Before the New Hampshire Public Utilities Commission
Docket No. DE 16-576

EXHIBIT
#58
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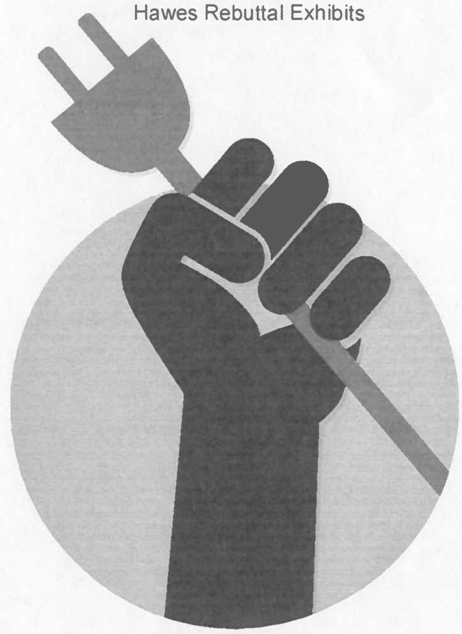
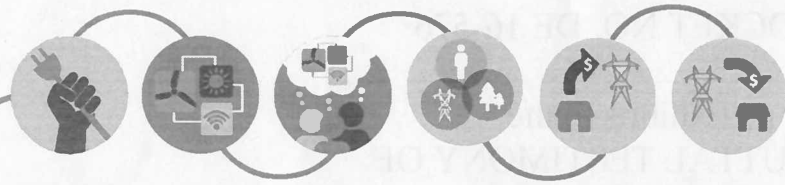
Exhibits to the
REBUTTAL TESTIMONY OF
ELLEN HAWES
On behalf of Acadia Center

Acadia Center

UtilityVision



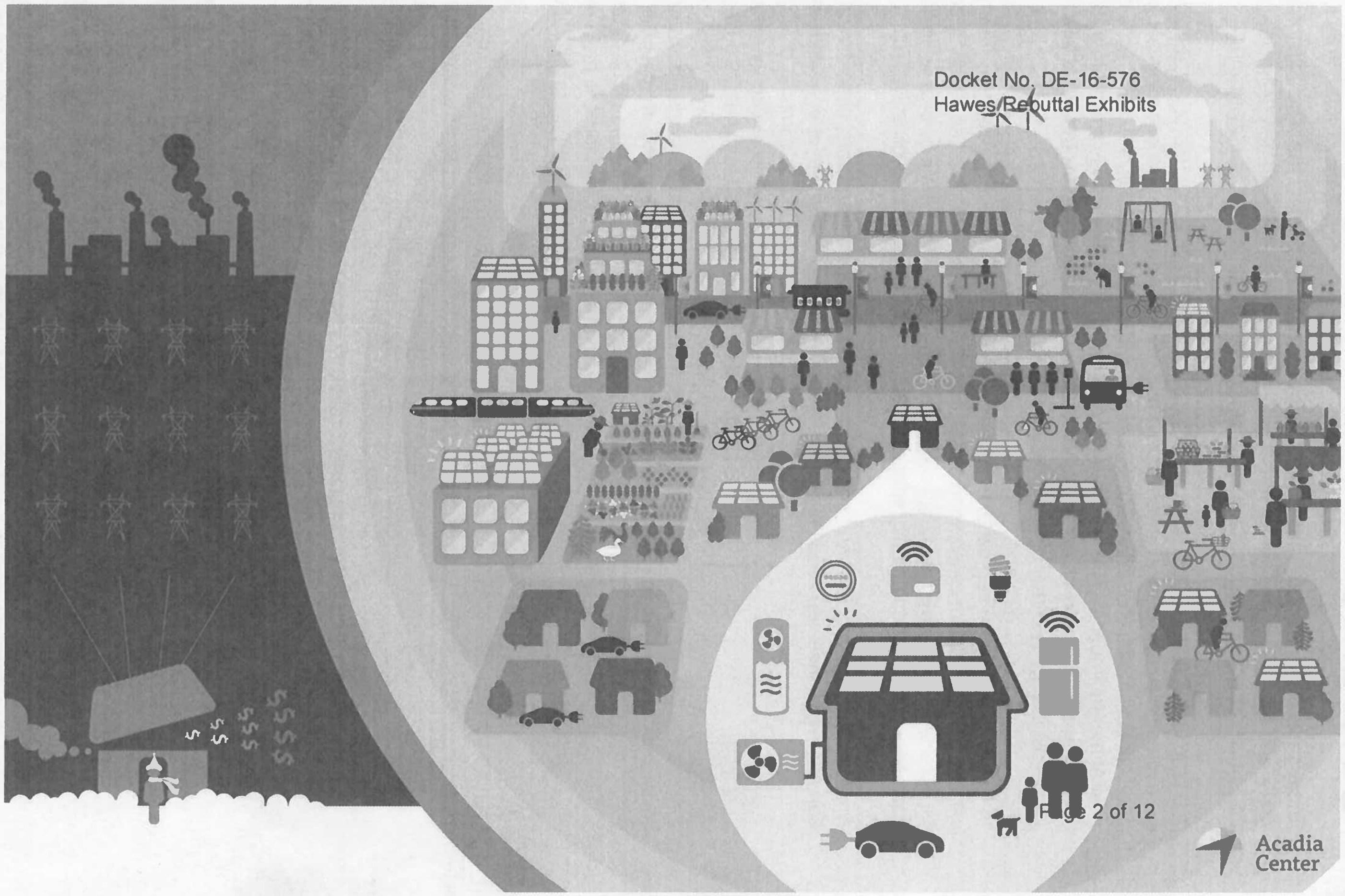


UtilityVision is a collection of resources for decision-makers and stakeholders, designed to outline the specific steps we can take to create an energy system that meets our energy needs and supports a fair, healthy economy and environment.

Acadia Center's EnergyVision (2014) presents an overarching framework to guide investment choices and reforms needed in our energy system. EnergyVision sets forth important steps on four parallel tracks to create an energy system that is safer, cleaner and more affordable, and offers the promise of deep reductions in greenhouse gas emissions: (i) utilize market-ready technologies to electrify buildings and transportation (ii) modernize the way we plan, manage, and invest in the power grid to facilitate consumer control and new technologies; (iii) make continued progress toward a clean electric supply; and (iv) maximize investments in energy efficiency to reduce unneeded energy demand that waste consumer dollars and act as a drag on the economy.

UtilityVision confronts a core part of this climate and energy future: how to construct a fully integrated, flexible, and low carbon energy and grid network. UtilityVision is a framework for how reforms in five interdependent categories can be aligned to put the consumer—our homes and business—at the center of a modern energy system and move us on the path to attain our climate, economic, and consumer goals. The interests of consumers and a sustainable energy system have merged more than ever before. UtilityVision offers a comprehensive pathway to a smart and dynamic electric system focused on giving consumers and communities greater freedom and control over their energy costs, managed with the cooperation of utilities, governed by updated regulations that honor energy technology change, supported by flourishing but well-regulated markets and providing a fair and safe system to protect consumers.

www.acadiacenter.org/document/utilityvision/


Acadia
Center

Empowering the Modern Energy Consumer

Today's electric grid is built around technologies that date back to the time of Thomas Edison. The grid—and the policies that govern it— are increasingly out-of-step with new technological advances and consumer expectations for a clean, affordable, resilient, and reliable energy system.

It is time for a cultural shift in how we think about the energy system. No longer should energy dollars be poured only into massive power stations and miles of wire. The energy system should empower people and connect communities in ways that maximize participation and minimize our energy burden and harmful environmental impacts. The old way of constructing the power grid is limited to traditional engineering approaches and is short on authentic consumer engagement that has the potential to deliver a cleaner, lower cost energy system and stronger communities.

In the new UtilityVision approach, more than poles and wires connect neighbors. The new energy system will bring energy efficiency into more homes, businesses and communities, creating local jobs that can't be outsourced and lowering energy bills. New energy technologies will be allowed to flourish so neighbors can connect through community solar arrays or district heating and cooling systems.

An advanced energy future isn't only about Teslas and Nest thermostats, either. Local energy projects can affordably meet the needs of municipalities, freeing up resources for education, public safety, and other critical services. We can reduce the impact of infrastructure in our neighborhoods by deploying customer-side energy resources like demand response and roof-top solar. Electric cars and city buses will reduce noise and diesel pollution in our streets, and the twenty-first century electric grid will embrace electric transportation in a manner that boosts system reliability, minimizes costs, and protects consumers. Renters will have the power to make energy choices for their homes and compare energy costs before they sign a lease. Communities can set and enforce a reasonable standard of efficiency to protect tenants from bearing the cost of overly expensive energy systems.

The modern energy system should benefit and empower all of us to control our energy use and costs, enable consumer-friendly, clean energy technologies to flourish, establish fair and non-burdensome rates, and ensure that consumers—especially the most vulnerable—are treated fairly in the new energy system. While UtilityVision describes a major shift in consumers' role in the energy system, the changes should be implemented strategically so that consumers have the information and understanding to make beneficial decisions.

UtilityVision's updated approach to energy regulation is based on overarching principles:

- *Coordinated planning for the future*: Grid planning will be comprehensive and proactive, merging traditional engineering and infrastructure solutions with customer-side, clean energy technologies.

- *Consumer protection and fair pricing for all*: The modern energy system will empower all consumers by allowing customer-side resources to flourish, establishing fair and non-burdensome rates and revenue structures, and providing a full safety net of necessary protections.

- *Updated roles for regulators, utilities and stakeholders*: Regulators will have a stronger role in strategic grid planning, aligning utility incentives with consumer and environmental goals, and ensuring that the consumer is at the center of the modern grid.

Strategic Planning for a Consumer-Focused Power Grid

Challenge:

Traditionally, utilities and regional grid planners focused on maintaining the power grid for one-way power flow from fossil-fuel power stations over miles of power lines to homes and businesses. Utilities used infrastructure and engineering tools like new circuits, new substations, new power lines, or larger conductors to support growing energy demand and maintain reliable service. Increasingly, cleaner and more cost-effective customer-side tools like energy efficiency, load control, distributed generation, and demand response can be used instead of—or in combination with—traditional infrastructure projects. But the old way of planning and paying for the grid effectively locks out consideration of these newer consumer- and environmentally-friendly solutions.

Recommendations:

Local Distribution Grid

- **New utility planning for a consumer-focused distribution grid:** Long-range grid planning must be comprehensive, merging the traditional world of "poles and wires" with new technologies and modern strategies. Comprehensive, multi-year Strategic Grid Plans should be required, and must:
  - Start with proactive planning to streamline consumer adoption of new energy technologies. Utilities should forecast adoption of customer-side energy resources and proactively plan more efficient and cost-effective upgrades at the local circuit level.
  - Compare a wide array of "grid-side tools" and "customer-side tools" to optimize the grid. The range of solutions considered should be broad and comprehensive: ranging from traditional "poles and wires" to new grid technologies like voltage management to customer energy efficiency, storage, and distributed generation.
  - Evaluate a range of options and scenarios on the basis of standard and level criteria, such as cost, benefits, risks, and public policy goals.
  - Pursue technological synergies.
  - Position the utility well for addressing emerging challenges, embracing new technologies, and continued innovation.
  - Identify an action plan to implement the plan over a multi-year period, implemented with on-going, independent evaluation and annual reporting to stakeholder advisory council and regulators.
- **Update cost-benefit calculations to reflect the public interest:** Decisions about the grid should be based on a calculation of cost-effectiveness that is aligned with state's consumer, energy, and environmental goals. Cost-benefit frameworks should be designed or expanded to fully reflect priorities such as reducing energy bills and reducing consumers' energy burden, addressing climate change, enhancing consumer control and choice, and system-wide efficiency.

Regional Transmission System

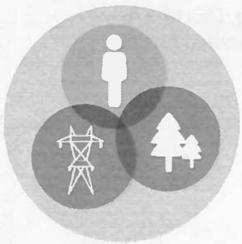
- Customer-side resources and energy policies that reduce demand must be included in forecasts of energy consumption and peak demand.
- System needs should be identified, quantified, and described early enough to allow customer-side energy solutions to be proposed and evaluated.
- Customer-side energy resources should be eligible for the same payment treatment as traditional infrastructure solutions for reliability needs.
- Utility incentives should be reformed so that customer-side energy resources are seen as opportunities, and not competition for large, capital-intensive transmission projects.
- State regulators should require that customer-side energy resources are evaluated as part of any economic justification for new transmission system projects. Proposed transmission projects should demonstrate how the project will maintain safe and reliable service, support clean energy goals, and provide the most cost-effective option compared to competing alternatives.

Consumer Voices Critical to Energy System Planning:

Consumers do not only have to be the pocketbook of the grid; they are increasingly the focus of new energy innovations. Improving the consumer voice in energy grid decisions is critically important. A consumer stakeholder advisory council can provide meaningful input into utilities' long-term grid plans and ensure that consumer and environmental benefits are maximized. Structured stakeholder participation in the development and review of long-term grid plans can benefit grid modernization efforts in several ways:

- *Address the imbalance in resources and information* that can lead to utilities' disproportionate ability to influence regulatory decisions and result in the public perception of unfairness.
- *Achieve greater buy-in by all affected parties*, which can reduce the total time of making and implementing decisions. This reduces the regulatory burden and the potential for litigation or appeals of regulatory decisions.
- *Bringing together diverse interests to identify*, discuss, and address complex issues and provide recommendations. This helps overcome information gaps and assist regulators' evaluation of plans and policies.
- *Building a foundation of common knowledge* will lead to greater public acceptance. Actively engaging consumer, business, and environmental interests will ensure more balanced and stable outcomes—a process that has worked well in several states to advance energy efficiency investments and could be adopted and expanded.

- **Regulators have a stronger role in strategic grid planning:** Regulators must play an important role in ensuring that grid planning and utility investment decisions advance a modern, clean, and consumer-friendly energy system by connecting and aligning the utility business model, grid planning, and stakeholder participation.
- **Regulators have a critical role in ensuring consumer protection:** The current regulatory system provides numerous safeguards for consumers. These should be maintained and adequate protections extended to new or expanded retail markets for energy services and equipment so that market players operate in a fair, responsible, and consumer-friendly manner. Protections ranging from winter shut-off restrictions to licensing and code of conduct for companies that approach consumers are among the wide range of consumer protections needed.



Aligning Utility Incentives with Consumer and Environmental Goals

Challenge:

A common way for utilities to earn revenue is by making capital investments on which the utility earns a specified rate of return that is set by the regulators. This system gives utilities incentives to build or upgrade traditional infrastructure projects. This model is increasingly at odds with new technologies that can optimize the energy system and with public policy goals to increase energy efficiency and consumer adoption of distributed energy technologies. Utilities are reluctant to make proactive investments in the grid—such as upgrading circuits to connect more roof-top solar—or to deploy advanced metering or communication systems, because it is unclear whether these investments fit the criteria that determine whether the utility can recover its costs and return.

Recommendations:

The regulatory model needs to evolve to provide utilities with the appropriate financial incentives to encourage full and timely implementation of states' consumer and environmental goals. 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.

- **Implement Revenue Decoupling:** Revenue decoupling is a well-established rate-making mechanism that severs the link between a utility's sales and its profits. This reduces a utility's financial disincentive to invest in energy efficiency, distributed generation, or any initiative to reduce consumption. States should implement full revenue decoupling, and should not implement high fixed charges or straight-fixed variable rates that are erroneously considered as alternatives to decoupling.

- **Use Grid Planning to Set Rates:** The Strategic Grid Plans should be used to inform the amount of future revenues a utility is allowed to earn, which would then be used to set electricity rates. The Strategic Grid Plans should also be used to inform performance incentive mechanisms.

- **Adopt Performance Incentive Mechanisms and Standards:** Performance incentives mechanisms for utilities have been used for many years, and these can be refined to include emerging performance areas such as system efficiency, grid enhancements, energy efficiency, distributed generation and environmental goals. By increasing the portion of revenue requirements recovered through performance incentives, while reducing the portion of revenue requirements that a utility recovers from the rate base, performance incentive mechanisms help to shift the financial incentive away from capital investments and towards achieving performance goals. In the long run, states and regulators should consider transitioning away from reliance on rate base revenue and give consideration to using transition charges as the energy system moves and resizes to a distributed model.

    - States should establish performance standards to ensure that utility management is aligned with state energy policy, such as capturing all cost-effective energy efficiency and demand response resources. Cost-effectiveness standards should be defined broadly to include all relevant benefits.

- **Provide Regulatory Certainty:** Regulators and stakeholders should use the Strategic Grid Plans to provide the utility with up-front guidance with regard to future resources, grid enhancements, and major capital expenditures. This guidance should provide utilities with greater flexibility and incentive to adopt emerging and innovative technologies and practices.

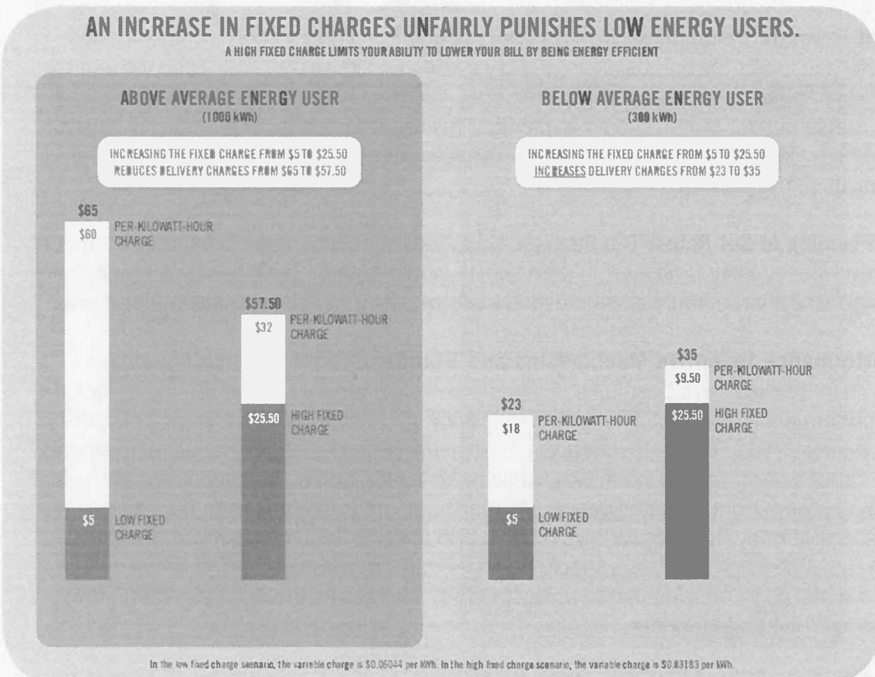
How Consumers Pay for the Power They Use

Challenge:

Despite the progress in clean and innovative energy options for consumers, current rate structures are outdated and do not allow sufficient freedom for new consumer choices. Most residential prices for electricity are flat: the same price per kilowatt hour any time of day or season. However, different portions of the electricity bill have different underlying cost structures. Energy supply costs are primarily influenced by the amount of electricity consumed and its timing because higher cost electricity generators operate when demand is high. In contrast, energy delivery costs, including transmission and distribution, are driven by infrastructure sizing for peak kW demand, often at a single hour during the year, at the regional and local levels. Our electricity bills should be designed to empower consumers to make smart energy and economic decisions, and preserve the consumer incentive to use electricity wisely.

Recommendations:

- **Avoid reliance on fixed charges, which limit consumer options:** High flat monthly charges make it harder to reduce electric bills by using less power or self-generating electricity. Fixed charges should be limited to the cost of keeping a customer connected to the grid, such as metering, billing, and data processing costs. The impacts of public policy considerations should be factored in, as well.



- **Move towards widespread time-varying rates for energy supply:** Time-varying rates provide better economic incentives to reduce overall generation costs and create opportunities for consumers to save money by taking advantage of low-cost hours. Time-varying rates come in a variety of forms, and as technology develops, consumers may be able to understand and benefit from more complex and granular options.

- **Align rates for energy delivery with real costs:** Both demand charges and time-varying rates are good options to consider to align rates for transmission and distribution with underlying system costs, while still creating opportunities for consumers to lower their energy bills through energy efficiency and other customer-side resources.

  Demand Charges: Charges based on the actual costs to maintain the grid to deliver power when needed can reflect the cost a customer imposes on the grid during peak demand periods. Consumers with low energy use will generally pay a lower demand charge than bigger energy consumers. Well-designed demand charges, based on local or system peaks, can respond to customers' behavior in a timely way to reflect the benefits of efficiency, demand response, or other actions to reduce energy use.

  Time-Varying Rates: Time-varying rates for energy delivery can be designed to approximate the incentives of well-designed demand charges. Customers would pay more for energy delivery at peak times when the system is constrained and less at times when the system has excess capacity.

Recommendations (continued...)

- **Align cross-subsidies with public policy objectives:** Market-based mechanisms can often be used to support consumer and environmental goals and reduce cross-subsidization (having one rate class support another). Some cross-subsidies exist to create a value that would otherwise be missed by pure markets, such as lower-cost power to low income customers. Regulators should ensure that beneficial cross-subsidies are aligned with state policy goals, while using market-mechanisms when possible to encourage economic decisions.

- **Phase-in rate innovations:** Significant rate innovations should be implemented on a phased and strategic schedule to ensure maximum consumer benefit and adoption. Consumers should be given time to fully understand the new rate system before it goes into effect. For example, time-varying rates may start as opt-in, transition to opt-out, before finally becoming mandatory. Clear information and education should be provided to allow consumers to understand their electricity bill and what actions they can take to reduce it.

- **Advanced metering infrastructure (AMI)**: AMI should be deployed when and where it is cost-effective. For example, AMI may be geographically targeted based on grid needs; rolled out based on customer size; or installed whenever old meters are retired. New residential rate classes can be created for customers with AMI, or for those who have high energy consumption. All customers could also be allowed to opt-into AMI and new rate structures.

  Costs, benefits, and consumer impacts must be evaluated throughout the phase-in. Keeping certain consumer segments, such as low income, on existing rate structures could be justified by both economics and consumer protection principles.

How Consumers Get Paid for the Power They Produce

Challenge:

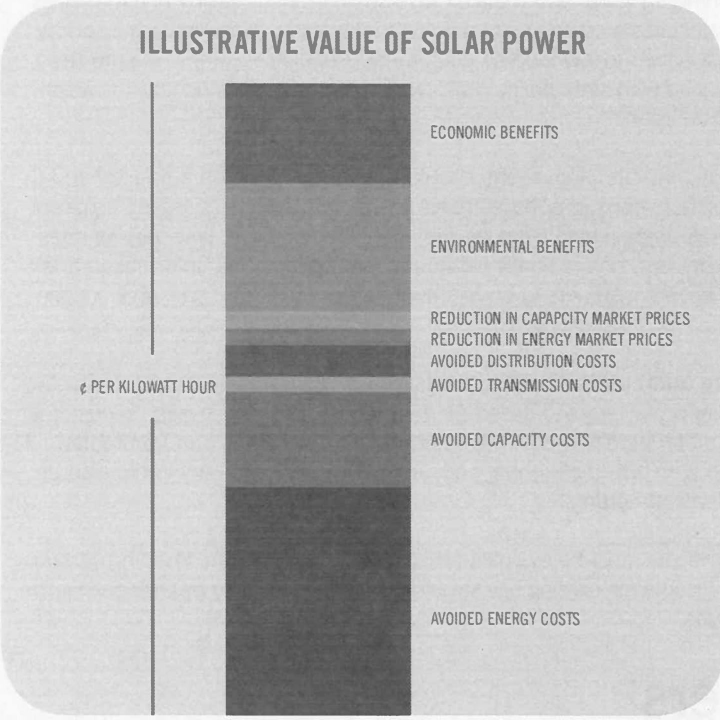
In many states, consumers with solar panels, wind turbines, or other power generation systems receive credits for excess electricity they provide to the grid when they generate more power than they need. In some cases, the customer pays the utility the retail rate for her net electricity consumption and gets credited at the retail rate for the power she sends back to the grid. The value of solar power—or wind power, or power stored in a battery or electric vehicle—however, is not necessarily the same as the retail price. It may be higher or lower depending on location, time of day and/or many other factors. Customers with distributed generation should pay the amount that reflects the costs of staying connected to the grid and get credited for the benefits they provide.

Recommendations:

In the long term, advanced metering and time-varying rate structures will make it possible to accurately charge and credit consumers for the grid services they use and provide. Until these innovations are widespread, regulators can set tariffs based on the calculated value of the benefits customer-side resources provide to the grid.

- **Short-Term–Use the right value for distributed generation:** Net output from distributed generation should be credited at a price that fully reflects its grid-wide costs and benefits, including environmental benefits and the value of avoided energy, capacity, transmission, and distribution costs, along with location value and other components where appropriate. Some jurisdictions are exploring or implementing, "value-of-solar" approaches and this methodology should be applied—and the right value calculated—for other distributed resources too.

Recommendations (continued...)



- **Long-Term- Align "how consumers pay" and "how consumers get paid:"** When the retail rates that we pay for energy supply reflect its time-and location- specific value, it will make economic sense to compensate distributed generation at the same rates. For example, it will cost more to use power on hot summer afternoons, and roof-top solar power will get compensated more for power it sends back to the grid because it is more valuable during those peak hours. Similar concepts apply to long-term reforms of energy delivery rates.
- **Meters that measure power flow in both directions:** Under a "bi-directional rates" approach, a distributed generation customer could receive a bill with the following components: 1) fixed charge (for metering and billing); 2) charge for power consumed on a time-varying basis; 3) credit for power exported on a time-varying basis; 4) charge for using the grid to consume power reflecting costs to the systems; and 5) charge for using the grid to export power reflecting benefits as well.

UtilityVision portrays a system that looks very different from the one we have today—one that would guide energy infrastructure investments and policies to a more consumer and technology—friendly, decentralized system that can put us on the path to achieving deep reductions in greenhouse gas emissions. UtilityVision sets forth a coherent path that ties the utility business model, rate-making, and customer-side energy resources together—offering a clear framework for stakeholders and regulators seeking to modernize the way we plan, manage, and invest in the power grid to empower consumers to have more control over their energy future.

Acadia Center is a non-profit, research and advocacy organization committed to advancing the clean energy future. Acadia Center is at the forefront of efforts to build clean, low-carbon, and consumer-friendly economies. Acadia Center's approach is characterized by reliable information, comprehensive advocacy and problem-solving through innovation and collaboration. UtilityVision was produced by Acadia Center staff, led by Abigail Anthony, Director, Grid Modernization and Utility Reform with primary contributions from Mark LeBel, Jamie Howland, and Daniel Sosland. Thanks to Synapse Energy Economics for their expertise and Public Displays of Affection for visualizations and design.

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Acadia Center

Next Generation Solar Framework

Reforming New Hampshire Net Metering Credit Structure

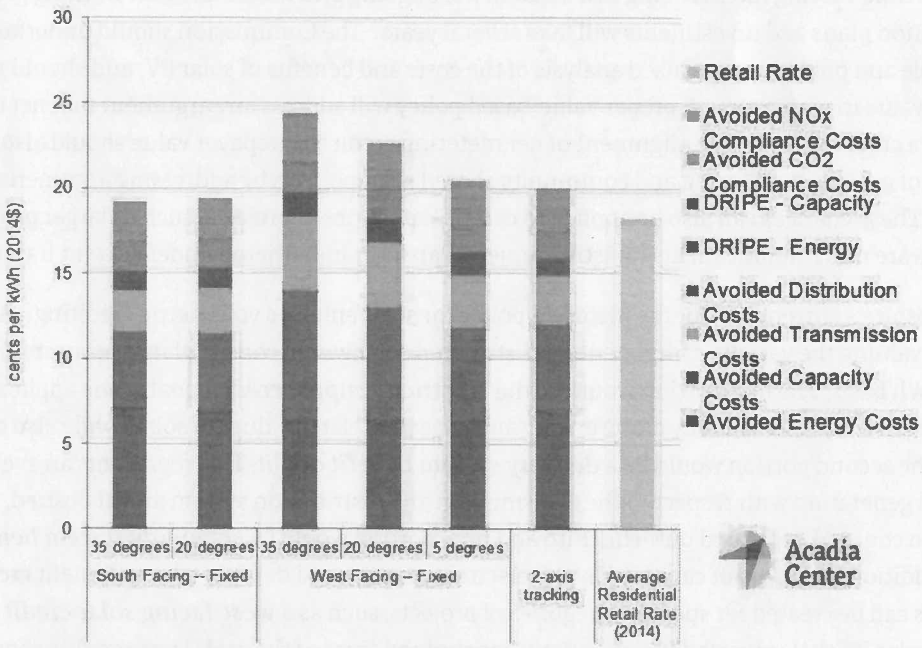
July 11, 2016

Acadia Center
Advancing the Clean Energy Future

Introduction

Across the United States, a debate is underway about proper rate design and compensation models for distributed energy resources generally and distributed solar photovoltaics (PV) specifically. An important first step in setting policy for distributed solar is to understand the value, or benefits, that distributed solar provides. Acadia Center has released Value of Solar studies that estimate the value of distributed solar generation in five states. These studies estimate the long-term benefits that distributed solar provides, including avoided energy supply costs, savings related to peak demand reductions, reductions in market prices, and emissions benefits. In New Hampshire, our study found that it ranges from 19-24 cents/kWh, with additional societal values of approximately 7 cents/kWh.

Figure 1: Grid Value of Solar PV in NH – 25-year Levelized Cost (2014$)



Note: Where appropriate, avoided reserve capacity costs, transmission and distribution losses, and a wholesale risk premium or price hedge are included in the calculations.

In other words, retail rate net metering is generally a fair policy that provides net benefits to ratepayers and society. However, once solar PV reaches significant penetration, balanced reforms can be undertaken to make rate structures more economically accurate and to ensure equitable payment for the distribution grid.

The values analyzed in these studies should be the basis for reform, but a range of other considerations apply. Any changes to solar compensation should be properly integrated with existing structures that support solar, such as net energy metering and renewable portfolio standards, and should reflect more general rate design principles like simplicity and understandability. Acadia Center has proposed the Next Generation Solar Framework as a generally applicable policy structure that can be applied in any state. The proposal contains three high-level elements:

- Valuation studies that are the basis for reforms should be performed by public agencies with significant stakeholder feedback regarding the assumptions and inputs.
- For certain categories of projects, credits for net energy metering should be applied on a monetary basis and aligned with long-run ratepayer value.
- Additional incentive programs should minimize the additional public cost to ratepayers necessary to build different types of projects.

Reforms to Net Energy Metering in New Hampshire

In the long run, customers who provide a range of products and services to the electric system should be charged and credited at rates that reflect the granular costs and benefits. Acadia Center's UtilityVision lays out a full agenda for long-term rate reform.

In the shorter term, without widespread advanced metering infrastructure in New Hampshire that would enable more granular rate design, balanced reforms to net metering credit value can be undertaken. While a transition to AMI and time varying rates is being discussed in the ongoing grid modernization working group, grid modernization plans and investments will take several years. The Commission should undertake reforms based on a credible and publicly-scrutinized analysis of the costs and benefits of solar PV, and should represent the long-term value to ratepayers. A proper value-based policy will address any argument that net metering represents a cross-subsidy. The alignment of net metering credit to ratepayer value should also facilitate an expansion of group net metering and community shared solar policies by addressing arguments about cross-subsidies. These changes can also be applied to certain categories of projects, such as larger projects where any imbalances are more significant and existing projects can be grandfathered under current frameworks.

New Hampshire's current net energy metering policy for solar employs volumetric crediting.[1] A policy more tailored to valuing the various components of distributed solar would consist of monetary crediting to be applied on a per-kWh basis. The first portion would be the ***electricity supply credit*** equal to the applicable electricity supply rate. This represents many of the energy and capacity-related values of solar, while also ensuring customer benefits. The second portion would be a ***delivery system benefit credit***. This represents an average value of distributed generation with respect to the transmission and distribution system and, if desired, transmission and distribution could be separated out. The third and final portion would be an ***energy system benefit credit*** that includes additional values not captured by the electricity supply and delivery system benefit credits. In addition, new credits can be created for specific categories of projects, such as a ***west-facing solar credit*** and a ***locational credit*** for solar PV that is located in particularly constrained areas of the grid. These credits should be paid for by the appropriate set of customers to which the value accrues, for example only the distribution utility should pay for distribution-related credits and the energy system benefit credit can be paid for on a broader basis. It is also worth noting that this same structure can be applied to other generation technologies in addition to solar PV, especially other non-dispatchable technologies.

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[1] Under volumetric net metering, a customer with net generation receives net metering credits in the form of kWhs, which directly offset one kWh of consumption, regardless of price differences. Under monetary net metering, a customer with net generation receives net metering credits in the form of dollars, which offsets that amount of dollars, without any kWh comparison.

Details on Reformed Net Energy Metering Credit Components

The following provides additional details on the net metering credit structure introduced on page 2.

Credits that apply to all projects

Electricity Supply Credit

- Equal to the relevant electricity supply rate. This portion would change automatically as rates for electricity supply change.

Delivery System Benefit Credit

- New per-kWh credit should reflect the net long-run value to the transmission and distribution system, including avoided infrastructure investments, improved local reliability and reduced vulnerability to failures or disruption, and improved power quality, as well as any integration costs.
- Can be initially determined in a special proceeding and updated for each utility in rate cases.
- This value can be determined separately for transmission and distribution to provide for more appropriate accounting.
- Determining average values can be appropriate but reasonable distinctions can be made based on location on the grid.

Energy System Benefit Credit

- New per-kWh credit incorporates long-run energy system benefits above and beyond the electricity supply credit and delivery system benefit credit.
- These benefits include the additional value for energy and capacity from the generation profile of solar, reduction in line losses, wholesale market price suppression, fuel price risk mitigation, and reasonably foreseeable avoided public health and environmental compliance costs.

Credits that apply to select projects

Locational Credit

- Applicable to distributed generation that provides additional value in areas of the grid that are particularly constrained.

West-facing Solar Credit

- Applicable to west-facing solar, which provides proportionally more on-peak generation and generates greater benefits related to peak demand than south facing solar.

Conclusion

Balanced solar policy depends on valuing the unique benefits that distributed generation provides to customers, the grid, and society. The Next Generation Solar Framework lays out a balanced approach to account for system-wide benefits and costs, while optimizing payment structures and advancing complementary public policy objectives. The reforms to net energy metering proposed here should be accompanied by an analysis of the New Hampshire RPS program and other solar incentives to ensure that the goals of those programs are still achieved.

For more information:

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