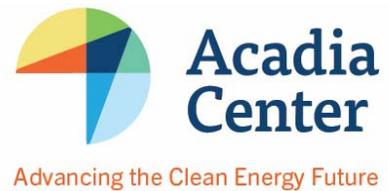


# Massachusetts Grid Modernization

## Summary of Utility Proposals

December 17, 2015



## The Need for Modernization

The energy system in Massachusetts is undergoing an unprecedented transition as disruptive, consumer-centric technologies upend the historic model of simply supplying energy to passive consumers. Utilities face expectations to accommodate and promote distributed solar, efficiency, smart energy management, and energy storage, even as these technologies challenge utilities' revenue structures. Active consumers able to reduce overall consumption and peak demand will require less energy and a smaller energy system, implying a contraction in utilities' rate base, lower sales, and a fundamental shift in the utility business model.

In June 2014, the Massachusetts Department of Public Utilities issued D.P.U. Order 12-76-B regarding the *Modernization of the Electric Grid*. This Order requires each electric utility in Massachusetts to submit a 10-year grid modernization plan (GMP) outlining how the utility proposes to make progress towards four grid modernization objectives established by the DPU: (1) reducing the effects of outages; (2) optimizing demand, which includes reducing system and customer costs; (3) integrating distributed resources; and (4) improving workforce and asset management. The Order clarified key elements of the GMPs and how the plans would be evaluated by the Department. The GMPs must include:

- Timing and priorities for all grid modernization planning and investment over a 10-year period;
- Marketing, education, and outreach plans;
- Research, development, and deployment plans;
- Proposed infrastructure and performance metrics to measure progress in achieving objectives;
- A 5-year Short Term Investment Plan (STIP) for capital investments and an approach to achieving advanced metering functionality within 5 years; and
- Comprehensive business case analysis to support capital investments in the STIP.

The Massachusetts utilities filed their 10-year GMPs with the DPU in August 2015. This memo summarizes the utilities' GMPs and provides Acadia Center's assessment of whether the plans will achieve the DPU's objectives of optimizing demand and integrated distributed resources. Additional details on the substance of the GMPs, and comparison to New York's Reforming the Energy Vision are provided in companion analyses.<sup>1</sup>

## Summary Description of the Grid Modernization Plans

The Massachusetts investor-owned utilities propose radically different approaches to grid modernization. The lack of consistent investment approaches across utilities means that geography will determine what technology consumers have to manage energy use, and progress towards grid modernization will be difficult to track and compare across utility service territories. Despite inconsistent frameworks and investment scenarios across utilities, a number of trends emerge in proposed grid modernization plans.

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<sup>1</sup> Both available at: <http://acadiacenter.org/document/grid-modernization/>

**National Grid** proposes a plan that would enhance customer control through advanced metering infrastructure (AMI), time-varying-rates (TVR), and related grid investments. AMI provides real-time information on energy consumption and prices, and gives customers the opportunity to reduce their electric bills through smart energy management. TVR builds on AMI<sup>2</sup> to provide incentives for customers to use energy in low demand periods, thus reducing peak demand and allowing for down-sizing of the grid.

National Grid's proposes four pathways with different levels of investments in AMI and grid upgrades. Of these, the most customer-focused option with full AMI deployment provides the greatest total and net benefits. National Grid also proposes complementary investments in research, development, and deployment, including a suite of pilot programs designed to facilitate incorporation of new technologies such as energy storage and to prepare the grid for increasing uptake of distributed energy technologies.

National Grid pairs a progressive approach to consumer energy engagement with a rate design proposal that will make it harder for customers to manage their electric bills, and will set back Massachusetts' progress on energy efficiency and renewable energy. The proposal increases fees for certain types of solar projects and reduces compensation for energy sent back into the grid under the current net-metering policy. National Grid's rate design proposal seeks to establish tiered fixed customer charges and reduce the portion of costs recovered through volumetric rates. The combination of higher fixed charges and lower volumetric rates reduces the portion of an electric bill over which a customer has control, undermining the financial incentive for energy efficiency, conservation, or distributed generation.<sup>3</sup> National Grid has proposed to implement this tiered fixed charge proposal in its recently-initiated rate case.<sup>4</sup>

**Eversource** proposes an array of investments to improve awareness of existing grid conditions and incorporate distributed energy resources (DER). Notwithstanding an explicit requirement in the Department's order to achieve full AMI functionality in 5 years, the company declines to provide AMI for more than an estimated 5% of customers who would 'opt in' to participation. No new pilots are offered beyond one energy storage project proposed to facilitate renewable energy integration. Eversource proposes time varying rates (TVR) for the small set of opt-in customers and argues for broader rate reforms.

**Unitil** proposes a fairly modest investment approach due in part to prior installation of some advanced metering capabilities. However, Unitil's first generation advanced meters lack the capacity to monitor consumption over short (e.g. 15 minute) increments, precluding TVR and other approaches to reducing peak demand and optimizing customer and system load. Unitil only proposes opt-in TVR rates for generation service and no other rate reforms.

## Acadia Center's Overall Assessment

While the Massachusetts proceeding should drive progress on some elements of grid modernization, it is less ambitious than holistic reforms pursued in other jurisdictions. For example, New York's *Reforming the Energy Vision* approach "aims to reorient both the electric industry and the ratemaking paradigm toward a consumer-

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<sup>2</sup> AMI enables the most comprehensive options for new rate designs. Some advanced meters are less functional and cannot support more granular prices and data.

<sup>3</sup> National Grid's proposal for tiered fixed customer charges is under consideration by the Rhode Island Public Utilities Commission and Massachusetts Department of Public Utilities.

<sup>4</sup> Massachusetts Department of Public Utilities Docket 15-155.

centered approach that harnesses technology and markets.”<sup>5</sup> Notably, the Massachusetts proceeding fails to tie utility earnings to grid modernization outcomes – as proposed in REV – and as such is unlikely to shift utilities’ current financial incentive from building infrastructure<sup>6</sup> to meeting system needs at lowest cost.

## Optimizing Demand

The Massachusetts utilities’ GMPs are unlikely to significantly advance the Department’s goal of optimizing demand, including reducing system and customer costs.

National Grid presents the most ambitious investment proposal for advanced metering and TVR, offering different levels of customer-focused investments across four potential scenarios. In the most comprehensive scenario, National Grid proposes a full rollout of AMI to all customers and default TVR for energy supply with critical peak pricing, and an option to elect a flat rate with peak time rebates. If fully implemented, these price signals should incentivize customers to shift consumption to off-peak periods, participate in demand response or other load management programs, and invest in distributed generation that produces power during more valuable time periods. National Grid also proposes a rollout of grid-facing investments in distribution automation and volt-VAR technology that can increase system efficiency. However, the design of National Grid’s tiered fixed charge proposal is flawed and would not contribute to reducing customer or system costs.

Eversource’s plan misses a number of elements to optimize demand. The plan includes two opt-in TVR designs with enabling metering and discusses several options for managing customer load, but no concrete proposal is evident. Opt-in TVR is unlikely to drive meaningful changes in customer behavior or reductions in peak demand.

Unitil already has advanced metering that has some, but not all, of the functionality required by the Department. With limited metering functionality, Unitil only proposes to offer opt-in full advanced metering functionality and TVR starting in 2020. Unitil does describe a web portal to enable customers to better understand and manage load along with a pilot on “gamification” - a set of techniques to encourage customer load management.

## Integrating Distributed Resources

The grid-facing investments proposed by Eversource and Unitil will likely help facilitate the integration of distributed generation on the grid. On the other hand, National Grid’s rate design proposal will significantly deter distributed generation.

In its five-year investment proposal, Eversource includes a reasonably comprehensive set of smart grid investments, including advanced distribution monitoring, automation, and management systems, along with significant investments in distributed generation integration, such as tracking and planning for DG and two-way power flow. Eversource also includes a proposal to undertake one significant storage project in New Bedford for the purpose of voltage smoothing to accommodate high solar PV penetration.

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<sup>5</sup> Case 14-M-0101 New York Public Service Commission Order Adopting Regulatory Policy Framework and Implementation Plan, Feb. 26, 2015.

<sup>6</sup> Massachusetts utilities, for example, earn guaranteed returns of 10.6% on transmission expenditures (<http://www.ferc.gov/media/news-releases/2014/2014-2/06-19-14-E-7.asp#.Vd-2lflVikq>) versus a potential 5% shareholder incentive (<http://database.aceee.org/state/massachusetts>) for helping customers save energy and reducing the need for additional energy infrastructure.

Unitil proposes a range of investments to enable distributed generation, including annual studies to determine circuit-by-circuit capacity to incorporate distributed energy resources.

National Grid's proposal does include some grid-facing investments that would help integrate distributed resources, but declines to adopt DER-specific measures to improve application processing, system analysis and planning, online tools for customers, and targeted system upgrades until there is a new method to pay for these investments. National Grid also proposes changes to distribution rates that would discourage distributed generation in several ways, including new fees on stand-alone solar projects and other types of distributed generation, and reducing the per kilowatt-hour charge, resulting in lower net metering credit values and lower compensation to customers feeding power back into the grid.

## Conclusion and Recommendations

Overall, each plan appears inadequate to address the fundamental challenges and opportunities facing Massachusetts utilities in the transition to a clean, distributed, customer-centric energy system. National Grid outlines the most ambitious investment plan, with cost-effective deployment of AMI to enhance consumer energy options and optimize the operation of the system. National Grid's rate design proposal, however, would undermine consumer incentives to pursue clean energy, and would fail to adequately prepare for integration of distributed energy resources and the transition from a one-way power delivery model to a multi-directional, networked system. Eversource focuses on upgrading grid-side infrastructure rather than focusing on consumers and lacks a strategic plan for adapting to shifts in the energy system and using distributed technologies to deliver lower, more stable energy costs. Unitil also presents a modest proposal, predicated in part on prior installation of metering infrastructure with limited functionality. Without improvements in grid modernization plans, Massachusetts utilities will struggle to adapt to accelerating trends toward an increasingly networked, electrified, and low-carbon energy system.<sup>7</sup>

Without improved business models, the utilities will not have the incentive to propose meaningful grid modernization plans. The Massachusetts DPU should consider how the regulatory model should evolve to provide utilities with the appropriate financial incentives to encourage full and timely implementation of the DPU's grid modernization objectives. Instead of earning revenue primarily for building more infrastructure, utilities should also be rewarded for achieving energy efficiency and clean energy goals, minimizing the cost of the grid, and providing choices, opportunities, and control to consumers.

A consumer advisory stakeholder council could help address the shortcomings of the current approach by developing broadly supported outcomes and implementation approaches; mirroring the successful model utilized to support Massachusetts' nation-leading utility energy efficiency programs. An advisory council could address the imbalance in resources and information that make it difficult for outside entities to engage in adjudicatory proceedings and influence utility investments. An advisory council would also achieve greater buy-

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<sup>7</sup> Acadia Center describes a pathway to a clean, modern, affordable energy future in its EnergyVision (<http://acadiacenter.org/document/energyvision/>) and UtilityVision (<http://acadiacenter.org/document/utilityvision/>) publications.

in from affected parties, assist regulators by providing recommendations on complex issues, and build a foundation of common knowledge to promote greater public acceptance of grid modernization.<sup>8</sup>

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<sup>8</sup> For additional information on the roles and responsibilities of a grid modernization consumer advisory stakeholder council see UtilityVision, p. 5 (<http://acadiacenter.org/document/utilityvision/>), and Acadia Center (then ENE) filing in DPU's grid modernization proceeding (Docket 12-76, at: <http://web1.env.state.ma.us/DPU/FileRoomAPI/api/Attachments/Get/?path=12-76%2f12-76-Comments-7970.pdf>)