UNITIL ENERGY SYSTEMS, INC.

DIRECT TESTIMONY OF

THOMAS P. MEISSNER JR.

New Hampshire Public Utilities Commission

Docket No. DE 16-384

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Thomas P. Meissner, Jr. My business address is 6 Liberty Lane West, Hampton, New Hampshire 03842.

Q. What is your position and what are your responsibilities?

A. I am the Chief Operating Officer of Unitil Corporation. I am also a Senior Vice President of Unitil Service Corp. ("Unitil Service"), which provides centralized utility management services to Unitil Corporation's subsidiary companies, and a Senior Vice President of Unitil Corporation's utility operating subsidiaries Fitchburg Gas and Electric Light Company ("FG&E"), Granite State Gas Transmission, Inc. ("Granite"), Northern Utilities, Inc. ("Northern"), and Unitil Energy Systems, Inc. ("Unitil Energy" or "the Company"). My responsibilities are primarily in the areas of utility operations and engineering.

Q. Please describe your business and educational background.

A. I have over 30 years of professional experience in the utility industry and an extensive background in all areas of gas and electric energy delivery. I joined Unitil Service Corp. in 1994 as a design engineer and was named Director of Engineering in 1996, Senior Vice President of Operations and Engineering in 2003, and assumed my current responsibilities as Chief Operating Officer of Unitil Corporation in 2005. Prior to joining Unitil Corporation, I was employed for ten years at Public Service of New Hampshire ("PSNH") where I advanced through a variety of positions in engineering and operations. The last position I held with PSNH prior to joining Unitil was that of Electrical Superintendent in Portsmouth, New Hampshire.

I hold Bachelor of Science degrees in Electrical Engineering and Mechanical Engineering from Northeastern University, a Certificate in Electric Power Systems Engineering from Power Technologies, Inc., a Master's degree in Business Administration from the University of New Hampshire, and graduated the Tuck Executive Program at Dartmouth College. I am also a registered Professional Engineer in the State of New Hampshire.

Q. Have you previously testified before the New Hampshire Public Utilities Commission or other regulatory agencies?

A. Yes, I have testified before this Commission on a number of occasions including Unitil Energy's most recent rate case in 2010 (DE 10-055). I have also testified before the Maine Public Utilities Commission and the Massachusetts Department of Public Utilities.

Q. What is the purpose of your testimony?

A. I will describe the value of the grid and explain why net energy metering or an equivalent utility service is important to the adoption and expansion of distributed energy. I will also explain why the services and functionality provided by the utility grid are essential to customers wishing to install small scale clean energy generation and represent more than an economic subsidy as reflected in current net metering policy. Finally, I will identify concerns with the current rate design of net energy metering and will introduce a proposed three-part rate design that will allow the Company to appropriately charge customer-generators for their use of the distribution system while continuing to allow net metering of energy.

Q. Is Unitil Energy proposing to eliminate net energy metering?

A. No. Unitil Energy supports New Hampshire's 10-Year State Energy Strategy, including efforts to increase penetration of small and commercial scale energy generation in order to diversify our fuel supply and increase the use of in-state resources. The Company supports net energy metering as an important policy that is vital to the growth of small scale renewable energy, especially resources that may be intermittent in nature. However, the Company believes it is the *service* provided by the utility under net energy metering that is essential, whereas the policy (subsidy) of net metering has generally been misunderstood or mischaracterized. Without net energy metering or an equivalent utility service, small scale renewable energy is neither economically viable nor operationally palatable to customers.

Although we do not dispute the value and benefits of clean energy, we believe an affordable and reliable electric grid is essential to the wide scale expansion and adoption of distributed energy resources. Only through transparent and efficient rate designs will a viable and sustainable long-term model be developed that provides sufficient revenue to support the significant investments needed to modernize the grid, while also incenting the appropriate behaviors and assuring fairness and equity among customers.

II. NEW HAMPSHIRE ENERGY STRATEGY AND THE RISE OF THE PROSUMER

Q. Why are distributed energy resources an important part of New Hampshire's 10-year energy strategy and how will they benefit consumers?

A. The New Hampshire 10-Year State Energy Strategy ("NH Energy Strategy") envisions a future in which consumers are empowered to manage their energy use by taking full advantage of the information, market mechanisms, energy efficient technologies, diverse fuel sources, and transportation options available to them. Fuel diversity and customer choice are essential to this vision. Small and commercial scale energy generation is expected to play an increasingly important role in meeting New Hampshire's energy goals in order to diversify our fuel supply and increase the use of in-state resources. As this occurs, electric utilities will need to adjust their operational practices and planning processes, and make investments to modernize the electric grid, in order to accommodate growing levels of distributed generation. The ability to seamlessly integrate all types and sizes of electrical generation and storage systems using simplified interconnection processes and universal interoperability standards to support a "plug-and-play" level of convenience will be one of the cornerstones of a modernized grid.

Q. What is a prosumer?

A. The term "prosumer" is being increasingly used within the electric industry to describe customers that both produce and consume electricity. In the future, a surge in distributed energy technologies will empower customers to manage their onsite needs through a variety of options and resources, giving rise to a new class of customers unlike those of the past. Unitil believes prosumers represents a new and distinct class of customers who will use the utility system much differently than traditional consumers. Just as the functionality of a modernized grid must necessarily change in response to the needs of these customers, the Company believes the pricing of grid services must change as well. Throughout this testimony, I will use the term "prosumer" to describe customer-generators who are both producing and consuming energy behind the meter.

Q. How does net energy metering support New Hampshire's energy strategy?

A. The NH Energy Strategy identifies a number of mechanisms to encourage small scale energy generation and make it more affordable. These mechanisms include increasing Renewable Portfolio Standards (RPS) Targets and Alternative Compliance Payment (ACP) Prices, expanding the state's net metering policy, implementing rate design changes to properly value Distributed Generation (DG), increasing and leveraging private financing, as well as tax exemptions and other incentives. Given the focus on expanding the state's net metering policy and implementing rate design changes to properly value DG, the Company believes it is important to address the pricing of the utility services needed to support this class of customer, and also to address the cross-subsidies resulting from current net metering rate design. Unitil supports net energy metering as an important policy that is vital to the growth of customer-owned renewable energy; especially intermittent energy resources. However, the Company believes it is the *service* provided by net metering that is essential, not the subsidy, and the policy of net energy metering has generally been misunderstood or mischaracterized. I will address net energy metering in greater detail in the next section of this testimony.

Q. Do prosumers use the grid differently than traditional consumers?

A. Yes. Arguably, customers with on-site generation (prosumers) use more grid services than customers using the grid for consumption only, and the grid investments that may be needed to support increased penetration of DG are not necessarily beneficial to non-generating customers. The hours during which prosumers generate their electricity typically do not correspond to their peak use of electricity, and hence, their generation may not result in any reduction in peak demand. On the other hand, prosumers use their electric service to both import and export electricity (two-way power flow) in order to balance their production with their consumption, and the electric system was not designed for bi-directional power flow. As a result, new technologies and investments will be needed accommodate growth of this new class of customers, and these investments may not provide value to traditional consumers.

Q. Can the rate design for prosumers be changed to better reflect the value of the service provided, while retaining the benefits of net energy metering?

A. Yes. There are a variety of ways to change the pricing of distribution services to more accurately reflect the value of DG to the grid, and the value of the grid to DG. The Company strongly believes the overarching objective of rate design should be the development of pricing for grid services that adhere to the principles of fairness, transparency and economic efficiency. Prices for energy services should reflect the value of the services provided and the true cost of providing those services; bills should reflect each customer's demand for or use of those services. Only through transparent and efficient rate designs will a viable and sustainable long-term model be developed that provides sufficient revenue to support the significant investments needed to modernize the grid, while also incenting the appropriate behaviors and assuring fairness and equity among customers.

III. THE CASE FOR NET ENERGY METERING

Q. What is Net Energy Metering?

A. Under PURPA §111(d)(11)[1] the term 'net metering service' is defined as service to an electric consumer under which electric ***energy*** generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric ***energy*** provided by the electric utility to the electric consumer during the applicable billing period. (emphasis added).

It is noteworthy that this definition does not suggest that electricity generated by an eligible on-site generating facility be valued at "full retail," nor does it specify that net metering be accomplished using a single meter. It does not define net metering service as a subsidy or as a means to bypass non-energy charges (e.g., delivery charges). Importantly, net metering is defined as a "service" – one that allows customer-generators to use their own *energy* production to offset electric *energy* provided by the utility. Unitil fully supports net metering of *energy* production, as defined under PURPA §111(d)(11), and believes it is vital to the growth of customer-owned renewable energy and other distributed energy resources.

Q. How does net energy metering work?

A. Under net energy metering, customer-generators are allowed to export electric energy to the local distribution grid to offset future energy purchases from the utility when on-site electricity generation exceeds on-site consumption. During time periods when the electricity demanded by the customer exceeds on-site electricity production, the customer consumes all of the electricity produced on-site and also consumes electricity imported from the electric grid. At times when the electricity demanded by the customer is less than on-site electricity production, the customer serves all of its demand with on-site generation and exports surplus electricity to the utility where it flows out onto the distribution system. *See* Figure 1. Metering is typically accomplished using a single meter capable of measuring the flow of electricity in both directions (the meter spins forward and backwards) and only the difference between energy consumed and energy produced is recorded for billing purposes. As a result, net energy metering allows customers to consume and generate electricity independently of one another and pay only the net difference.

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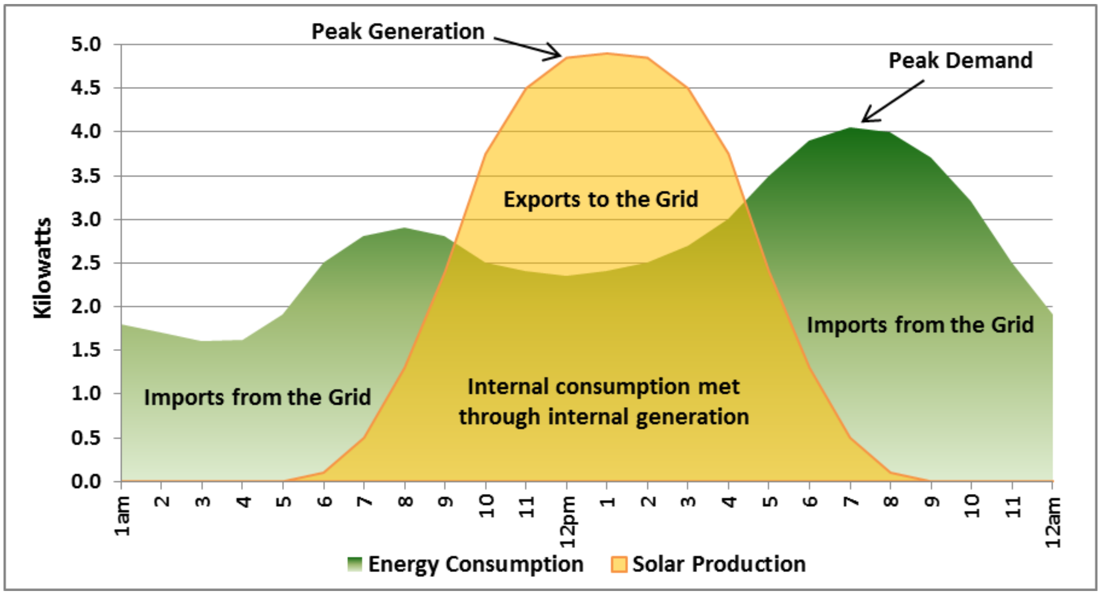
[1] Section 1251 of the Energy Policy Act of 2005 amended section 111(d) of the Public Utilities Regulatory Policies Act of 1978 (PURP A) to include three new subsections including §111(d)(11) Net Metering.

Figure 1. Illustrative Residential Profile with Net Metered Solar Generation



Q. How is Net Energy Metering defined in New Hampshire?

A. With regard to the existing provisions of RSA 362-A:9, the section itself is called Net ***<u>Energy</u>*** Metering (emphasis added), and the Company believes the clear intent of the language in the statute is to provide net *energy* metering to eligible customer-generators, consistent with the definition of net metering service under PURPA §111(d)(11). This net *energy* metering is specifically aimed at the customer's default generation supply or competitive electricity supply, and not distribution. However, section IV. (a) of RSA 362-A:9 specifies that for small facilities below 100 kilowatts, the utility shall apply the customer's net energy usage when calculating all charges that are based on kilowatt hour usage. As a result, to the extent a utility's rate design recovers its distribution cost of service through kilowatt hour energy usage, the costs of constructing, operating and maintaining the grid are not recovered from those customers who are able to displace their kilowatt hour usage with on-site generation. Those costs are instead recovered from customers without on-site generation. The Company believes it is quite feasible to develop a tariff for prosumers that is consistent with the provisions of RSA 362-A:9 by recovering its distribution costs through charges other than energy usage.

Q. Why is Net Energy Metering important to the adoption of distributed energy?

A. Net energy metering is a grid-enabled energy service that offers an inexpensive way to address a number of the shortcomings of small scale clean energy resources (e.g., intermittency) by acting as a substitute for on-site energy storage and other technical requirements that would be necessary if net energy metering or an equivalent utility service were unavailable. Most small scale customer-generators are unable to synchronize their energy consumption with their electricity production, are unable to increase production to meet increased demand for electricity, and must have reliable backup for those times when the energy resource (e.g., the sun) is not available. They are <u>intermittent</u> resources that produce electricity when they *can*, not necessarily when it is needed. Net energy metering fulfills an essential service by reliably providing for all of the customer's energy consumption while enabling prosumers to generate as much of their own energy as they can. I would argue that without a grid connection, rooftop solar and other small scale renewable energy resources are simply not viable. This is not due to any real or perceived financial subsidy; it is due to the essential functionality provided by the grid itself. <u>It is the grid connection that is vital to prosumers, not the net metering subsidy.</u>

Q. Do customer-generators have alternatives to net energy metering?

A. Yes. Prosumers can accomplish the same objective of offsetting their energy consumption while realizing full retail value for their generation by installing on-site energy storage (e.g., batteries), thus eliminating the need to export surplus generation to the utility. However, energy storage is expensive and would detract significantly from the economics of clean energy projects. Grid access provides a simple and inexpensive (currently "free") alternative. Absent a grid connection, the cost of a typical residential rooftop solar installation would be greatly increased, and therefore uneconomic. Net energy metering, under current policy, is essentially a free service that allows prosumers to forego the expense of energy storage.

It is noteworthy that companies including Tesla and SolarCity have recognized that net energy metering is essentially a free energy storage service. As noted in a lengthy article highlighting the clash between net metering and storage, Mateo Jaramillo, Tesla's director of powertrain business development, was quoted as saying that net metering creates a disincentive to add energy storage, limiting the value of battery storage in many places in the U.S.

> "Net metering is essentially a free battery," Jaramillo said. "You basically sell your power back to the utility, then you just buy it back at the same rate later. So it's hard to compete."[2]

[2] Environment & Energy Publishing (E&E Publishing, LLC), TECHNOLOGY: Net metering vs. storage creates clash between some allies, September 23, 2015 found at http://www.eenews.net/stories/1060025111

In a separate article, SolarCity spokesman Jonathan Bass was quoted as saying that SolarCity had decided not to install the Tesla Powerwall battery that's optimized for daily use because the battery "doesn't really make financial sense" due to regulations that allow most U.S. solar customers to sell extra electricity back to the grid.[3] A footnote attributed to this statement notes that one of the reasons Tesla's Powerwall batteries don't make sense for many U.S. customers is the policy of net metering.

Q. Why are these distinctions important?

A. In popular understanding, net energy metering has become synonymous with two things: i) a financial incentive (i.e., subsidy) to customer-generators that values all of their generation output at the full retail price, including any occasional excess, and ii) the practice of using a single electric meter that is permitted to turn backwards. This perpetuates a widely held misconception that the purpose of net metering is to "properly value" a customer's generation at the full retail rate (the rate at which they normally purchase electricity) while avoiding duplicative metering costs. This limited perspective on net energy metering fails to discern the true value of the net metering service and instead attempts to focus attention on the value and benefits of renewable energy as a matter of public policy. As a company, we do not dispute the value and benefits of clean energy and we believe an

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[3] Bloomberg, Tesla's New Battery Doesn't Work That Well With Solar, May 6, 2015 found at http://www.bloomberg.com/news/articles/2015-05-06/tesla-s-new-battery-doesn-t-work-that-well-with-solar

affordable and reliable electric grid is essential to the wide scale expansion and adoption of distributed energy resources.

Q. Are there other misconceptions about net energy metering that should be clarified?

A. Yes. A great deal of debate over net metering has focused on the value of the credit for "excess" energy exported to the grid (i.e., how energy not needed for internal consumption is valued), which is somewhat of a red herring. For most customers, the amount of "excess" energy is *de minimis* as most energy is only temporarily exported to the utility until it is needed, whereupon it is imported back from the grid in order to offset energy purchases from the utility. <u>All of the electricity produced</u> by customer-generators under the current net metering rate design displaces energy purchases from the utility, and hence, all such electricity production avoids paying for distribution services to the extent such services are recovered through kilowatt hour energy usage.

IV. THE VALUE OF THE GRID

Q. Why is the electric grid important to the development and adoption of distributed energy resources?

A. An interconnection with the utility gird offers a number of invaluable benefits to small customer-generators that greatly reduce the installed cost of renewable customer-owned generation, including:

1. Balancing Service

2. Supplemental Service
3. Backup Service
4. Regulation Service

Q. What is Balancing Service?

A. As already described, small scale renewable energy producers are unable to balance their energy consumption and their electricity production. In simple terms, prosumers consume and produce their electricity independently of one another, and at different times, with no means to synchronize the two. As a result, prosumers must have a way to "store" surplus output when it isn't needed and then draw upon stored electricity when consumption exceeds production in order to balance supply and demand. The utility system provides a service akin to energy storage by allowing prosumers to export surplus energy to the grid in much the same way that they might charge batteries, and then draw this energy back from the utility grid at a later time when it is needed. Without the ability to export electricity to the utility grid, prosumers would need to install their own energy storage (e.g., batteries) at significant cost.

Q. What is Supplemental Service?

A. By connecting to the utility grid, prosumers are able to tailor the capacity of on-site generation based solely on project economics without consideration of peak load demand or other requirements (e.g., motor starting) because on-site electricity production can be supplemented with electricity imported from the utility grid *any* *time it is needed*. Without this ability to supplement internally generated electricity with imports from the utility, it would be necessary to oversize generating equipment and/or increase energy storage to cover the full range of customer electricity consumption at all times of the day, month and year. For example, a typical rooftop solar installation may produce sufficient electricity to cover energy consumption during many months of the year, but it may not be able to meet air conditioning demands in the summer or heating demand in the winter. It would be uneconomic to size on-site generation to meet peak demands that may only be present for a few weeks each year.

Q. What is Backup Service?

A. As with other types of customer generation, consideration must be given to backup should a distributed energy resource fail to produce adequate output. This is especially true with intermittent resources such as solar or wind. These resources may fail to produce adequate output for a variety of reasons, including the most obvious – lack of wind or lack of sun. Calm weather or cloudy days may result in insufficient output to cover even basic household requirements. In the case of rooftop solar, panels may not produce electricity in the winter simply because they are covered in snow. A family heading to Disney World during February vacation should not expect to return to a cold, dark home because a snowstorm occurred while they were away. The utility grid offers reliable and inexpensive backup service to supplement or replace on-site generation whenever the need should arise.

Lacking a utility connection, the customer would need install redundant or supplemental energy sources, or do without electricity.

Q. What is Regulation Service?

A. In addition to other requirements, customers need electricity service that is regulated within acceptable voltage and frequency parameters. Utilities provide electric service within a prescribed voltage range and at a constant frequency, while maintaining high AC waveform quality. Connection to the utility grid ensures that on-site voltage and frequency are stabilized to match that of the grid. Absent a grid connection, on-site controls would be needed to ensure voltage and frequency regulation and AC waveform quality.

Q. Is there evidence supporting the value of the grid to small scale renewables?

A. Nowhere is the value of the grid more evident than in current analyses of residential solar grid parity (i.e., "socket parity").[4] For example, according to a recently published report by GTM Research, 20 U.S. states have already reached or surpassed grid parity, and 42 states are expected to reach that milestone by 2020 under business-as-usual conditions. New Hampshire is identified among the 20 states that have already attained grid parity.[5] What is often overlooked by casual

[4] Grid parity at the retail level is sometimes referred to as "socket parity," and occurs when the average price of on-site generation is equal to the price of electricity that a consumer buys at retail from a utility. Socket parity is a term used to distinguish between grid parity at the retail level, and wholesale grid parity where utility-scale wind or solar may be able to produce electricity at an average price that is competitive with conventional generation.

[5] GTM Research: U.S. Residential Solar Economic Outlook: Grid Parity, Rate Design and Net Metering Risk found at http://www.greentechmedia.com/articles/read/Slideshow-US-Residential-Solar-Outlook-Grid-Parity-Rate-Design-and-Net

readers of such reports is that all of the analyses forecasting grid parity are based on grid-connected solar. None of these analyses even consider the economics of off-grid installations. Why? Because the increased cost of off-grid operation would be prohibitively expensive, and would result in a cost of electricity far greater than the utility rate. There would be no grid parity, anywhere, without a grid connection. To repeat what I said earlier, it is the grid connection that is essential to small scale renewable generators, not the net metering subsidy.

Q. Are there other important benefits of a grid connection?

A. Perhaps the most important benefit of a grid connection is the one that is most often overlooked: convenience. For customers hoping to integrate new clean energy technologies, grid-connected operation is simple, reliable, and effortless. It offers seamless convenience by allowing customers to both import and export electricity *as needed*, without having to take any action, and without having to change any household behaviors. When on-site production is insufficient to meet consumer demand for electricity, the utility service is always present to provide what is needed. Off-grid operation is a "lifestyle" that dominates almost every household decision; a constant effort to balance electricity needs with electricity production. Forecasting weather, scheduling home activities, storing sufficient reserves, and making choices about which uses of electricity are necessities, and which are luxuries. If production fails to keep up with consumption, the off-grid prosumer does without electricity. In short, a connection to the utility grid is what makes small scale clean energy generation both economically viable and socially acceptable to customers.

V. RECONCILING POLICY OBJECTIVES WITH RATE DESIGN

Q. Given the success of net metering policy as a means to encourage the adoption of small scale energy generation, why is a change in rate design needed?

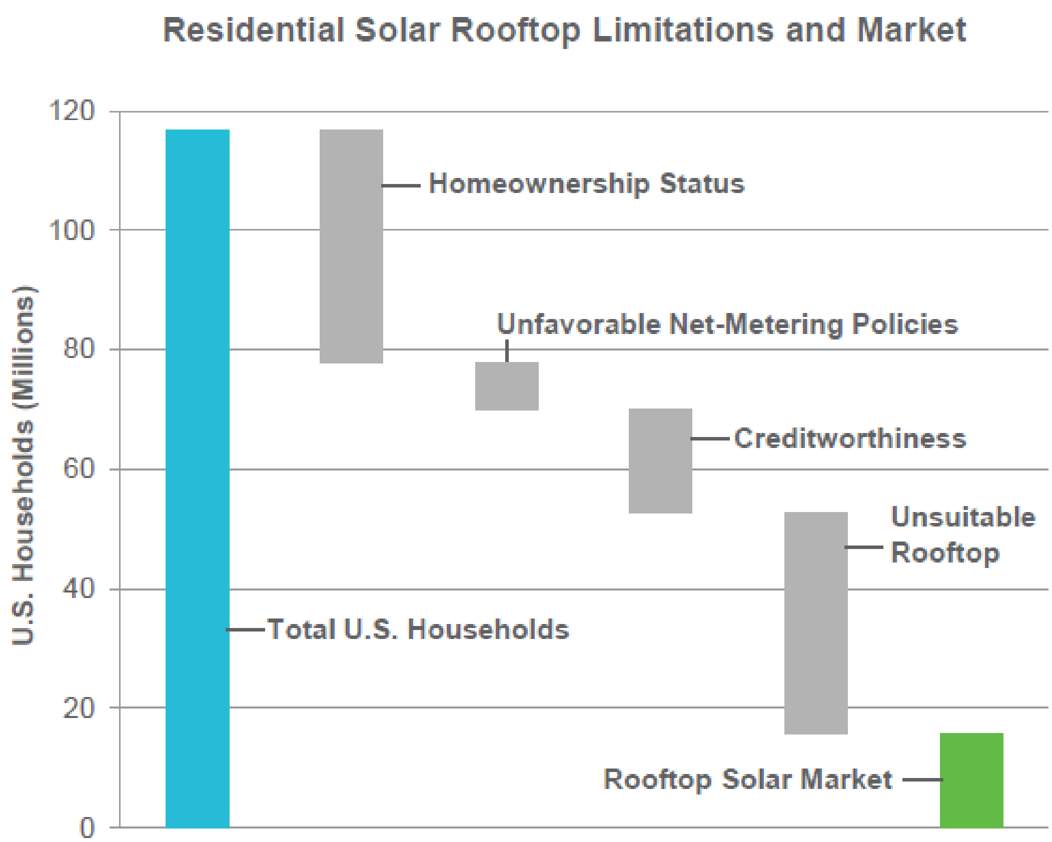
A. Until recently, customer adoption of rooftop solar and other technologies was inconsequential, and the investments that might be needed to address increased penetration of DG were not a concern. Cross-subsidies and cost-shifting were not significant in magnitude and the impact on non-generating customers was small. However, as these new technologies gain widespread acceptance and DG penetration increases, this will no longer be the case. At higher penetration levels, it will become necessary to invest in upgrades to the electric system in order to accommodate the increase in distributed resources. Under existing rate designs, these upgrades will be recovered not from those customers with distributed generation (cost causers), but from the non-generating customers. Issues of cost recovery in the context of grid modernization, especially the recovery of those investments needed to accommodate increased penetration of DG, will exacerbate concerns over cross-subsidies between consumers and prosumers.

Q. Even if cross-subsidies exist, don't all customers have equal opportunity to make choices that allow them to take advantage of net energy metering?

A. No. In fact the opposite is true. According to a recent report from GTM Research, most households in the United States are unable to install rooftop solar due to limitations that include home ownership (e.g., rental), credit worthiness, and unsuitable rooftop (e.g., orientation or shading). As noted in a related article by Vox, "[y]ou can't install rooftop solar if you rent, own a condo, have poor credit, or have a rooftop that's shaded or faces the wrong way."[6] According to this analysis, only about one in seven U.S. households are suitable for solar, even in locations with favorable net metering policies. *See* Figure 2.

[6] Vox: Here's how to get solar power if you don't own a roof, June 25, 2015 found at http://www.vox.com/2015/6/25/8846507/community-solar

Figure 2.



Source: ScottMadden, GTM Research, Vox found at http://www.scottmadden.com/insight/community-solar-overview-of-an-emerging-growth-market/

Q. Why does this matter?

A. It suggests that net metering service is not equally available to all customers, and may in fact favor a small subset of customers who a) are homeowners, b) have good credit, and c) whose homes face in the right direction. While rooftop solar is not the only renewable technology to qualify for net energy metering, it is likely that other technology alternatives face similar limitations. The Company supports net *energy* metering as an important grid-enabled utility service for prosumers and believes it is important that net metering service be designed so that the large majority of customers who do not have this choice are not subsidizing a small subset of customers who do.

Q. Are there other considerations underscoring the need for rate design changes to improve the transparency of the net metering service?

It is important to recognize that policies designed to create incentives also create unintended consequences, and may result in perverse incentives that are contrary to the stated interests of the policymakers. Rate designs that incentivize one technology may do so at the expense of others. Moreover, short-term incentives can have long-term consequences. As I have already described, the ability to connect to a reliable electric grid is essential to the long-term adoption and growth of distributed renewable energy. It will be necessary to modernize the grid in order to integrate all types and sizes of electrical generation and storage systems using simplified interconnection processes and universal interoperability standards to support a “plug-and-play” level of convenience. As such, rate designs that favor specific technologies at the expense of others or that discourage needed investments or encourage the wrong investments may be contrary to the long-term interests of distributed renewable energy.

Q. Do you have any examples of current net metering policy incentivizing the wrong technologies, or having undesirable long-term consequences?

A. I have already alluded to one consequence of current net metering policy. Net metering in its current form acts as a disincentive to energy storage. Energy storage is widely seen as vital to the modernization of the electric grid, both to improve efficiency, reliability, and service quality, and to address the intermittency of clean energy resources. Ultimately, electrical energy storage technologies that are located in proximity to electrical load and distributed generation will help to defer the costs of transmission and distribution investment by better integrating intermittent generation and enabling peak shaving while achieving an efficient, secure and modern electrical grid. Unfortunately, energy storage will not be installed at the prosumer level if net metering policies offer a no-cost alternative. If current rate designs remain in place over the long term, utilities may need to invest in utility-scale storage systems in order to accommodate higher penetration of distributed energy, and non-generating ratepayers will effectively pay for those investments. In the alternative, utilities may invest in less costly alternatives to energy storage based on traditional least cost planning principals, thereby treating the symptoms and not the cause.[7] Incentivizing the wrong technologies in the short term may result in undesired outcomes and inefficient allocation of resources over the long term.

Q. Are there other compelling reasons to modify the current rate design for net metering service?

A. Yes. The current rate design for net energy metering is not transparent or efficient, and does not send appropriate price signals to prosumers. For example, prosumers

[7] To provide one example, high penetration of distributed generation at the distribution level may result in reverse power flow during light load periods, which must be addressed through investments on the utility system. Changes to substation protection systems and relaying to *accommodate* reverse power flow are far less costly than utility scale energy storage to *prevent* reverse power flow.

may be incentivized to oversize a system and “bank” the overproduction to supply power during those times in the future when the panels aren't producing since there is no economic consequence for doing so. Similarly, without appropriate price signals, customers have little incentive to install energy storage or demand response technologies to balance on-site energy consumption with on-site electricity production in a way that reduces demand on the T&D system. Under the current rate design for net energy metering, customers have little incentive to change their behavior in a way that provides benefits to the grid or to other customers, thereby forgoing the benefits of improved efficiency, reliability, and service quality. These benefits are often cited in value of solar studies, yet whether these benefits are actually attained is questionable under current policy.

Q. Why is it important that the rate design for net metering service be addressed now? Can’t it wait until the issues you have described are more evident?

A. The current rate design for net energy metering is unsustainable, and the longer the rate design issues persist the more difficult it will be to address the cost-shifting and cross-subsidies in the future. Non-generating customers will pay for grid investments solely benefitting prosumers. As more customers choose clean energy technologies to supplement their on-site needs, a dwindling number of customers will be paying for the grid. Ironically, this will increase the volumetric energy rate for all customers, thereby raising rates for non-generators and increasing the incentive (subsidy) for prosumers. Grandfathering of prosumers who install clean energy systems under early net metering rate designs will exacerbate concerns over fair and equitable cost allocation.

Q. Solar advocates have argued that the market for rooftop solar will grind to a halt without net metering. How does the Company respond?

A. First, the Company is not proposing to eliminate net metering. The Company is instead proposing to modify the rate design of net metering service to achieve net *energy* metering consistent with PURPA §111(d)(11) and RSA 362-A:9. Customers will continue to enjoy all the benefits of a grid connection and will continue to benefit from the netting of energy production from consumption. Having a sustainable, transparent and efficient rate design that provides sufficient revenue to support the significant investments needed to modernize the grid, while also incentivizing appropriate behaviors and assuring fairness and equity among customers, should provide long term clarity to prosumers hoping to implement clean energy technologies. Second, the Company believes that addressing the rate design issues associated with net metering service may lessen the need for net metering "caps," thereby providing better long term clarity to solar providers. The current cap on net metering, and the contentious process followed to raise the cap when it is reached, has cast a pall over the industry and at least temporarily interrupted new installations. Finally, I would argue that the goal of regulation should not be to ensure the financial success of competitive solution providers, especially where those profits are at least partially derived from a largely captive customer base not benefitting from the installation of these systems. Net energy metering should be viewed as a service to prosumers, not as an incentive or subsidy to solar installers.

VI. UNITIL'S DER RATE DESIGN PROPOSAL

Q. What is Unitil proposing in order to address the rate design issue that you have described?

A. As described in testimony of Witness Overcast, Unitil proposes a three-part rate design that includes a demand charge for new Domestic customers who install distributed generation after the Company has reached its net metering capacity cap (currently set at 6.17 mW).

Q. Why is a multi-part rate with a demand charge appropriate?

A. All customers connected to the utility system must be provided sufficient capacity to meet their peak load requirements irrespective of any on-site generation. The utility grid and the customer's service connection must be sized to deliver all of the customer's electricity needs at all hours of the day, and over all days, weeks, and months of the year. Due to generation intermittency and hourly load characteristics, a prosumer's peak demand for electricity may be no different than a traditional consumer, and the distribution facilities needed to serve this class of customers are essentially identical to the facilities serving non-generating consumers. Under current rate designs, however, prosumers and traditional customers pay very different amounts for identical demands on the distribution system. A demand charge allows the Company to appropriately charge prosumers for their use of the distribution system while continuing to allow net metering of energy purchases. Such a rate design is fully consistent with net energy metering, and with net metering service as defined under PURPA §111(d)(11).

Q. Is a three part rate with a demand component "fair" to the prosumer?

A. Yes. Customer demand is a metered quantity and the Company is proposing a 15-minute integrated demand reading that will be captured by the Company's advanced metering ("AMI") system. As a result, prosumers will pay only for their actual (measured) use of the distribution system and will be billed appropriately for the distribution facilities needed to serve their peak load requirements. As described in Witness Overcast's testimony, a multi-part rate also provides efficient price signals while correctly reflecting matching and cost causation principles. By sending appropriate price signals to prosumers, the Company's proposed rate design will encourage them to consider electricity demand when sizing generating equipment and better manage on-site energy usage. For example, prosumers would for the first time have an incentive to install on-site energy storage to better manage on-site energy generation and consumption.

Q. Please explain the rate design rationale for this rate and how this rate is calculated.

A. Please refer to the expert testimony of H. Edwin Overcast, with Black & Veatch Management Consulting, LLC. This testimony fully describes the economic and rate design rationale for this rate; in addition, this testimony presents the new demand rate and explains its derivation.

CONCLUSION

Q. Please summarize your testimony.

A. I have described the value of the grid, and explained why net energy metering or an equivalent utility service is important to the adoption and expansion of distributed energy. I have also explained why the service and functionality provided by the electric grid is vital to prosumers and is much more important than the economic subsidy of current net metering policy. Other key takeaways from my testimony include the following:

- New Hampshire's 10-Year State Energy Strategy envisions a future in which consumers are empowered to manage their on-site energy use and identifies various mechanisms to encourage small scale energy generation including expansion of the state's net metering policy.
- The Company believes current policies and advances in distributed energy technologies are giving rise to a new and distinct class of customers who use the utility system differently than traditional consumers. These "prosumers" represent a class of customers unlike full requirements customers.
- Net energy metering should be viewed not as a subsidy, but as an important grid-enabled energy service that substitutes for on-site energy storage and other technical requirements. Connection to the electric grid greatly reduces the upfront investment cost of distributed energy.
- Prosumers use more grid services than traditional consumers despite lower net energy consumption because they use their utility service to both import and export electricity (two-way power flow). The distribution system was not designed for bi-directional power flow.
- New technologies and investments will be needed to accommodate growth of this new class of customers, and these investments may not provide value to

non-generating consumers. Under existing rate designs, non-generating customers will pay for grid investments solely benefitting prosumers.

- The hours during which prosumers generate electricity typically do not correspond to their peak use of electricity. As a result, a prosumer's peak demand for electricity may be no different than a traditional consumer. Under current rate designs, prosumers and full requirements customers pay very different amounts for identical demands on the distribution system.
- The Company is proposing a three-part rate design that includes a demand charge for new Domestic customers who install distributed generation after the Company has reached its net metering capacity cap. This demand charge will allow the Company to appropriately charge prosumers for their use of the distribution system while continuing to allow net metering of energy purchases.
- A multi-part rate will provide efficient price signals, encouraging prosumers to consider electricity demand when sizing generating equipment and better manage on-site energy usage. Prosumers would for the first time have an incentive to install on-site energy storage to better manage on-site energy generation and consumption.

Q. Does this conclude your testimony?

A. Yes, it does.