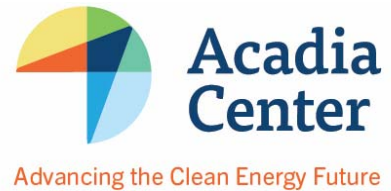


2016 Energy Analysis Series

Part II:

Technology Upends the Utility Business Model

March 2016



In the sharing economy, new consumer technologies and business models are upending industries from transportation to accommodation, opening up markets previously dominated by established players. Similar forces are sweeping over the energy sector. A homeowner who feeds surplus electricity into the grid competes with electricity generated by large power plants. Even without solar panels, a customer can provide value to the grid by dialing back on air conditioning on a hot summer day, reducing the need for additional power plant generation and all of the expensive utility infrastructure – poles, wires, substations, and related equipment – built to meet peak electrical demand.

New approaches to energy management and declining costs for solar and other consumer energy technologies have the capacity to revolutionize the energy sector, but the rules will have to change to accommodate innovation. As it stands now, utilities are compensated based on the amount of infrastructure they build and maintain. Utilities thus have no financial incentive to facilitate the adoption of technologies that reduce the need for infrastructure. In an additional wrinkle, energy services provided by consumers are often more valuable than their traditional equivalents: solar power provided close to where it is consumed avoids not only the cost of energy from a power plant, but can also avoid costs for expensive grid infrastructure required to transport energy from a power plant to the consumer.

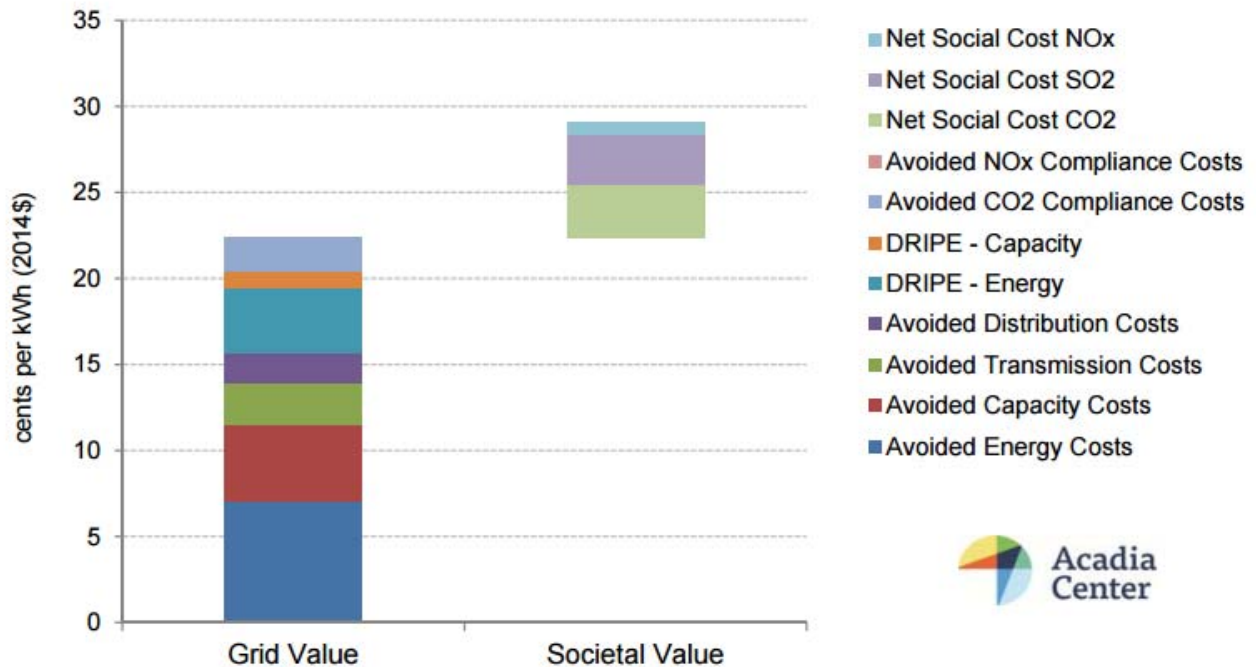
Part II of this series describes how new technologies and approaches to energy management are transforming the utility sector, with particular attention to solar energy and efforts to modernize how we manage and pay for the grid. This focus builds on Part I of the series, [“The case against gas pipelines”](#), which describes the need to reduce climate pollution while minimizing expenditures on large-scale infrastructure like natural gas pipelines that run counter to both climate goals and trends that are decentralizing the grid.

Solar

Distributed solar is the most visible force driving democratization and competition in the energy sector. Costs for solar have declined so significantly that generating one’s own power is already – or will soon be – competitive with buying power from the grid [in many parts](#) of the United States. Some developing countries are leapfrogging traditional grids and going [straight to solar](#), mirroring the rapid adoption of cellular communications that avoided the need for expensive land lines.

Where grids already exist, solar provides value by offsetting costs that ratepayers and society as a whole would otherwise pay. Acadia Center calculated [the value](#) that a unit of distributed solar power provides to the grid and to society – including energy, capacity (the value of having generation sources available when needed), price reduction impacts, and avoided emissions.

Value of Solar Generation in Massachusetts



When accounting for these diverse values, a unit of energy from rooftop solar is worth more than a unit of energy from a conventional, fossil fuel-powered generator. Some take issue with counting benefits beyond energy alone, but in a modern energy system where needs can be met with a wide array of resources, the unique attributes of each resource must be considered.

Accounting for the value of energy produced in different locations requires a new way of managing and paying for the power grid. Gone is the simplifying assumption that additional energy infrastructure is the only way to meet energy needs. In its place policymakers must structure energy markets and incentives to meet customers' needs in the most cost-effective, non-discriminatory manner possible. A rooftop solar panel on its own will not replace the need for an entire power plant or utility substation, but even a small portion of the tens of thousands of roofs in Massachusetts could go a long way to meeting our energy needs, while at the same time generating income streams for new market participants and fostering competition.

Massachusetts is currently grappling with the disruptive challenge of solar: seeking to align incentives with declining solar costs while preserving a sustainable solar market. The heart of the debate focuses on a policy called net metering. Net metering is a simple way to compensate customers by spinning the electricity meter backwards for power fed into the grid and netting out consumption against generation each month. Each unit of electricity fed into the grid is credited at the full retail rate – the charge for energy produced by power plants, and the distribution, transmission, and other costs to deliver power to a customer. When considering modifications to net metering, a cautionary example is provided by Nevada, which recently [took the draconian step](#) of reducing net metering credits for solar power to the price of energy alone. As a result, [solar development and jobs are evaporating](#) and homeowners and [Presidential candidates](#) are objecting to a policy that undercuts investments made in good faith. Similar concerns were raised in [a recent letter](#) supported by almost two thirds of Massachusetts House members, objecting to significant changes to net metering rates until an official, publicly scrutinized analysis of costs and benefits is conducted.

The way forward is to develop an approach that would reduce costs and promote solar development where it is most needed by adjusting net metering credits based on the value of different types of solar projects. In order to support diverse project types and create a stable solar market, compensation must be adjusted through modifications to net metering credits rather than through add-on incentives. Under such an approach, large, stand-alone projects that feed all of their power into the grid would receive credit for value to ratepayers including: 1) producing clean energy, 2) avoiding costs associated with high voltage transmission lines needed to move power to or around Massachusetts, and 3) reducing energy prices across the region. Rooftop projects meeting on-site demand would be credited for the values above, and for avoiding costs that would otherwise result from overbuilding the distribution system to meet peak demand. Solar projects would also pay their fair share for system upgrades needed to accommodate power fed back into the grid.

Scaling compensation by different project types is at the heart of Acadia Center's [Next Generation Solar Framework](#). Under this approach solar producers would be credited for avoiding costs that customers otherwise would have to pay for grid-supplied energy, while covering fair costs for solar integration. This approach would address concerns about cost-shifts between customers with and without solar. It would also provide a strong economic framework for continuing 'virtual net metering,' a policy that treats certain offsite solar developments as if they were on a customer's roof. Virtual net metering is crucial for providing equitable access to shared projects for consumers who cannot install solar themselves, and for enabling projects that benefit low-income ratepayers. Any additional payments from incentive programs (such as the Solar Renewable Energy Certificate, or SREC, program) should be structured to be cost-effective and minimize ratepayer costs.

Utility Pushback

The current regulatory structure is ill-suited for an increasingly democratized energy system, where independent producers and customers are competing with incumbents rewarded for building energy infrastructure. Under the current system utilities can receive 10% or more return on equity for transmission and distribution system investments, and little or nothing for integrating consumer resources such as solar. With these skewed incentives, it is not surprising that utilities across the country are pushing policies that would undermine competition from distributed resources.

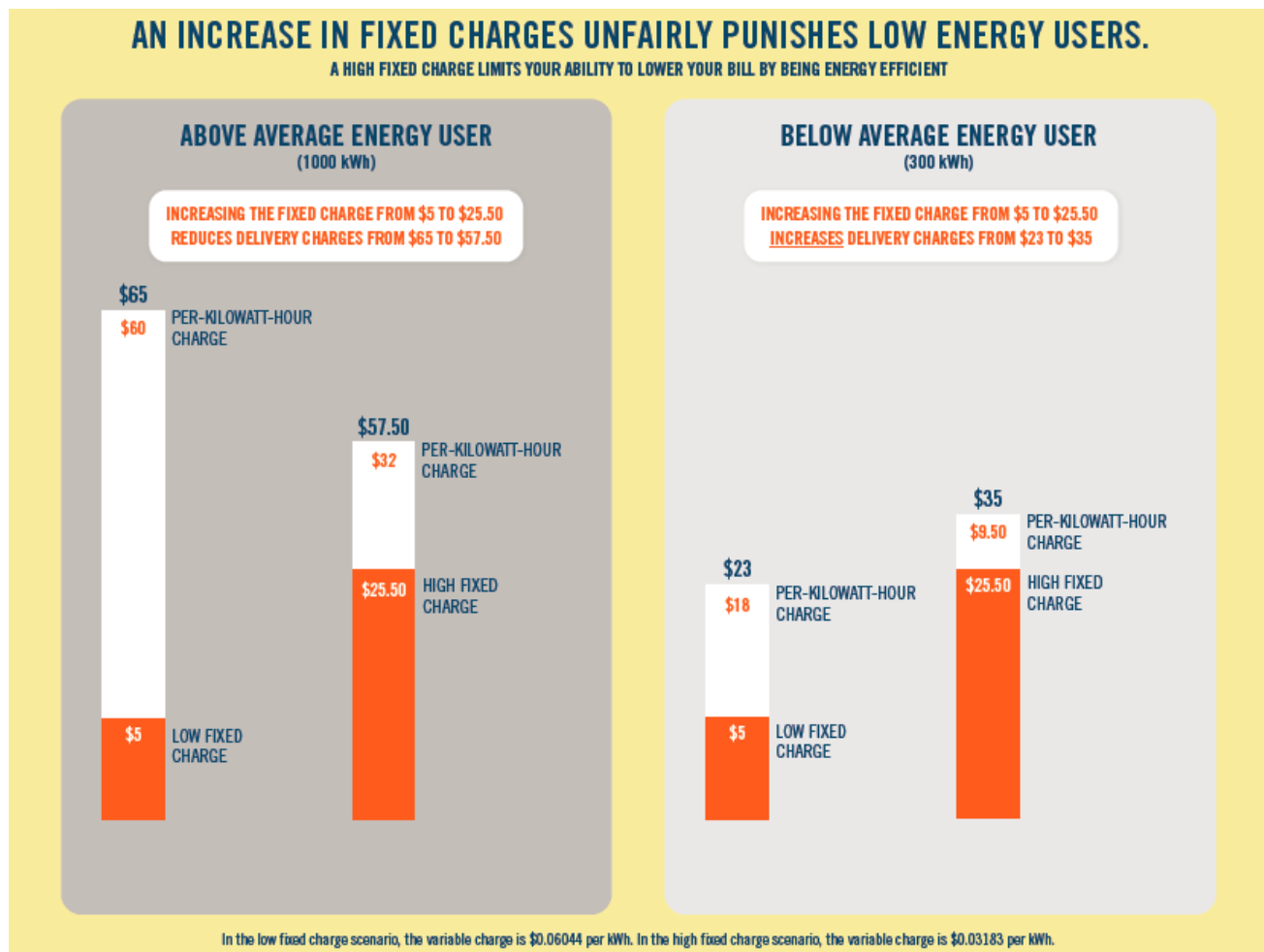
Cutting Compensation

When solar panels were sparse the simple practice of net metering at the full retail rate appealed to utilities and regulators for administrative simplicity and general approximation of value: a unit of energy produced on-site avoids the cost of supplying that unit at the retail rate. However, with costs of solar plummeting and installations no longer sparse, utilities now see solar akin to how taxi companies see Uber: as competition for market share and a threat to the bottom line. Each rooftop solar system reduces utilities' sales, meaning they have to spread costs over fewer units, and each unit becomes more expensive. As electricity becomes more expensive, customers have greater incentive to install solar or improve efficiency, creating a vicious cycle that erodes utilities' customer base.

In response to the threat of solar, utilities across the country – and in Massachusetts – are [proposing to significantly cut compensation from the retail rate](#). Utilities and large business groups have argued that with solar costs coming down, incentives should decline as well. Cutting the incentives (SRECs) layered on top of net-metering is appropriate as the Massachusetts solar market matures, and the costs of these incentives have been declining. However, cutting the net metering credits for all solar projects to the bone would likely crater the Massachusetts solar market, as it has in Nevada. As solar development dries up, customers will revert to spending more on utility infrastructure – and utility profits will increase.

The Inappropriate ‘Fix’ of Raising Fixed Charges

Increasing fixed customer charges (the portion of customers’ bills that remains unchanged from month to month) provides utilities with another means to fight off competition from solar. Higher fixed charges have two main impacts: 1) they reduce the per-unit cost of power, thereby cutting compensation for solar net-metering, and; 2) they reduce customer control over energy bills, undermining the incentive to reduce consumption. Higher fixed charges are also regressive, increasing bills for below-average energy users, as shown in Acadia Center’s [UitlityVision](#).



This regressive impact has led to widespread opposition to increasing fixed charges. In Connecticut, opposition to increased fixed charges [united AARP, Walmart, the Governor, and Sen. Blumenthal](#), who called for a federal review of “unconscionable” proposals. The issue is now coming to Massachusetts, as National Grid has proposed to [establish new, tiered fixed charges](#). The utility recently withdrew a similar proposal in Rhode Island, where it faced widespread opposition, but in Massachusetts National Grid has yet to pull back from its proposal.

Accommodating Disruption

Just like ride-sharing and room-renting, rooftop solar and other distributed energy resources are not going away. Solar panels will continue to get cheaper and more efficient, and home energy management systems will enable greater consumer control over usage and costs. The implications are wider than rooftop solar, requiring fundamental redesign of a historically centralized, one-way energy system. Active consumers able to reduce

overall consumption and peak demand will require less energy and a smaller energy system, contracting utilities' rate base, reducing sales, and fundamentally shifting the utility business model.

In response to these challenges, Massachusetts' Department of Public Utilities (DPU) three years ago initiated an effort requiring utilities to use new technologies to avoid outages, reduce peak demand, integrate distributed resources, and improve utilization of existing capacity.

While admirable in its objectives, this 'grid modernization' proceeding has not to date addressed the fundamental challenges and opportunities facing Massachusetts' utilities. Plans filed last August (and now under review by the DPU) differ widely in scope and ambition. All National Grid customers could receive advanced energy meters, enabling better management of customer and system-wide energy demand, while Eversource would provide advanced meters to only the estimated 5% who file necessary paperwork. In a worrying departure from DPU's order for plans focusing on "optimizing demand, which includes reducing system and customer costs," utilities do not even attempt to account for savings on transmission and distribution expenditures enabled by new technology. (See here for Acadia Center's [summary of the grid modernization plans](#)). Without realigned financial incentives, Massachusetts will not succeed in compelling utilities to adapt business models, embrace new technologies, and truly modernize the grid. So long as installing transformers is more lucrative than helping customers manage energy usage, the grid will remain over-built, outdated, and inefficient.

There are other models. As part of ambitious reforms underway in New York, utilities incentives will be tied to modernizing the grid and managing resource-agnostic energy markets that would appropriately value centralized power plants, rooftop solar panels, consumer demand savings, and even power from electric vehicles. (Acadia Center's comparison of the NY and MA processes is available [here](#)). New York's success is not guaranteed, but the state's willingness to tackle new realities head-on has improved ratings for its utilities, which are considered lower risk for being [ahead of the market and regulatory curve](#).

Adapting to disruptive technologies requires policymakers to find a balance that reaps the benefits of innovation while protecting consumers. Proposals to require background checks and insurance for Uber drivers rather than shutting the service down attempt to find that balance. In the case of solar, scaling back on incentives (SRECs), while better valuing the unique benefits of distributed, clean energy and maintaining equitable access would chart a similar path. More broadly, re-aligning utility incentives to facilitate adoption of emerging technologies and truly modernize the grid would deliver economic and environmental benefits, while empowering the consumer.

Peter Shattuck is Massachusetts Director, Mark LeBel is Staff Attorney, and Abigail Anthony is Grid Modernization Director at Acadia Center, a non-profit, research and advocacy organization committed to advancing the clean energy future. Copyrighted material used with the permission of Acadia Center. Installments in this analysis series are also available at: <http://acadiacenter.org/document/2016-energy-analysis-series/>