Unitil

September 17, 2015

BY HAND-DELIVERY AND E-MAIL

Debra A. Howland, Executive Director and Secretary
New Hampshire Public Utilities Commission
21 S. Fruit Street, Suite 10
Concord, NH 03301-2429

RE: Docket No. IR 15-296

Dear Director Howland:

Enclosed on behalf of Unitil Energy Systems, Inc., are an original and six copies of the Company's Initial Comments in the above referenced docket. Thank you for your attention to this matter.

Sincerely,

Gary Epler
Attorney for Unitil Energy Systems, Inc.

cc: Office of Consumer Advocate
Service List (via e-mail)

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THE STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION
IR 15-296
ELECTRIC DISTRIBUTION UTITILIES
Investigation into Grid Modernization

Initial Comments of Unitil Energy Systems, Inc.

Unitil Energy Systems, Inc. ("Unitil" or the "Company") appreciates the opportunity to respond to the Commission's request for comment on the definition, or elements, of grid modernization that should be included in its Investigation into Grid Modernization in Docket No. IR 15-296. The Company's affiliate, Fitchburg Gas and Electric Light Company ("FG&E"), participated in a similar investigation in Massachusetts before the Department of Public Utilities ("DPU"), and recently filed a Grid Modernization Plan as a result of that proceeding. Accordingly, the Company believes it is well positioned to assist the Commission with an investigation into grid modernization in New Hampshire. The Company respectfully offers its comments regarding the scope, elements, and framework of grid modernization that should be considered in this proceeding.

INTRODUCTION

As noted in the Order of Notice, the New Hampshire 10-Year State Energy Strategy ("NH Energy Strategy") states that "[g]rid modernization refers to a wide range of actions aimed at ensuring that the electric grid is more resilient and flexible, better able to integrate variable energy sources and demand side management, and capable of providing real-time information to help customers manage this energy use and reduce energy cost." The Order of Notice further states that grid modernization is a broad topic that encompasses many elements, including replacement of aging infrastructure, outage management, the integration of distributed generation, and education of customers on how to manage their energy use for the benefit of the electric delivery system and to minimize energy costs. The Company generally agrees with this broad definition of Grid Modernization.

Given the breadth of the topic, the Company believes it will be important to develop a consistent definitional framework for grid modernization that allows all the parties to understand the objectives and essential functionalities of "the electric grid of the future" in consistent terms that everyone understands. Within the industry, many different definitions and interpretations of grid modernization have emerged that are at best inconsistent, and at worse contradictory. Exactly what grid modernization means for utilities and their customers varies widely by state, region and stakeholder group. Therefore, establishing a definitional framework for grid modernization as it applies to customers and key stakeholders in New Hampshire will be an important outcome of this proceeding.

A FRAMEWORK FOR GRID MODERNIZATION

The United States Department of Energy (DOE) has devoted extensive efforts to the development of a clear vision of the power system required for the future.[1] Through this vision, the DOE hopes to create the alignment necessary to inspire passion, investment, and progress toward the Smart Grid for the 21st century.[2] As an outcome of those efforts, an extensive body of literature has been developed to define a vision for the modern grid in terms of its value areas, its characteristics, and the milestones for achieving it.[3] Under the DOE framework, the Modern Grid is defined in terms of six value areas, and seven principal characteristics. The Company believes that these characteristics and value areas provide a well-defined model of grid modernization that may be considered by the parties in this proceeding as a starting point for the development of a New Hampshire policy framework.

Smart Grid Value Areas

1) **It must be more reliable**. A reliable grid provides power, when and where its users need it and of the quality they value.

2) **It must be more secure**. A secure grid withstands physical and cyber-attacks without suffering massive blackouts or exorbitant recovery costs. It is also less vulnerable to natural disasters and recovers more quickly.

3) **It must be more economic**. An economic grid operates under the basic laws of supply and demand, resulting in fair prices and adequate supplies.

4) **It must be more efficient**. An efficient grid employs strategies that lead to cost control, lower transmission and distribution losses, efficient power production, and optimal asset utilization while providing consumers options for managing their energy usage.

5) **It must be more environmentally friendly**. An environmentally friendly grid reduces environmental impacts through improvements in efficiency and by enabling the integration of a larger percentage of intermittent resources than could otherwise be reliably supported.

6) **It must be safer**. A safe grid does no harm to the public or to grid workers and is sensitive to users who depend on it as a medical necessity.

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[1] Reference "The Modern Grid Strategy, A Vision for the Modern Grid" developed by the National Energy Technology Laboratory for the U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability, June 2009. This and other whitepapers and publications can be found on the NETL website at the following link: http://www.netl.doe.gov/research/energy-efficiency/publications

[2] The National Energy Technology Laboratory (NETL) and Department of Energy (DOE) use the terms "Smart Grid" and "Modern Grid" somewhat interchangeably throughout their literature.

[3] Developed by the National Energy Technology Laboratory for the U.S. Department of Energy Office of Electricity Delivery and Energy Reliability.

Smart Grid Principal Characteristics

1) **It will enable active participation by consumers**. The smart grid will give consumers information, control, and options that enable them to engage in new "electricity markets." Grid operators will treat willing consumers as resources in the day-to-day operation of the grid. Well-informed consumers will modify consumption based on the balancing of their demands and resources with the electric system's capability to meet those demands.

2) **It will accommodate all generation and storage options**. It will 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. Large central power plants will continue to play a major role even as large numbers of smaller distributed resources, including Plug-in Electric Vehicles, are deployed.

3) **It will enable new products, services, and markets**. The Smart Grid will link buyers and sellers together – from the consumer to the Regional Transmission Organization. It will support the creation of new electricity markets from the home energy management system at the consumer's premise to technologies that allow consumers and third parties to bid their energy resources into the electricity market. The Smart Grid will support consistent market operation across regions.

4) **It will provide power quality for the digital economy**. It will monitor, diagnose, and respond to power quality deficiencies resulting in a reduction in the business losses currently experienced by consumers due to insufficient power quality.

5) **It will optimize asset utilization and operate efficiently**. Operationally, the Smart Grid will improve load factors, lower system losses, and improve outage management performance. The availability of additional grid intelligence will give planners and engineers the knowledge to build what is needed, when it is needed, to extend the life of assets, to repair equipment before it fails unexpectedly, and to more effectively manage the work force. Operational, maintenance, and capital costs will be reduced thereby keeping downward pressure on prices.

6) **It will anticipate and respond to system disturbances (self-heal)**. It will heal itself by performing continuous self-assessments to detect and analyze issues, take corrective action to mitigate them and, if needed, rapidly restore grid components or network sections. It will also handle problems too large or too fast-moving for human intervention.

7) **The Smart Grid will operate resiliently against attack and natural disaster**. The Smart Grid will incorporate a system-wide solution that reduces physical and cyber vulnerabilities and enables a rapid recovery from disruptions. Its resilience will create an image that intimidates would-be attackers. It will also be less vulnerable to natural disasters.

It is noteworthy that these value areas and principal characteristics of a modernized grid are well aligned with the benefits of Grid Modernization described in the NH Energy Strategy which

states “[t]he potential benefits of grid modernization are wide-ranging and can include better outage response and increased reliability; enhanced customer engagement in reducing the high costs of meeting peak demand; easier integration of distributed generation, renewable resources and energy storage; improved efficiencies for distribution utilities; advanced integration of electric vehicles; and cost savings for all customers.” [4]

UNITIL’S VISION OF GRID MODERNIZATION

Unitil has followed and generally adopted the DOE vision of grid modernization since it first emerged in 2007. Over time, this framework has guided the Company’s efforts in such areas as integration of Distributed Energy Resources (DER), implementation of Advanced Metering Infrastructure (AMI), implementation of Outage Management Systems (OMS), and integration of various other information technologies including Supervisory Control and Data Acquisition (SCADA), Geographic Information Systems (GIS), fleet telematics, together with AMI and OMS. While the DOE framework does an excellent job defining the characteristics and value areas of the modern grid and provides a general road map to achieve the required functionality, it does not identify the specific technologies needed, nor does it define “who” is best positioned to implement specific technical capabilities and services. Instead, it is assumed that new markets and new technologies will emerge in response to changing policies and clean energy objectives, and in response to the changing preferences and needs of customers.

The Company believes that an important element of this proceeding will be to identify the desired functionality of a modernized grid while also considering which specific functions and services are best provided by the utility, and which could be provided by newly emergent competitive markets. It is the Company’s vision that the modernized grid will provide a robust network that integrates customers, competitive markets and new technologies in a manner that achieves the desired objectives and functionalities, though the regulated utility may not be the entity that develops or implements specific technologies or services. From the Company’s perspective, it does not make sense to devote utility capital to the development of technological innovations that competitive markets may be better able, suited and willing to provide.

Unitil believes that the primary role of the electric distribution companies, first and foremost, is to provide safe and reliable service while implementing technologies, investments and programs aimed at making the grid more efficient, economic and secure. This encompasses several of the value areas and characteristics of the DOE smart grid framework. Beyond these traditional obligations, the Company sees itself as responsible for implementing enabling technologies supporting both traditional electric company operations and new smart grid capabilities. Unitil’s vision of the modern grid is that it will be defined by the functionality that it delivers as opposed to the specific technologies deployed, many of which are only now emerging or have yet to be developed. The Company sees its business model changing in order to become an "enabling platform" supporting diverse activities by third parties and electricity customers. This is consistent with the Energy Vision described in the NH Energy Strategy which states in part:

[4] 2014 New Hampshire State Energy Strategy at page 17.

> In 2025, 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. [5]

Under the Company's vision, the utility electric grid and associated Operations Technology (O.T.) and Information Technology (I.T.) systems will function as an open, flexible platform integrating customers, competitive markets and service providers in a way that delivers the functionality of the DOE's smart grid vision. Under this vision the modern grid is not simply a newer, upgraded version of the legacy electric system, nor is it a specific technology or suite of technologies layered onto the existing utility systems. The modern grid is instead the foundation of a larger ecosystem of customers, competitive markets and service providers who are interacting with the utility electric grid and the utility's information systems. Utility investments should be focused on those areas that support or enable the development of this new operating environment, including the necessary information systems. State strategy should be aimed at putting in place the essential policies necessary for this ecosystem to develop, grow and flourish.

In summary, the proceeding should not focus narrowly on the utilities and their electric systems and planning processes. The scope of the proceeding should instead adopt a holistic view of the current electricity marketplace and consider the entire ecosystem that will be built upon the foundation of grid modernization. Only through a comprehensive view of customers, competitive markets and emerging technologies will the appropriate policies be identified to enable the creation of the smart grid ecosystem, of which the electric distribution companies will be a part.

DATA ACCESS, PRIVACY AND SECURITY

Given the intricacies and importance of information technologies and data interchange, the Company believes that another important area be included in the scope of investigation into grid modernization should be protocols for data access (including meter data access), data security and consumer privacy. Information and the exchange of information will be the lifeblood of the smart grid ecosystem. Many of the principle characteristics identified the DOE Modern Grid Strategy (e.g., enabling active participation by consumers, integrating diverse generation and storage options, and enabling new products, services, and markets) will develop from information maintained by the utility and shared externally with customers and service providers. The availability of this information will be crucial to the development of new electricity markets and services. No investigation into grid modernization would be complete without addressing data and data exchange, as well as the related topics of consumer privacy and information security.

[5] *Id* at page 3.

RATEMAKING AND REGULATORY MODELS

A common refrain among policymakers, industry experts, and other stakeholder is the belief that utilities must adapt their business model to respond to the rapidly changing landscape of grid modernization, and especially distributed energy. In fact, the presentation accompanying the State Energy Strategy contains a statement attributed to the NE Clean Energy Council that reads "Electric utilities must now adjust operational practices to accommodate a growing variety of distributed energy resources and modernize their planning processes to fully integrate and take advantage of . . . these advanced energy technologies. *Utilities must evolve their business model to adapt to this changing world*." (emphasis added) The Company agrees that the utility business model must change. However, this raises an important question – is a utility's business model really any different than its regulatory model? Can utilities transform their business model without changes to regulation and ratemaking? It is the Company's belief that its business model is indistinguishable from its regulatory model.

The NH Energy Strategy recognizes that regulatory models will need to adapt to the State's vision for a new energy future. As noted in the strategy "[w]hile hardware upgrades offer exciting opportunities, to achieve the full benefits of grid modernization, technology upgrades *must be paired with reformed regulatory and market structures*, particularly those that engage and incent consumers *and reflect the true costs of providing electricity and the true benefits of distributed energy generation sources*." [6] (emphasis added) The NH Energy Strategy also recommends that regulatory structures and rate design to realign utility incentives be included in the investigation into grid modernization stating "the State should ensure that the docket recommended in the Grid Modernization chapter takes into consideration changes recommended here." [7]

Unitil agrees that any investigation into grid modernization would be incomplete without consideration of a new policy framework and changes to regulation that will be needed to create a successful environment for grid modernization. To be more specific, ratemaking, cost allocation methodologies and pricing of distribution services must all evolve in response to the changing nature of today's customers. 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 on-site needs through a variety of options and resources, giving rise to a new class of customers unlike those of the past. Just as the functionality of a modernized grid must necessarily change in response to the needs of these customers, Unitil believes the pricing of grid services must change as well.

RATE DESIGN CHANGES TO PROPERLY VALUE GRID SERVICES

As noted in the earlier statement attributed to NE Clean Energy Council, electric utilities must adjust their operational practices and modernize their planning processes to accommodate a

[6] *Id* at page 18.

[7] *Id* at page 33.

growing variety of distributed energy resources in order to fully integrate and take advantage of advanced energy technologies. Implicit in that statement should be a recognition that prosumers who are implementing distributed energy resources and advanced energy technologies must pay for their use of the electric grid in order to assure a viable and sustainable business model for electric utilities. If utilities are to evolve their business model to adapt to this changing world, they must develop new services to support distributed technologies and charge appropriate rates and fees for those services.

The NH Energy Strategy focuses extensively on Distributed Generation (DG) and the mechanisms needed to encourage small scale energy generation and make it more affordable and attainable. Mechanisms identified in the NH Energy Strategy include increasing RPS Targets and ACP Prices, expanding the State's net metering policy, implementing rate design changes to properly value DG, increasing and leveraging private financing, as well as tax exemptions and other incentives. Rate design changes to properly value DG refer to mechanisms that "*reward* distributed generation (DG) *for the value it provides to the grid*."[8] (emphasis added) Overlooked is any discussion of the value the grid provides to small scale energy generators, or of the cross-subsidies that exist under current policies. As such, Unitil believes this is a one-sided and incomplete characterization of the policies needed to support the envisioned surge in distributed energy technologies and create a sustainable environment for grid modernization.

The Company strongly believes the overarching objective of regulatory reform and rate redesign 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. This aligns with comments elsewhere in the NH Energy Strategy where the regulatory and market reforms needed achieve the full benefits of grid modernization are those that engage and incent consumers *and reflect the true costs of providing electricity* and the true benefits of distributed energy generation sources.[9] (emphasis added) Only through transparent and economically 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.

NET ENERGY METERING

Given that the NH Energy Strategy focuses extensively on increasing the deployment of small scale renewable energy generation and recommends expanding the availability of net metering as a means to encourage this development, the Company believes it will be important to address the pricing of the utility services needed to support this class of customers, and also to address the cross-subsidies resulting from current net energy metering policies. Unitil supports

[8] *Id* at page 48.

[9] *Id* at page 18.

net energy metering as an important policy that is vital to the growth of customer-owned renewable energy; especially intermittent energy sources. However, the Company believes it is the *functionality* provided by net metering that is essential, not the subsidy, and the policy of net energy metering has generally been misunderstood or mischaracterized.

In popular understanding, net energy metering has become synonymous with two things: 1) a financial incentive to customer-generators that values all of their generation output *at the full retail price*, including any occasional excess, and 2) the practice of using a single electric meter that is permitted to turn backwards. These definitions perpetuate the misconception that net metering fairly and appropriately values a customer's generation at the full retail rate (the rate at which they normally purchase electricity) while avoiding duplicative metering costs. This is simply an erroneous understanding of the functional value of net energy metering in the context of distributed energy.

Net energy metering is a grid-enabled energy service that addresses an important limitation of most small scale renewable energy resources (i.e., intermittency) by providing an inexpensive alternative to on-site energy storage and other requirements. Most small scale customer-generators are unable to balance their electricity production with their electricity consumption. Connection to the utility grid accomplishes this balancing inexpensively, offering a cheaper alternative to on-site energy storage and associated control systems. The customer-generator simply exports excess electricity to the utility system when it isn't needed, and later imports electricity when it is needed. In a sense, the utility system provides an energy storage service or balancing service ("Balancing Service").

Likewise, the grid connection in combination with net energy metering allows customers to size on-site generating equipment to achieve optimal economics without consideration of peak load requirements by allowing them to supplement their on-site electricity production with electricity imported from the utility grid ("Supplemental Service"). The utility grid offers reliable and inexpensive backup ("Backup Service") when on-site generation is unavailable, while also regulating voltage and frequency. In short, the connection to the utility grid is what makes most renewable energy resources economically viable and operationally palatable to customers, and it is the policy of net energy metering that delivers the essential functionality.

While net energy metering offers important grid-enabled functionality, it requires a reliable electric utility network to support the balancing, supplemental, backup and regulation services; services that must ultimately be paid for by customers. The major concern with net metering arises from rate designs that intentionally or unintentionally compensate customer generators "at the full retail price" (e.g., energy supply, transmission and distribution) for all energy produced, without compensating for the grid services that are actually used. As a result, customers without on-site generation disproportionately bear the costs of constructing and maintaining the grid, effectively subsidizing those with on-site generation. Arguably, customers with on-site generation (prosumers) use more grid services than those that simply use the grid for consumption, and the investments that may be needed to accommodate increased penetration of DG are not necessarily beneficial to non-generating consumers.

Unitil does not believe it is necessary to drastically overhaul the policy of net energy metering to address the issue of cross-subsidies; in fact the Company supports net metering of *energy* purchases. The current model simply requires a refinement of rate designs to appropriately allocate a portion of the utility's delivery charges to the customer-generators who benefit. Given that grid modernization will require new investments to seamlessly integrate all types and sizes of electrical generation and storage systems and support a "plug-and-play" level of convenience, it will be important to address cost allocation and pricing of services to ensure that customers without generation are not paying for the investments that benefit customers who have generation.

With regard to the existing provisions of RSA 362-A:9 Net Energy Metering, the Company believes that the clear intent of the existing statute is to provide net *energy* metering to eligible customer-generators. This net *energy* metering is specifically aimed at the customer's default generation supply or competitive electricity supply (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. Given this requirement, recovering distribution services through charges other than volumetric energy usage would be entirely consistent with the statute. The Company believes it is entirely feasible to develop tariff's for net energy metering that are consistent with the provisions of RSA 362-A:9 by recovering distribution costs through charges other than volumetric energy usage.

CUSTOMER CONSENT UNDER RSA 374:62

As one final area of comment, the Order of Notice notes that grid modernization includes the incorporation of "smart meters" but states that, pursuant to RSA 374:62, "no electric utility is allowed to install a smart meter device without the written consent of the customer." The Company believes that the requirement to obtain the written consent of the customer has been misstated in the Order of Notice.

The Company implemented an Advanced Metering Infrastructure (AMI) system for 100% of its New Hampshire electric customers in 2006 and has relied on this system to accomplish its meter reading functions since that time. AMI systems such as Unitil's normally meet the definition of "smart metering" (AKA advanced metering) which is usually defined as the ability to record and retrieve more frequent, time-based metering information in combination with communication technology that allows communication between the utility and the meter. The Company does not believe such a system violates any provision of RSA 374:62.

RSA 374:62 is titled Smart Meter *Gateway* Devices (not smart meters) which are defined as any "electric utility meter, electric utility meter component, electric utility load control device, or device ancillary to the electric utility meter, which is located at an end-user's residence or business, *and which serves as a communications gateway or portal to electrical appliances, electrical equipment, or electrical devices within the end-user's residence or business, or which otherwise communicates with, monitors, or controls such electrical appliances, electrical*

equipment, or electrical devices." RSA 374:62 II. (a) establishes that "[n]o electric utility that sells or provides electricity within the state of New Hampshire shall install a smart meter *gateway* device on or in a person's home or business without the written consent of the person or persons who own the home or business." By definition, a smart meter would only be considered to be a smart meter gateway device if it contained functionality allowing it to communicate with, monitor, or control the end-user's equipment or devices *inside the home or business*.

While this type of functionality does indeed exist, and may be encompassed under a broader definition of advanced metering, it is not necessary to incorporate this functionality in order to accomplish smart metering. Rather, this functionality is an optional or enhanced feature that is not integral to smart metering and is not the specific capability that differentiates the metering system as "smart". Thus, smart meters, advanced metering, and AMI systems are not subject to the customer permission requirement of RSA 374:62 except to the extent that they include enhanced functionality enabling communication and control inside the customer's home. Unitil's AMI system does not have this functionality and hence does not meet the definition of a smart meter gateway device. Therefore, no customer consent is required.

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The Company is available to respond to questions concerning these comments, and looks forward to the opportunity to work with the Commission and interested parties on these issues.

Respectfully submitted,

Unitil Energy Systems, Inc.