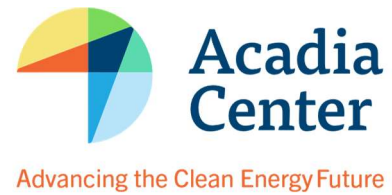


Massachusetts Utility Grid Modernization and AMI Plans (2022- 2025) – DPU 21-80, 21-81, 21-82



Summary and Review of Utility Proposals

September 2021

Introduction and Key Takeaways

The next phase of grid modernization in Massachusetts is underway, but the speed at which the grid will be transformed is likely still too slow. Grid modernization can create a distribution grid that self-heals, allows automated consumer response to price signals, and fully utilizes distributed energy resources (DER) as grid resources—all of which can help slow the climate crisis, but only when deployed effectively. In May 2021, the Massachusetts Department of Public Utilities (DPU) required each electric distribution company (EDC) in the state to submit grid modernization plans (GMP) and a plan to achieve full-scale deployment of advanced metering infrastructure (AMI). National Grid, Eversource, and Unitil submitted their plans in July.^{1,2} The utilities' plans for meeting the state's grid modernization objectives are significantly more robust than past proposals, but Acadia Center's analysis of the plans has identified four major areas of concern:

- **Environmental Justice:** Efforts to modernize the electricity grid in Massachusetts should prioritize benefits for people living in environmental justice communities, including deploying equitable levels of grid modernization across the state. However, National Grid's plans make only passing mention of environmental justice, while Eversource's plans do not touch on the issue at all. A resilient grid can benefit the most underserved communities in many ways, including by providing protection during extreme weather events.
- **Time-Varying Rates:** Eversource and National Grid's treatment of time-varying rates (TVR) also leaves much to be desired. Both utilities' plans call for implementation of TVR to start only when they have completed installing 100% of their AMI, after 2027. According to its AMI deployment timeline, Eversource expects to reach only 10% customer enrollment in TVR in 2033, and National Grid assumes a 15% enrollment rate in TVR (without specifying a year by which that will be achieved), both through an opt-in offering. Despite already having AMI, Unitil does not provide detailed information about TVR deployment. Although the DPU did not require the utilities to propose an opt-out TVR program (as it did in the 2015 grid mod dockets), it is disappointing that the utilities assume they will only utilize AMI for opt-in TVR that reaches very low rates of penetration. The delay in the implementation of TVR—a critical tool for helping to meet our climate and energy goals—will prevent consumers and the state from realizing the full benefits of AMI and make it more difficult for the state to reach its climate targets.

¹ The DPU docketed each EDC's grid modernization and AMI plan separately (Eversource as DPU 21-80, National Grid as DPU 21-81, and Unitil as DPU 21-82).

² In this piece, Acadia Center primarily focuses on Eversource and National Grid's proposals, as they are more complex, with Unitil already having installed AMI (though without the interval metering necessary for time-varying rates). Unitil GMP, p. 36.

- **Customer Data:** The utilities' treatment of energy usage data raises some questions as well. National Grid and Eversource present considerably different approaches to customer data access and appear to have a different understanding of the potential benefits of facilitating customer data access and transparency. While National Grid includes a detailed plan for ensuring customer data access, Eversource seems less prepared for enabling access to energy usage for both customers and third-party vendors. All utilities must ensure robust data access and transparency to support greater customer control of their usage and bills, as well as the ability of third-party providers to offer innovative programs and services.
- **Costs and Benefits:** There is a significant discrepancy in some of the costs and assumed benefits in both the grid modernization and AMI filings from Eversource and National Grid. The utilities present differing levels of detail in terms of their benefit-cost analysis and present markedly different benefit-cost ratios for their grid modernization and AMI investments, raising questions about the underlying assumptions.

Acadia Center is a full intervenor in all three dockets, and will investigate these issues through discovery, participation in hearings, and submission of briefs. The DPU is accepting public comments on these filings until 5 PM on September 9 and holding a [public hearing](#) at 2 PM that day. Anyone who wishes to testify must register by Tuesday, September 7.

Many of the issues of concern that this document identifies could be addressed through legislation that Acadia Center supports ([S.2144/H.3261](#)), which would require regularly updated statewide grid modernization plans and a grid modernization consumer board. This would enable significantly more stakeholder involvement in grid modernization in Massachusetts. S.2144/H.3261 are described in more detail at the end of this document.

Grid Modernization in Massachusetts

Massachusetts has made significant progress in implementing policies to help meet the Commonwealth's 2020 emissions reduction requirements, but much work remains to be done to meet the 2050 net-zero requirement. One of the most critical aspects of meeting the state's climate targets will be modernizing the electricity grid. The electric grid must undergo significant upgrades to accommodate the increase in distributed energy resources (DER), storage devices, electric vehicles, smart customer appliances, and other technologies that will be required to meet the Commonwealth's carbon reduction targets.

However, efforts to advance grid modernization priorities in Massachusetts have moved slowly. A 2018 Department of Public Utilities (DPU) decision rejected customer-facing grid modernization investments and declined to approve advanced metering infrastructure (AMI) proposals, even though advanced metering infrastructure has become increasingly common throughout the US.³ As of 2019, approximately 83.5 million residential customers had advanced metering infrastructure installed.⁴

³ The DPU created a four-prong test (described below) for the functionality that advanced meters should provide and refers to these attributes as Advanced Metering Functionality (AMF). The utilities submitted Advanced Metering Infrastructure (AMI) plans, and for ease of reference, Acadia Center will use the more general term AMI to refer to the plans and the DPU's requirements.

⁴ See <https://www.eia.gov/tools/faqs/faq.php?id=108&t=3>

The DPU kicked off Phase II of its grid modernization proceeding last summer by focusing on the potential benefits of targeting AMI deployment to electric vehicle customers. The DPU found that limiting AMI only to that subset of customers would not be cost-effective, given the data management system and communications upgrades that would be required to make use of AMI and the data it provides. Instead, the DPU recognized the many potential benefits of AMI for all customers and called for achieving full-scale deployment of AMI throughout the Commonwealth. In May, the DPU required each electric distribution company to submit an updated grid modernization plan, as well as a plan to achieve full-scale deployment of AMI. On July 1, Eversource, National Grid, and Unitil submitted separate plans that included a ten-year grid modernization vision, a five-year strategic plan, and a four-year investment plan covering 2022-2025.

Benefits of Grid Modernization and AMI

Grid modernization is a necessary piece of the Commonwealth's work to transform its energy system and to meet the state's climate targets. Grid modernization includes both the infrastructure upgrades, as well as the planning, communications, and data management systems that are necessary to make the electric grid ready to effectively utilize advanced energy technologies. These investments offer many benefits, including giving customers greater control over their energy usage, providing greater visibility into grid operations, integrating more distributed energy resources, and avoiding traditional infrastructure costs.

Advanced metering infrastructure is a key component of grid modernization. AMI includes integrated networks of smart meters, two-way communications networks, meter data management systems, and customer energy management platforms. AMI enables the collection of more granular energy usage data, which provides greater insights for customers, utilities, and grid operators. Integration of AMI data into system operations and program offerings allows for customization of energy efficiency and demand response programs, the ability to implement more sophisticated time-varying rates, and better outage management. It also allows many functions to be automated, allowing for the grid to self-heal or for consumers' appliances to manage their energy use to operate when power is cheapest.

In recognition of these benefits, the DPU outlined three primary grid modernization objectives that the EDCs' plans must meet (DPU 15-120 and 12-76-B). Grid modernization efforts should help to:

- Optimize system performance by attaining optimal levels of grid visibility, command and control, and self-healing.
- Optimize system demand by facilitating consumer price-responsiveness and minimizing losses on the system.
- Facilitate the interconnection of distributed energy resources and to integrate these resources into the Companies' planning and operations processes.

Overview of Grid Modernization Plans

To meet the DPU's grid modernization objectives, each electric distribution company has proposed a combination of continuing investments approved in the DPU's 2018 grid modernization Phase I order and new investments that expand on the previous grid modernization plans. Together, each utility's grid modernization investments should build on the previous investment period to deploy technologies and systems that enable greater real-time visibility and control of the distribution system; more detailed planning models and data analytics; more sophisticated outage detection and response; more advanced short-term load forecasting and management of DERs; and reductions in energy demand.

National Grid's grid-facing investments total \$316.26 million over four years; Eversource's grid-facing investments total \$198.8 million; Until's investments total \$11.22 million. All three utilities' grid-facing investments in the 2022-2025 period include:

- **Volt-VAR Optimization (VVO)** to help reduce line losses, improve system efficiency, and lower consumption.
- **Monitoring and control systems**, including system upgrades to support fault location and service restoration after an outage; feeder monitoring sensors; and other tools to enable a grid capable of self-healing.
- **Advanced Distribution Management Systems (ADMS)**, enabling more real-time visibility and control of the distribution system.
- **Distributed Energy Resource Management System (DERMS)** to support greater ability to manage and operate DER and more advanced short-term load forecasting.
- Investments to support implementation of **FERC Order No. 2222**, which requires wholesale markets to allow all DERs to participate in wholesale markets. To support DER aggregation and market participation, the utilities will invest in system upgrades for settlement of meter readings; the development of a DER aggregation operations portal to help coordinate the dispatch of DERs; and congestion management software tools, among other investments.
- **Advanced modeling, forecasting, and analytics software tools** to support the increase in DERs and the significant increase in data processing that is required to make full use of AMI.
- **IT and communications systems upgrades** to support the integration of all the systems and devices related to grid modernization.
- **Measurement and verification support.**

National Grid also includes two demonstration projects to test changes to distributed generation (DG) interconnection processes and options for integrating increasing amounts of DG. National Grid plans to spend most of its grid modernization budget on VVO and Communications & Networking, while Eversource's largest investment categories are Monitoring & Control and VVO. National Grid's grid modernization plan will result in a total cumulative residential customer bill impact of approximately 1.63% over the 2022-2025 period. Eversource does not provide details on the customer bill impacts of its grid modernization plans.

National Grid's grid-facing 2022-2025 budget is significantly higher than Eversource's, despite having similarly sized customer bases. Some of the notable differences, according to each utility's four-year GMP budget, include National Grid's \$60.42 million planned for ADMS investment, compared to Eversource's \$17 million for ADMS. National Grid plans to spend \$76.44 million on Volt VAR Optimization and Conservation Voltage Reduction, whereas Eversource has allocated \$40 million for those investments. Customers would benefit from a greater understanding of the disparity between the budgets.

For several of its grid modernization investments, National Grid states that "[a]ll customers will benefit from this investment, including low-income customers and EJC's."⁵ However, the proposal does not explicitly state how National Grid's grid modernization efforts will prioritize benefits for people living in environmental justice communities. While National Grid makes minimal mention of environmental justice communities in its grid

⁵ Exhibit NG-GMP-2, p. 26, 29, and 32.

modernization plan, Eversource's 221-page plan never mentions environmental justice communities. The development of a modern grid requires a sharp eye focused on environmental justice. That the grid modernization plans barely mention environmental justice is deeply concerning.

Overview of AMI Plans

In Order 12-76-B, the DPU established four requirements for advanced metering functionality:

- The collection of customers' interval data, in near real-time, usable for settlement in the ISO-New England energy and ancillary services markets;
- Automated outage and restoration notification;
- Two-way communication between customers and the electric distribution company;
- and, with a customer's permission, communication with and control of appliances.

Now that the DPU has called for full-scale deployment of advanced metering infrastructure, customers in Massachusetts should increasingly benefit from each of these functionalities over the coming years. While the utilities' plans make progress in working to meet these objectives after years of delay, there are still several elements—such as outage notification and TVR—for which the utilities are delaying implementation to an unreasonable degree.

National Grid

Roughly 900,000 automatic meter reading (AMR) meters, or close to 64% of their overall total, are nearing their end of useful life within National Grid's service territory. In addition to the many benefits that AMI provides, the age of National Grid's meters further reinforces the need to act now to plan for their replacement. National Grid notes that between 75-80% of customers in the US have AMI; Massachusetts is already far behind much of the US. National Grid is proposing a 4.5-year AMI deployment schedule, including 1.5 years for back-office systems implementation and mesh communication network upgrades, and three years for meter deployment. National Grid will also implement a customer portal to enable data access. National Grid plans to begin deployment of AMI meters at the start of 2024 and complete at the end of 2026. On a 20-year NPV basis, National Grid's AMI plan provides \$728 million in benefits, with a 20-year NPV cost totaling \$480.67 million. This equates to roughly \$520 per meter in benefits and \$343 per meter in costs on a 20-year NPV basis. National Grid includes an estimation for the implementation of time-varying rates beginning in 2027, reaching 15% of customers on an opt-in basis, after completing deployment of the meters but does not provide specifics on rate designs or overall timeline.

Eversource

Like National Grid, a large percentage of Eversource's existing AMR meters will come to the end of their useful lives over the next few years. Eversource is proposing full AMI deployment to all 1.4 million residential and small commercial electric customers. Eversource's AMI investments include the AMI meters themselves, communications and Meter Data Management System (MDMS) deployment, analytics systems, and a customer portal. Eversource will spend two years between 2023-2024 implementing its MDMS and building out a mesh communications network before deploying meters between the start of 2025 (i.e. one year after National Grid) and the middle of 2027. On a 20-year NPV basis, Eversource's AMI costs total \$655.29 million and will provide \$667 million in benefits (both more expensive and less beneficial than National Grid's plan). This equates to

roughly \$476 per meter in benefits and \$468 per meter in costs on a 20-year NPV basis. Eversource's estimated rollout for time-varying rates is slower than National Grid's: Eversource would begin planning for TVR in 2027 and would start implementation in 2029, reaching a "steady state" of 10% of customers by 2033.⁶

Unitil

Unlike National Grid and Eversource, Unitil first implemented AMI in 2006; every electric customer in its service territory now has AMI. Unitil will replace existing TS2 AMI meters with newer PLX meters each year during 2022-2025 for a total of 29,107 meters. Unitil states that these new meters are capable of interval metering, which will allow it to assess real-time energy usage more accurately. Unitil will spend \$11.2 million on meter replacements, plus an additional \$2.34 million on upgrades to its customer engagement offerings, including its Customer Energy Management Solution. The utility does not provide details on its plan to expand its TVR offerings; Acadia Center will push to ensure that the utility develops a clear and timely plan for TVR implementation to make effective use of ratepayers' investment, as a large portion of the benefits of full AMI deployment come from TVR.

Assessment

The timeline for implementation of TVR for both National Grid and Eversource is unreasonably slow. Both utilities should accelerate the planned deployment of TVR. National Grid claims that "[e]xcept for TVR and outage detection, the Company proposes to develop and implement the near-term functionalities when meter installation begins."⁷ Acadia Center believes that the development and implementation of TVR and outage detection should be included alongside other AMI functions and that the DPU should prioritize a plan to facilitate their implementation. Unitil's lack of any information regarding TVR is concerning, and it should provide more detail on plans for TVR implementation.

National Grid provides extensive details in terms of customer data access; communications network integrations with the distribution network and using that network to offer additional services; and DER connection. Eversource provides less information on how AMI data will be integrated into its operations.

Unlike Eversource, National Grid also includes discussion of meter-as-a-service for municipal water metering, street lighting, smart city services, and gas demand response, as well as collaborative efforts to share its AMI network with peer utilities. It would be useful for customers to see how the utilities may have estimated revenues from these additional services. National Grid's communication network costs are significantly lower than Eversource's communication costs; without access to the full benefit-cost analysis, it is unclear whether Eversource has accounted for these other services as revenue streams to offset costs. It is also unclear how much of Eversource's existing communications network will be leveraged for AMI deployment, or why Eversource's communications expenses are so much higher than National Grid's. Based on testimony from the 2017 grid modernization proceedings, it may be that National Grid's existing communications structure and back office are more robust and better maintained, enabling a lower cost upgrade to enable AMI.

Both Eversource and National Grid include robust customer engagement plans for AMI. The utilities have generally the same elements in their customer engagement plans, including building awareness among customers of the phases of AMI meter deployment, education on the benefits of AMI, and providing access and

⁶ Exhibit NG-AMI-2, p. 25 and Exhibit ES-AMI-4 REVISED, p. 24

⁷ Exhibit NG-AMI-1, p. 21.

information on the customer portal to make full use of the AMI meters. Eversource claims that “[o]nce all AMI meters have been deployed, the Company will build awareness and educate customers on time-varying rates.”⁸ Acadia Center believes both utilities should conduct public education on the benefits of TVR well in advance of meter deployment and that education on TVR benefits should be part of earlier awareness-building.

None of the utilities provide much detail on benefits or impacts of the AMI plans on people living in environmental justice communities. Eversource makes no mention of environmental justice communities in their AMI plan. One of Eversource’s only comments about low-income customers is that with AMI deployment the utility “will have additional tools to encourage active participation in its energy efficiency programs, including those geared towards low-income customers.”⁹ However, both National Grid and Eversource do note that they will prioritize targeted outreach and education for low- and moderate-income groups and consumer advocacy groups before initiating broader customer outreach. In addition, National Grid notes that it will prioritize outreach to seniors, non-English speaking households, and medical hardship customers in its customer engagement process in preparation for AMI meter deployment. Such outreach should also include discussions to prepare these populations for time-varying rates, as they may have a harder time adjusting the timing of their load and may need additional support.

Business Case Analysis

Grid Modernization

National Grid conducted a detailed benefit-cost analysis of its grid modernization plan. All of the sensitivities that National Grid included in its analysis indicate that the benefits of its grid modernization plan far outweigh the costs. On a 20-year NPV basis, National Grid’s grid modernization plan provides \$1,268.59 million of benefits and costs \$681.06 million.¹⁰ National Grid’s base case benefit-cost ratio estimate is 1.86 for the full portfolio of GMP investments on a 20-year NPV basis. National Grid outlines four major categories of benefits: Avoided Capital Costs, Avoided O&M Costs, Customer Benefits, Societal Benefits. The vast majority of benefits come from reliability improvements and reduced outage restoration time. Depending on the sensitivity and assumptions used, National Grid’s five benefit-cost tests range from 1.60 to 2.19—indicating that in all cases benefits far outweigh the costs.

Instead of providing a quantitative assessment of grid modernization benefits in its plan like National Grid, and like the DPU requested, **Eversource** provided a qualitative grid modernization business case that does not attach specific dollar amounts to the benefits that grid modernization investments provide. Instead, Eversource rates each major investment category on a scale of 0-10 for “the degree to which each [program or initiative] is expected to achieve each of the ten benefit categories.”¹¹ The ten benefit categories include: Improve Hosting Capacity, Increase Net Benefits of DER, Reduce Demand and Energy, Increase Reliability, Improve Power Quality, Enable Dynamic Grid Operation, Improve Planning Analysis, Increase Operational Efficiency, Advance Other Objectives, and Support New Technology Learning. Each investment category is then given a “Benefit Score Per \$ Million,” with Probabilistic Power Flow Modeling providing the greatest benefit relative to its cost. Volt-VAR Optimization provides the largest greatest benefits overall. Eversource does provide quantitative analysis of the

⁸ Exhibit ES-AMI-2, p. 37.

⁹ Exhibit ES-AMI-2, p. 7.

¹⁰ Grid Modernization Plan, p. 136 and 139.

¹¹ Eversource Information Request: DPU 1-1, p. 1.

benefits for one of its investment categories: Volt-VAR Optimization. The 20-year net present value benefit-to-cost ratio of Eversource's VVO investments is 1.72. While National Grid provides a detailed quantitative assessment of the benefits of its grid-facing investments, Eversource claims that "[m]ost of these benefits do not produce outcomes that lend themselves to consistent quantification or monetization in a way that supports an 'apples-to-apples' analysis that compares benefits across all programs and can provide an accurate reflection of the magnitude of benefits for the associated costs."¹² Acadia Center believes that customers would be well served if Eversource provided more quantitative assessment of the benefits of each of its grid modernization investments.

Unitil provides a combination of qualitative and quantitative analysis of the benefits its grid-facing investments.¹³ Some of the quantitative benefits include \$100,000-\$200,000 in annual customer savings from its Supervisory Control and Data Acquisition (SCADA) system to support monitoring and control, and an estimated 2% reduction in energy demand from its VVO investments, contributing in part to approximately \$1.7 million in annual bill savings by 2025. Unitil also includes rough estimates of the customer savings from reduce outage times but notes the uncertainty in predicting exactly how many minutes of outage time may be avoided thanks to grid modernization investments.

Advanced Metering Infrastructure

While National Grid and Eversource both propose the same number of AMI meters deployed (1.4 million), the utilities' costs for meter investments, back-office upgrades, analytics, and customer engagement vary significantly.

National Grid's benefit-cost analysis demonstrates that full-scale AMI deployment will deliver 20-year NPV total benefits of approximately \$728 million, with 20-year NPV costs totaling \$480.67 million. The benefit-cost ratio is 1.51. The major categories of benefits are avoided O&M costs, avoided AMR costs, customer benefits, societal benefits, and revenue benefits. As National Grid acknowledges, there are several categories of AMI benefits that it did not quantify in its benefit-cost analysis, including the opportunity to use AMI communications systems to integrate other end-point devices (such as smart streetlights and smart remote methane detectors), as well as the role of AMI in enabling transportation electrification.¹⁴ National Grid notes that assuming a TVR participation rate of 85% under an opt-out offering would result in a BCA of 2.37—significantly higher than its base case BCA.¹⁵

Eversource's AMI plan costs \$655.29 million and will provide \$667 million in benefits, both on a 20-year NPV basis. Eversource's 20-year NPV benefit-cost ratio is 1.02, significantly lower than National Grid's base-case BCA. Eversource's AMI costs are significantly higher than National Grid's, and its benefits are considerably lower. Both utilities show the relationship of AMI costs and benefits over time.¹⁶ Surprisingly, Eversource's estimated benefits associated with AMI seem to flatten out beginning around 2034, which raises the question over why the benefits do not continue to grow, presumably as an increasing number of customers are able to enroll in time-varying

¹² Eversource Information Request: DPU 1-1 (August 18, 2021), p. 1.

¹³ 2022-2025 Grid Modernization Plan, p. 100-102.

¹⁴ Exhibit NG-AMI-1, p. 31.

¹⁵ D.P.U. 21-81 Exhibit NG-AMI-2, p. 41

¹⁶ Exhibit NG-AMI-2, p. 25 and Exhibit ES-AMI-4 REVISED, p. 7.

rates, better manage their energy usage, and contribute to a reduction in peak energy demand. National Grid's timeline of benefits includes a slight upward trend over time.

AMI Implementation Costs

	Eversource (\$million)		National Grid (\$million)		Unitil (\$million)
Cost Category	20-year NPV	Deployment phase nominal	20-year NPV	Deployment phase nominal	10-year costs
AMI electric meters	\$168.21	\$180.18	\$218.08	\$275.92	\$11.23
Communication network	\$46.40	\$49.70	\$16.94	\$14.51	
Headend and meter data management system	\$75.85	\$81.38	\$38.53	\$18.84	
Customer information system	\$146.95	\$157.41	\$8.40	\$8.66	
Customer enablement products & services	\$37.42	\$40.09	\$8.75	\$5.34	\$0.54
Analytics	\$38.57	\$41.31	\$45.98	\$28.27	
Operational system integrations & enhancements	\$33.91	\$36.33			
Cybersecurity	\$16.83	\$18.03	\$7.03	\$5.56	
Customer engagement and security	\$7.24	\$7.76	\$64.49	\$41.52	\$1.79
Project management	\$31.85	\$34.12	\$72.46	\$88.74	
Contact center & theft costs	\$52.06	\$55.76			
Total	\$655.29	\$702.07	\$480.67	\$487.36	\$13.56

On a 20-year NPV basis, National Grid's AMI plan equates to roughly \$520 per meter in benefits and \$343 per meter in costs, compared to \$476 per meter in benefits and \$468 per meter in costs for Eversource. Customers would benefit from more information on this variance.

The reasons behind the significant disparities between Eversource and National Grid's costs are not clear. Although Eversource appears to be anticipating significantly lower expenses for the same number of smart meters as National Grid, Eversource plans to spend much more than National Grid on communications, data management, information systems, customer enablement products & services, system integrations, and cyber security. Acadia Center will request to receive further information about where Eversource's additional communication costs coming from compared to National Grid's. Another question raised in comparing Eversource's and National Grid's AMI plans is why Eversource's head-end and MDMS investments are significantly more expensive than those of National Grid's when presumably both utilities must each buy new systems. Eversource includes contact center and theft costs, but National Grid does not, while National Grid's project management costs are more than double those of Eversource.

Both Eversource and National Grid assume an opt-in time-varying rate, rather than of opt-out rate, in their business case analysis. National Grid assumes an opt-in rate of 15%, while Eversource assumes 10% of customers will enroll in TVR. Acadia Center recommends the inclusion of an opt-out time-varying rate in each utility's

benefit-cost analysis to provide customers and regulators with a clearer sense of the potential customer savings that are possible compared to 10% or 15% enrollment in an opt-in time-varying rate. A 2016 study by the U.S. Department of Energy showed that a TVR opt-out enrollment program resulted in an average rate of 92% participation, while opt-in approaches resulted in an average participation rate of 15%.¹⁷ National Grid’s illustrative best-case scenario for TVR enrollment—which assumes 85% participation—still does not reach the national average for opt-out TVR offerings. Given that many of the benefits of AMI come from customers being able to use the data to inform how they use energy and at what times of the day, it is very likely that each utility’s proposed value of benefits would be considerably higher if a greater percentage of customers enrolled in TVR.

In addition, Eversource’s AMI business case analysis includes only a very small amount of benefits coming from customer enrollment in time-varying rates compared to the other benefit categories. Given the potential for TVR to produce customer benefits, it would be helpful for Eversource to provide more information on why its business case for TVR benefits seems limited.

Unitil does not provide a benefit-cost ratio for its AMI meter replacement plan but notes that benefits from AMI includes “lower energy bills,” “lower peak and critical peak energy usage,” “reduce[d] market rates for all customers,” the ability to “defer investments in equipment,” and “improvements in outage monitoring and circuit monitoring.”¹⁸

Data Access for Customers and Third-Party Vendors

Summary

All EDCs provide a detailed data governance and privacy plan within their AMI proposals but differ in terms of customer data access. National Grid is proposing to implement the national Green Button Connect data access standard as part of its AMI deployment, which should enable more effective data sharing with third parties. Eversource, on the other hand, does not discuss Green Button Connect, nor a planned protocol for data access. Unitil is exploring Green Button Connect. Among the utilities, National Grid has the most extensive plan to enable low-latency, pre-VEE (“validation, estimation, and editing”) data access for customers and third-party vendors. In addition to National Grid’s detailed plan for customer data access, the utility makes clear that it understands the benefits of customer data access and the role of third parties: “the Company will facilitate customer interaction with third-party vendors who can help supplement customer needs with new innovative products and services.”¹⁹ Eversource provides less information on how customers will access and share their data with third parties, other than to state that Eversource will ensure that third parties have sufficient data protection and cybersecurity controls in place. Eversource states that it will not release customer data to third parties whose security controls are deemed “unacceptable,” according to the utility.²⁰

Assessment

National Grid’s approach to customer data access seems much more consumer-oriented compared to Eversource’s. National Grid’s AMI plan emphasizes the benefits of enabling customers to give third parties access to their usage data, while Eversource appears to be less prepared for enabling customer data access. Unlike

¹⁷ See <https://www.osti.gov/servlets/purl/1424221>, p. vii

¹⁸ Unitil FGE Grid Modernization Plan, p. 89.

¹⁹ Exhibit NG-AMI-1, p. 34.

²⁰ Exhibit ES-AMI-2, p. 35.

National Grid's proposal, the main goals of Eversource's customer portal do not mention sharing data with third parties.²¹

All EDCs should fully recognize that smart meter data belongs to the customer and that customers should not be limited in terms of what they can do with it. Meter technology and data management protocols should not limit the choices that customers can make about how to use their data and whom to share it with.

While the EDCs mention a plan for 15-minute interval data using AMI, ISO-New England requires 5-minute interval data in order for demand response assets to participate in wholesale markets. The DPU and EDCs should clarify a plan to provide 5-minute interval data.

The DPU should consider the implementation of a centralized, state-wide energy data repository. A centralized repository would provide a single access point for energy management providers and would ensure technological consistency across Massachusetts, enabling customers to easily and securely share their energy usage information with providers. A centralized repository could help to reduce costs associated with accommodating utility-specific data types, data formats, and technical access requirements, and can enable greater adherence to standards (including Green Button Connect). Massachusetts can look to other states, including New Hampshire, for lessons on a centralized approach.²²

Performance metrics

Each utility includes a set of performance metrics to track progress in meeting their grid modernization objectives, some of which the DPU already approved in its previous grid modernization decision (see Appendix). In the current filings, National Grid and Eversource are proposing new statewide performance metrics and utility-specific performance metrics. The performance metrics are not tied to financial penalties or rewards. Acadia Center will pay close attention to the metrics in this proceeding, with particular interest in ensuring that the utilities are tracking how their grid modernization and AMI investments are benefiting consumers and the environment.

The two new statewide metrics are DERMS Demonstration and FERC Order No. 2222 Customer Participation. The DERMS Demonstration would "monitor the number and percentage of DER sites enrolled in each Company's DERMS system and the associated dispatched kilowatts."²³ The FERC order metric aims to provide the number of customers and total number of kilowatts for customers participating in ISO-New England wholesale market programs. See the Appendix for proposed utility-specific performance metrics.

National Grid does not include metrics to track AMI deployment in its plan but notes that it will work with the DPU to identify metrics and reporting requirements. Eversource also does not include AMI-related metrics but mentions several example metrics that it will finalize throughout the planning period.²⁴ In reviewing the AMI

²¹ Exhibit ES-AMI-1, p. 29.

²² See

https://www.greenbuttonalliance.org/index.php?option=com_dailyplanetblog&view=entry&year=2019&month=09&day=23&id=73:new-hampshire-moves-forward-on-statewide-energy-data-access-platform

²³ Exhibit ES-JAS-2, p. 146

²⁴ Examples include the number of routers deployed per day or week, geographical coverage percentages, the number of meters experiencing communications issues, meter read rates, meter loss of communications, bandwidth of network routers and collectors, and latency statistics. Exhibit ES-AMI-2, page 21 and 22.

plans, the DPU should require performance metrics that track success in meeting AMI deployment timelines, system performance improvements as a result of AMI, customer usage of online portals, customer AMI opt-out rates, the number of third-parties who successfully access customer data, and ensuring that customer savings from AMI actually materialize.

Bill H.3261/S2144 will advance grid modernization goals in Massachusetts

Acadia Center drafted legislation that would address many of the issues outlined in this document. [S.2144](#) and [H.3261](#), filed by Massachusetts State Senator Comerford and State Representative Blais, would help ensure a clean and modern grid that suits customers' needs while emphasizing a phase-out of fossil fuels and a rapid electrification of end uses. While the EDCs' grid modernization and AMI plans represent a significant step forward for the state, these bills will further accelerate the good work already underway.

H.3261/S.2144 will require each local distribution utility to file a Grid Modernization Plan every three years. The bills also require each distribution utility to file a Fossil Fuel Phase-out and Electrification Plan that describes how utilities will phase-out natural gas service to help the Commonwealth meet its net-zero GHG goals. Finally, the bills would establish a Grid Modernization Consumer Board, consisting of a diverse set of stakeholders, to evaluate and approve the Grid Modernization Plans and the Fossil Fuel Phase-out and Electrification Plans.

A statewide grid modernization would enable greater transparency into grid modernization efforts and ensure that utilities deliver offerings that are equitable across Massachusetts. It would also enable common evaluation of costs and benefits across utilities, which currently use different categorizations. Regular plan updates would ensure sustained progress in meeting grid modernization goals. And a Grid Modernization Consumer Board would allow for greater stakeholder input and transparency into the plans and would be well-positioned to push for improved environmental justice outcomes, maximized benefits for customers, a rapid phase-out of fossil fuels, and consumer protections. H.3261/S.2144 offers Massachusetts the opportunity to accelerate the speed at which it can update the energy system to help meet its climate and energy requirements.

Conclusion

National Grid, Eversource, and Unitil each propose grid modernization and AMI plans that to varying degrees meet the DPU's grid modernization objectives. However, the plans fall short or require additional information in several key areas. Acadia Center applauds the DPU for requiring detailed grid modernization plans and full-scale deployment of AMI and looks forward to working alongside the utilities and other stakeholders as the plans are further developed.

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Appendix

Grid Modernization Performance Metrics

Previously approved statewide metrics	Proposed National Grid metrics	Proposed Eversource metrics	Proposed Until metrics
Volt Var Optimization and Conservation Voltage Reduction	DERMS Software	Distributed Energy Resource Management System ("DERMS") Demonstration	DERMS Implementation
Volt Var Optimization Energy Savings	FERC Order No. 2222 Customer Participation Metric	FERC Order No. 2222 Customer Participation Metric	FERC Order 2222 Proposed Metric
VVO Peak Load Impact	Increase in Feeders with Advanced Short-Term Load Forecasting Capabilities	Load Forecasting – Milestone Completion	AMI Meter Replacement Metric
VVO – Distribution Losses Without AMF	DERMS Investigation	Power Quality Monitoring	Customer Engagement
VVO Power Factor			Data Sharing Platform
VVO Estimated VVO/CVR Energy And GHG Impact			DER Mitigation
Increase In Substations With Distribution Management System Power Flow And Control Capabilities			
Control Functions Implemented By Circuit (VVO, Auto Reconfiguration)			
Numbers Of Customers That Benefit From GMP Funded Distribution Automation Devices			
Reliability-Focused Grid Modernization Investments' Effect On Outage Durations			
Reliability-Focused Grid Modernization Investments' Effect On Outage Frequency			

VVO Related Voltage Complaints			
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