost allocation and rate design at this time. Furthermore, National Grid will only begin cost recovery after a rate order is issued in its currently pending rate proceedings, Cases 20-E-0380 and 20-G-381. Accordingly, it is reasonable to address these topics in the currently pending rate proceedings for National Grid to provide parties an opportunity to further refine the proposals and/or offer alternative allocation or rate design methods.

Incentives and Metrics

1. Incentives

National Grid proposed that, if it were to deploy AMI as planned in the first six years, for at least $10 million below its forecasted capital costs, then its shareholders would retain 20% of the savings and customers would receive 80% of the savings. UIU opposed this Capital Expenditure Efficiency Savings sharing mechanism. The Commission agrees with UIU that this mechanism is not appropriate since deployment of AMI with lower capital expenditures than forecasted does not guarantee the expected level of benefits will materialize. Indeed,

decreased costs could result in decreased benefits. National Grid has not proposed to guarantee any specific level of benefits with the forecasted or hypothetically reduced costs of the project. Therefore, the Company's proposed Capital Expenditure Efficiency Savings sharing mechanism is denied. Notwithstanding, the Commission reminds National Grid that it has a responsibility to control costs and make prudent investments. Therefore, National Grid is expected to minimize the costs of this program even without the proposed mechanism.

However, the Commission does support the concept of positive and/or negative incentives related to the AMI project. This topic should be considered holistically in the context of base rate proceedings, such as in the Company's rebuttal/update testimony to be filed in Cases 20-E-0380 and 20-G-0381, or in future rate proceedings. The Company may propose positive incentives if the Company creates increased net benefits to customers through actions such as, but not limited to, significant advancement of the deployment schedule, identification and implementation of additional features that significantly increase customer benefits, or significant advancement of customer benefits already identified while controlling overall capital and O&M costs. Negative incentives may be considered to account for circumstances where National Grid fails to produce promised outcomes key to the implementation and success of the AMI project. In addition, Mission:Data's proposal to link cost recovery to the realization of customer benefits can also be considered. The amount of the positive and/or negative incentives shall be derived by accounting for the financial impact the actions being incentivized will have on customers.

National Grid's proposal to identify, for consideration by the Commission, AMI-related PSRs for potential

sharing of revenue between the Company and customers is justified and encouraged. National Grid should seek out lessons learned from Con Edison and other utilities that have already worked with third parties to help identify PSR opportunities and the steps the Company needs to take to achieve such opportunities.

2. AMI Metrics

The AMI metrics and reporting proposed by National Grid are generally reasonable as they are in line with the AMI metrics and reporting approved in Con Edison's current rate plan.[35] However, they require modifications to better address the specifics of National Grid's proposed AMI project.

First, National Grid has proposed an application for smart phones and other devices that provides real-time usage data. Accordingly, National Grid shall add a metric to track the number of customers using this application under the Enablement/Empowerment/Tools category.

Second, National Grid proposes to provide customers with the ability to use of GBC. To track the use of GBC, National Grid shall add two metrics. First, National Grid shall track the number of third-parties who are onboarded with GBC. Second, National Grid shall track the number of customers who are sharing their data via GBC under the Enablement/Empowerment/ Tools category. Third, National Grid shall ensure that its GBC is certified and meets GBC Alliance Standards once complete.[36]

Third, National Grid proposed a metric under the Deployment category to track the number of customers who opt-out

[35] Cases 19-E-0065 and 19-G-0066, Con Edison – Rates, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan (issued January 16, 2020), Attachment A, Appendix 19 -- AMI Metrics.

[36] See https://www.greenbuttonalliance.org/certification.

of receiving the AMI meter. National Grid shall report that data broken down by the following customer types: residential (all), low-income customers enrolled in the Energy Affordability Program, small C&I, and large C&I.

Fourth, National Grid proposed a metric under the Rates category that tracks the number of customers who opt-out of the TVP rate. This metric is unnecessary as the TVP plan is not approved at this time.

Fifth, National Grid shall include a metric to track the number of low voltage and outage cases that the Company positively confirms through the AMI system.

Sixth, National Grid proposed reporting on the achievements of key program milestones under the AMI Program Progress category. Within that category, National Grid shall also identify and track delays in meeting key program milestones, the cause of such delays, and updates to the project schedule by key milestone. National Grid shall include the key milestones on which it will report. At a minimum these key milestones shall include: progress under the AMI Benefits Implementation Plan that is further discussed below, use of AMI data for complex billing, and progress under the Customer Engagement Plan.

In Cases 20-E-0380 and 20-G-0381, the Company, Staff and intervenors shall assess whether any other metrics should be added or modified. Further, in those cases, the Company shall propose the commencement date for each metric report, the frequency of each metric reporting, and the targets for all metrics. In order to facilitate the changes to the metrics discussed above, the Company shall file rebuttal/update testimony in Cases 20-E-0380 and 20-G-0381 that describes its AMI metrics proposals. This will provide Staff and intervenors

with the opportunity to respond to the Company's proposals in in those cases.

AMI Benefits Implementation Plan

National Grid discussed numerous quantified and unquantified benefits of AMI in its AMI Business Case. In addition, as technology evolves, additional benefits may be identified. To assist with understanding these benefits, tracking their attainment, and learning from the implementation of the AMI project, National Grid shall develop an AMI Benefit Implementation Plan (Benefit Implementation Plan). National Grid shall file this Benefit Implementation Plan with the Secretary to the Commission within 60 days of the issuance of this Order.

The Benefit Implementation Plan shall include: (1) a description of the quantified and unquantified benefits that AMI can enable; (2) a prioritized list of the quantified and unquantified benefits that the Company intends to pursue, together with specific implementation action steps and schedules with specific interim milestones; (3) updates, as applicable, to the forecasted 20-year NPV of quantified benefits and costs to achieve benefits that are identified in the October 2020 Updated BCA; (4) a BCA for any new benefits that National Grid plans to implement, but that were not included in the October 2020 Updated BCA; and, (5) a BCA for any benefits that the Company has not yet chosen to pursue.

The phrase "quantified and unquantified benefits that AMI can enable" includes: all quantified benefits identified in the October 2020 Updated BCA; all benefits that the Company identified in its AMI Business Case and other related and subsequent filings that may be unquantifiable or not yet quantified by the Company, including but not limited to, grid-

edge computing capabilities, value-added access to useful data for customers and distributed energy resource providers, and other benefits that the Company can identify prior to the deadline for filing the Benefit Implementation Plan.

The Benefit Implementation Plan shall describe how the Company will conduct outreach to vendors, other utilities, interested parties, and/or Staff for input on attaining benefits and achieving the vision set forth in the Company's AMI Business Case, related filings, this Order, and the Benefit Implementation Plan itself. National Grid shall file semi-annual reports identifying its progress in achieving the goals set forth in the Benefit Implementation Plan.

National Grid shall work with Staff to develop this Benefit Implementation Plan. If a consensus on any aspect of the Benefit Implementation Plan cannot be reached between the Company and Staff, when National Grid files its Benefit Implementation Plan, it shall identify the areas of disagreement for Commission consideration. Staff will have 30 days to submit a response to the Company's filing.

Once a final Benefit Implementation Plan is finalized, the Commission recognizes that the timeline for particular actions and the attainment of benefits can be altered as AMI implementation progresses. To provide adequate flexibility, should the Company need to substantially alter the timeline for implementing benefits, or to not achieve certain identified benefits, the Company may file a proposal with the Secretary to the Commission. Such a request must be supported by ample support and should explain how the proposed alteration to the Benefit Implementation Plan more effectively supports the achievement of the benefit(s), produces more benefits and/or less risk, or is appropriate for technical reasons. Any proposal not to implement a benefit must be similarly justified.

For such proposal to be effective, it must be approved by the Director of the Office of Electric, Gas and Water. Should the Company experience significant schedule slippages or other deviations, the Director of the Office of Electric, Gas and Water can require that National Grid file additional interim updates.

Customer Education and Engagement

The Company submitted a comprehensive Customer Engagement Plan that incorporated input from Staff and other stakeholders that were involved in the AMI collaborative. The Company's plan also reflected lessons learned regarding AMI meter deployment, separate from testing TVP rates, from its own pilot projects in Worcester, Massachusetts, and Clifton Park, New York, as well as best practices from other utilities. The Company's proposed a three-phase approach should provide customers with ample information on AMI at every stage of deployment. The Customer Engagement Plan is not overly prescriptive and does not provide a timeline, aside from the three phases. While flexibility is important, should a delay arise, the Commission finds that a general timeline with dates is needed to further improve the Customer Engagement Plan and allow for adequate oversight.

Proper employee training will be crucial to the Company's success in its AMI initiative so that customers receive consistent and accurate information throughout all phases. However, the Customer Engagement Plan did not provide a sufficient plan for employee training on AMI. Nor does the plan provide proposed training materials, aside from two brochures used for the Worcester and Clifton Park pilot projects.

Regarding AMI meter opt-out considerations, customers must be informed of the monthly meter-reading fees before the

customer chooses to opt-out of receiving an AMI meter. When customers call the Company to opt-out of the AMI meter, additional education has proven to be beneficial, as shown with Con Edison's and O&R's AMI deployments, and is encouraged. It is appropriate that there is no fee to the customer if a customer that has opted out later chooses to have an AMI meter installed, as stated in the Customer Engagement Plan. No party submitted comments against the existing opt-out fees; however, as discussed above, the Company has proposed to increase the opt-out fees as part of its proposals in Cases 20-E-0380 and 20-G-0381.[37] The proposed increases in those fees are not before the Commission in this case. Parties may submit testimony on those fees in Cases 20-E-0380 and 20-G-0381, and the appropriateness of the proposed fees will be addressed there. As guidance, the AMI meter opt-out fees should be calculated using a cost-based methodology, similar to the methodology used for AMI meter opt-out fees for other utilities.[38]

National Grid shall revise its Customer Engagement Plan with employee training materials, customer educational materials, and specific dates and/or time frames. National Grid shall file the revised Customer Engagement Plan within six months of the issuance of this Order. National Grid shall provide a draft of the revised Customer Engagement Plan to Staff and interested stakeholders at least 45 days before the plan will be filed. This will allow the Company to receive and reflect Staff's and interested stakeholders' input in the filed Customer Engagement Plan.

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[37] Cases 20-E-0380 and 20-G-0381, National Grid – Electric and Gas Rates, pending tariff leaves Electric 120.1, Revision 2; Gas 69, Revision 6; and Gas 69.1, Revision 2.

[38] Cases 14-E-0570 and 14-G-0571, Cons Edison – Tariff Filing to Establish AMR/AMI Meter Opt-Out, Order Approving Tariff Amendments (issued December 23, 2015).

CONCLUSION

By this Order, the Commission authorizes National Grid to implement AMI in its upstate New York electric and gas service territories subject to the modifications discussed above. To ensure that deploying AMI provides useful data to customers and the Company, the Commission requires that National Grid provide data to mass market customers in 15-minute intervals with the data latency described above. To protect customers' interests, National Grid's capital expenditures for completing accomplishments during the first six years of implementation, identified in the Company's October 2020 Update BCA model, are capped at $475.2 million. Additionally, to allow for input from the Company, rate case parties, and Staff, the following topics shall be addressed in Cases 20-E-0380 and 20-G-0381 as discussed above: resiliency of the AMI communication system, methane detectors, unrecovered investments associated with its AMR meters and gas modules, AMI project cost allocation, treatment of incentives, and updates to the AMI metrics. Further, National Grid shall submit an AMI Benefits Implementation Plan and a revised Customer Engagement Plan as described above.

The Commission orders:

1. The Advanced Metering Infrastructure (AMI) Business Plan filed by Niagara Mohawk Power Corporation d/b/a National Grid is approved, subject to the discussion and modifications in the body of this Order.

2. The recoverable capital expenditures for Niagara Mohawk Power Corporation d/b/a National Grid's implementation of Advanced Metering Infrastructure for the work set forth in the Company's planned six-year AMI deployment period are capped at $475.2 million, as discussed in the body of this Order.

3. Niagara Mohawk Power Corporation d/b/a National Grid is authorized to defer up to $3.335 million of the revenue requirement impact of AMI deployment until its base delivery rates are next reset, as discussed in the body of this Order.

4. Niagara Mohawk Power Corporation d/b/a National Grid is directed to submit testimony in the pending electric and gas rate proceedings, Cases 20-E-0380 and 20-G-0381, no later than December 16, 2020, regarding the topics identified and consistent with the discussion in the body of this Order.

5. Niagara Mohawk Power Corporation d/b/a National Grid shall file with the Secretary, within 60 days of the issuance of this Order, an AMI Benefits Implementation Plan, as described in the body of this Order.

6. Niagara Mohawk Power Corporation d/b/a National Grid shall file with the Secretary, semiannually, a report identifying the progress made toward achieving the goals set forth in the AMI Benefits Implementation Plan identified in Ordering Clause 5.

7. Niagara Mohawk Power Corporation d/b/a National Grid shall file with the Secretary, within 120 days of this Order, a meter testing plan for its AMI meter population, consistent with the discussion in the body of this Order.

8. Niagara Mohawk Power Corporation d/b/a National Grid shall file with the Secretary, within six months of the issuance of this Order, a revised Customer Engagement Plan, as described in the body of this Order.

9. Niagara Mohawk Power Corporation d/b/a National Grid shall file with the Secretary, by May 31 of each year, a report detailing the status of the capital expenditures related to AMI during the fiscal year concluding on March 31 of that calendar year, and for the AMI project from inception to completion of AMI implementation.

10. In the Secretary's sole discretion, the deadlines set forth in this order may be extended. Any request for an extension must be in writing, must include a justification for the extension, and must be filed at least three days prior to the affected deadline.

11. These proceedings are continued.

By the Commission,

(SIGNED) MICHELLE L. PHILLIPS
Secretary