



Comments of Carolyn B. Anderson  
Green Mountain Power Corporation  
U.S. Department of Energy Quadrennial Energy Review  
Second Installment  
Electricity: Generation to End-Use  
Stakeholder Meeting #2: Boston, MA  
April 15, 2016  
Panel 1

Bulk Power Generation and Transmission: How Can We Plan, Build, and Operate the Appropriate Amount for Future Needs?

My name is Carolyn Anderson. I am the Director, Transmission Policy & Insurance with Green Mountain Power located in the beautiful state of Vermont. I would like to thank the Department of Energy for holding this meeting on bulk power generation and transmission and how we can plan, build and operate the appropriate amount for future needs. I am truly honored to be here.

### **Green Mountain Power**

Green Mountain Power is Vermont's largest utility serving over 265,000 customers. While we have been serving customers in Vermont since 1893, we are not your typical electric utility; we like to call ourselves the energy company of the future! We believe the traditional utility is changing and may even be vanishing. Green Mountain Power has a vision to use energy as a force for good, to improve lives and transform communities. We are focused on a new way of doing business to meet the needs of customers with integrated energy services that help people use less energy and save money, while continuing to generate clean, cost-effective and reliable power in Vermont. GMP is the first utility in the world to achieve a B Corp certification for which we had to meet rigorous social, environmental, accountability and transparency standards.

A focus of each employee every day is to be customer obsessed, and by that we mean exceeding the expectations of customers and offering solutions through new products and services to make their lives simpler. We are partnering with customers on a new energy future where energy is generated and used closer to where it is needed, is clean, reliable and cost effective.

### **Bulk Transmission and How We Plan For The Future**

The need for a reliable cost effective transmission system is evident. However, this system faces challenges from the ever increasing costs of reliability and security and the need to integrate distributed generation and storage. What Green Mountain Power sees is that the grid of the future will be a very different thing from the grid of the past with a much more distributed market platform that leverages battery storage. This creates challenges and opportunities. We have both cost and risk pressures from increasing capacity costs, the growing regional reliance on natural gas, flat or declining load growth, and increasing weather disturbances. With these challenges in mind, we believe every decision relating to the grid must be informed by a series of considerations to determine whether there truly is a need that cannot otherwise be met through

efficiency or other non-transmission alternatives and whether our money could be better spent investing in the equipment and technology, such as storage and automation, that could increase resiliency and efficiency.

### **Where There Are Challenges, There Are Opportunities**

We believe that technology and local renewable resources create an opportunity to embrace progress and transition to a new business model with much less reliance on the bulk transmission grid with centralized power sources and more reliance on a customer-focused distribution grid with energy generated closer to load. We have three strategic imperatives to advance this business model: (1) change the distribution grid model; (2) engage customer value; and (3) increase our reliance on local resources. To advance our three initiatives, we want to create value from the renewable energy supply and demand assets behind the customer meter; leverage advanced software and controls to automate grid observation and response functions for greater resilience and efficiency and do a complete refocus on grid investments to maximize local value and resiliency. These three strategic imperatives will enable Green Mountain Power to reduce reliance on the bulk transmission grid and deliver the new energy future that our customers tell us they want. Below, I discuss some of the tools, projects, products and services that Green Mountain Power is using to advance our strategic initiatives.

#### **Integrating Renewables on the Distribution Grid**

Solar penetration on Vermont's distribution grid is growing rapidly. To give you some perspective, in Green Mountain Power's service territory alone, at the end of February 2016, we had 109 MW of solar, and we expect to have 120 MW of solar representing more than 15% of our annual peak demand in the not too distant future. In 2017, there will be a new net metering rule which we expect will bring even more solar onto the grid. The high penetration presents potential system and operational opportunities. For example, the cheapest, most accessible land is not necessarily the best interconnection point on the grid. We want to encourage renewable generation closer to where the load is to mitigate some interconnection issues and better leverage this power source. We are constantly looking for tools to accommodate integration of renewables in a cost effective way that benefits customers.

A couple of these tools include the Vermont Weather Analytics Center (VTWAC) and Green Mountain Power's Interactive Distributed Generation Map. VELCO, Vermont's transmission only company which is predominantly owned by Vermont's distribution utilities, recognizing the challenges and opportunities of distributed generation and ever increasing weather disturbances, created VTWAC which uses advanced weather analytics and modeling tools to improve renewable generation and load forecasting. Green Mountain Power also is creating an Interactive Distributed Generation Map available on our website. It will be a tool for developers to self-serve and obtain necessary technical grid information to optimize the location, size and electrical details of their distributed resource projects. With this tool, we have automated the modeling and screening of distributed resource projects in an effort to reduce interconnection costs and project lead times.

### **Solar and Batteries**

One of the most exciting building blocks for integration of distributed generation is battery storage, and Green Mountain Power has several exciting initiatives. In 2013, the Vermont Department Of Public Service Clean Energy Development Fund issued a Request for Proposals (“RFP”) for an Electrical Energy Storage Demonstration Program funded by the Department of Energy. The RFP sought proposals from Vermont electric utilities and their partners for demonstrations of grid-scale electrical energy storage that (1) integrates renewable energy onto the grid; and (2) provides learning opportunities for the State, Vermont electric utilities, and other stakeholders. When the RFP came out, Green Mountain Power already was in the process of developing a 2.2 MW solar facility on a capped landfill known as the Stafford Hill Solar Farm located right next to the Rutland High School making it a perfect facility to incorporate battery storage. Green Mountain Power applied for and received the grant. The solar facility is comprised of 2.5 MW fixed solar; 2 MW/1MWH lithium ion batteries, 2 MW/2.4MWH lead acid batteries and 4 500kW multiport inverters. This project will provide energy and increase resiliency in an emergency. Features include the ability to island an emergency shelter at Rutland High School, system reliability benefits, renewable integration, potential for reduced transmission costs through peak shaving, and educational value as it will allow us to assess the viability of storage as an alternative in other locations around the state in order to provide grid resiliency benefits to customers that may be in more remote or rural locations of the electric system.

We also are working on a program to experiment with new control software to manage behind the meter devices on this same circuit where we will have 4 MW peak load, more than 3.5 MW of solar, 3.4 MWH battery storage, controllable water heaters and home energy storage units. The goal of this experiment is to help us better understand how to choreograph distributed energy resources such as controllable water heaters, residential energy storage units, utility scale energy storage and potentially other devices, in ways that help us manage a grid with energy generated close to the load it is serving. To continue to increase our knowledge and ability to seamlessly integrate renewables through battery storage, we also have recently undertaken another solar project that will incorporate battery storage in Panton, Vermont. This project will include the ability to island with battery storage providing emergency electricity to Panton.

### **Innovative Products and Services**

Green Mountain Power also is offering a whole line of innovative products and services to customers from home energy storage units to Electric Vehicle charging stations. Green Mountain Power is the first utility to partner with Tesla to offer the Tesla Powerwall, a home battery system that enables greater energy independence and offers customers an opportunity to save money by storing energy when it costs less off-peak. The energy can then be used when it is dark out or as an emergency back- up if there is a power outage. Through an innovative rate package, customers who allow some level of control of the batteries pay less, and GMP will partner with customers to utilize the batteries during peak energy times to directly lower costs for all customers by reducing transmission and capacity costs. In partnership with other stakeholders, our line of innovative services offers our customers home automation, LED lighting, weatherization, heat pump heating and cooling systems, heat pump hot water heaters

and more. We offer this comprehensively through our eHome program that helps people reduce their fossil fuel use and save money on their energy bills. The eHome program helps empower people to make their own energy choices and to partner with us to make it easier to make comprehensive changes.

#### **Clean Power, Cleaner Lake**

Green Mountain Power's Clean Power, Cleaner Lake is one of the most substantive efforts launched in the Lake Champlain basin to reduce phosphorus while generating electricity. Working with area dairy farms in St. Albans, Vermont, this effort will significantly reduce phosphorus runoff while generating clean, local baseload power. This exciting initiative alone will achieve about 1/3 of the EPA's goal for phosphorus reduction by farms in the St. Albans Bay. Green Mountain Power's community digester will use technology to extract phosphorus from the manure stream while generating renewable energy locally for customers.

#### **Conclusion**

Through these various initiatives, Green Mountain Power seeks to transform how we obtain and use energy, while continuing to generate clean, cost-effective and reliable power in Vermont. We recognize that we do not have all the solutions yet, but from our eHomes to digesters to battery storage initiatives, we are envisioning a dramatically different future for our company and our customers, and working hard to bring that future to them as quickly as we possibly can.

Thank you for this opportunity to present Green Mountain Power's vision for our energy future.