Public Service of New Hampshire

A Northeast Utilities Company

PSNH Energy Park
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire
P.O. Box 330
Manchester, NH 03105-0330
(603) 634-2761
Fax (603) 634-2213

William J. Quinlan
President and Chief Operating Officer

July 25, 2014

Meredith Hatfield, Director
New Hampshire Office of Energy & Planning
Gov. Hugh J. Gallen State Office Park
107 Pleasant Street
Concord, New Hampshire 03301

Re: New Hampshire Energy Strategy

Dear Meredith:

I am writing in response to your request for comments on the New Hampshire State Energy Strategy draft document, dated May 1, 2014, prepared by Navigant Consulting. Public Service of New Hampshire (PSNH) appreciates the opportunity to be involved in the ongoing process that is leading towards the development of an energy strategy for the State of New Hampshire.

We recognize the future economic well-being of New Hampshire depends upon a comprehensive, long-term energy strategy. As a result of advancements in technology and fuel supply, it is truly an exciting time to be in the energy business. Our goal is to be the most respected energy company in the region and to deliver outstanding reliability and superior service to our customers. To accomplish these objectives we intend to pursue transformational change through innovation.

PSNH is already fully engaged in meeting New Hampshire's energy needs by leading the implementation of quality energy efficiency programs, making the investments to enable a more modern grid, and enabling the integration of clean energy resources to our energy system. We are also actively pursuing opportunities to enhance the service to our customers as we move into the future. PSNH hopes to be a partner in the implementation of New Hampshire's State Energy Strategy as we together strive for a successful energy future for our state.

After reviewing the document prepared by Navigant Consulting and participating in the process, we think it is important to first share our views on the energy challenges we see in the region, and then we will provide our specific views and recommendations on the different elements of the draft document.

Regional Challenges

The New England region faces several energy supply challenges that we believe need to be addressed in order to set the foundation for the critical energy policies that New Hampshire wishes to implement through this long-term energy strategy.

On the generation front, the region has undergone a major change, as the production of energy from traditional fossil fuels, such as coal and oil, has generally transitioned to natural gas. In 2000, natural gas comprised 15 percent of the region's generation output. Today natural gas has risen to be about half the generation output. This substantial shift has occurred without corresponding investments in natural gas delivery infrastructure. With 3,000 MW of reduced capacity occurring over the next several years and another 5,000 MW of generation projected by ISO-NE to potentially retire in the foreseeable future, the situation will become even more precarious in the coming years. Most of that generation is expected to be replaced with natural gas units, further increasing our region's dependence on natural gas.

The past winter weather exposed these weaknesses in New England's gas infrastructure, generating capacity and reliability. Gas infrastructure constraints, coupled with high oil prices, led to incredible market price pressure and volatility. In total, the energy market value for the winter of 2013-2014 was more than $6.8 billion, which is up from an average of $2.8 billion during the previous three winters. We believe that approximately $3 billion of this increase can be directly attributed to pipeline constraints. This occurred when over 10,000 megawatts of the region's most efficient power plants sat idle without gas supply. In essence, New England almost "ran out of gas" for power generation. If not for our non-gas burning facilities, ISO-NE and New Hampshire would likely have faced energy supply curtailments. The implementation of ISO-NE's "oil storage" program kept the lights on with oil running in merit versus the high cost of natural gas. But the cost to our customers and to our regional economy was significant and we feel this problem is highly likely to be repeated in upcoming winter periods.

As power plants retire and production shifts, we will need to substantially reinforce our transmission grid to eliminate bottlenecks and price congestion. Remaining fossil fuel facilities will play a critical back-up role providing fuel diversity and competitive pricing. In addition, as part of the Regional Greenhouse Gas Initiative (RGGI), New England states have implemented a set of aggressive greenhouse gas emission reduction goals, and have aggressive renewable portfolio standard targets. These goals will lead to greater investments in clean energy generation, but the output of this generation will need to be connected to the load centers where it is going to be consumed.

Important opportunities to address these challenges include importing low-cost clean hydro power from Canada and developing northern New England's economic renewable power potential. Both of these opportunities will require significant transmission investment that falls outside of our traditional regional, reliability-based tariffs. These efforts will assist the region and New Hampshire in meeting stricter environmental regulations, and achieving the shared objective of reducing greenhouse gas emissions.

As a result, we support the New England States Committee on Electricity (NESCOE) initiative, which seeks to bring between 1,200 to 3,600 of clean renewable energy into the region through a combination of transmission and long-term contracts. The NESCOE initiative also calls for expanding the region's natural gas capacity. Although it is the fuel of choice for the region, we have not seen gas transmission capacity, other than LNG based imports added, in more than 20 years in New England. We need to address this situation as it keeps our most efficient capacity off line in the winter and adds potentially $3 billion in inefficiency costs to our customers' bills and increases reliability risks.

We also believe that the remaining power generation facilities in the region are needed to assist in getting to a new future state. The New Hampshire Energy Strategy focuses appropriately on new initiatives for bulk power supply – gas fired generation, renewable energy facilities, and clean energy from out of the region. However until these new additions to the New England and New Hampshire

energy supply mix are in place, existing resources should be recognized as an important bridge to the future.

In summary, we believe New Hampshire and the region need to address these immediate challenges in order to set the foundation for a successful long-term energy strategy. We are committed to supporting New Hampshire and the other New England states in pursuing solutions to address these critical issues.

ENERGY EFFICIENCY

Our parent corporation, Northeast Utilities (NU), and its subsidiaries have been on the forefront of providing energy efficiency products and services to customers for many years. PSNH's energy efficiency services team members have been recognized on both the regional and national level for their collaboration and outreach efforts that have allowed them to meet or exceed energy savings goals each year. In Massachusetts, the leadership of NSTAR and WMECO (two of NU's subsidiaries) has propelled the state to the #1 ranking in the United States in energy efficiency by the American Council on Energy Efficiency Economy (ACEEE); and, in Connecticut NU's CL&P subsidiary has led the state to be ranked #5 in the country by ACEEE.

The leadership and results of the programs and services that we have provided are undeniable and significant. In the past three years alone, NU's subsidiaries have delivered approximately $1 billion in energy efficiency portfolio service while creating $4 billion in customer savings and serving 3.8 million customers. The company has completed approximately 180,000 energy audits, weatherized more than 100,000 homes and deployed approximately $180 million in private financing capital. The company's environmental stewardship through these initiatives has resulted in the equivalent of removing 175,000 cars off the road, negated the need to build the equivalent of a 320 MW fossil fuel power plant and delivered the equivalent of building 2,000 MW of solar generation. In 2014 alone, NU companies will drive close to 1 TWH in electric savings for our customers.

PSNH, along with other utilities in New Hampshire, has a successful and proven track record of being able to scale the CORE Programs in a cost effective manner to deliver energy efficiency to customers as demonstrated via partnerships with the New Hampshire Office of Energy and Planning (NHOEP), Community Development Finance Authority (CDFA), Community Action Agencies (CAAs) and the New Hampshire Public Utilities Commission (NHPUC) prudently using System Benefit Charge (SBC), Forward Capacity Market (FCM), American Recovery and Reinvestment Act (ARRA), Department of Energy – Weatherization Assistance Program (DOE-WAP) and Regional Greenhouse Gas Initiative (RGGI) funds. The company has continued to expand education and community involvement in its programs and, importantly, has the ability to leverage larger NU experiences for the benefit of New Hampshire.

As a result of a deep understanding of our customers and markets, PSNH/NU can provide additional benefits to our customers. PSNH can evaluate customer energy usage to target the right services to the right customers with integrated energy solutions that meet their particular needs in a way they can afford. PSNH/NU has assembled an innovative entrepreneurial energy efficiency organization that has the expertise to bring additional benefits to New Hampshire immediately – specifically through:

- engaging key stakeholders and policy makers to support investments in energy efficiency
- driving demand for energy efficiency among customers
- driving the sophistication and scaling of the delivery infrastructure

- simple, yet effective, financing models that leverage local financial institutions

Energy Efficiency Recommendations

Energy efficiency can provide significant benefits to the business, residents and communities in New Hampshire. We believe there are four key areas that need to be incorporated to have an effective economic model for energy efficiency programs and we recommend these be included in the draft energy strategy.

- Program cost recovery coincident with spending, and true up in the subsequent year.
- Full lost revenue recovery on energy efficiency driven savings.
- Performance-based incentives that transform energy efficiency into a sustainable line of business for utilities.
- Low cost financing mechanisms that support customer investment in energy efficiency and leverages local financial institutions.

GRID MODERNIZATION AND AUTOMATION

Customer expectations are changing. Customers today are more dependent on the grid than ever. Our customers need the grid to power electronic devices that allow them to communicate, to entertain, to transact, and to run their small businesses. In this new world, our customers' expectations around reliability, resiliency and automation have increased significantly and we, at PSNH, are working to make the right investments in infrastructure to meet those expectations.

The advent of new control, communications and systems technologies are providing utility companies with numerous opportunities to modernize and automate the grid. PSNH believes that grid modernization and automation is an absolute necessity and is essential to meeting customer's increasing expectations. Overall, PSNH believes that cost effective modernization of the electric distribution system should focus on three primary objectives by deploying technology that allows real time situational awareness: (1) to reduce the frequency of outages; (2) to reduce the effect of outages; and (3) to improve situational awareness to provide greater customer service. These three objectives are beneficial to customers today and the future operating environment.

PSNH and NU are already undertaking important grid modernization and automation investments. We are leaders in the U.S. in efforts to automate our grid to attain a greater awareness of system conditions that provide a higher level of reliability to our customers. PSNH is also focused on system hardening and finding opportunities to reduce the frequency of outages.

For example, to improve service reliability and reduce the extent, frequency and duration of customer outages, PSNH started a pilot in 2012 to test new system, control and communication technologies. PSNH's "self-healing" system pilot combines detection, assessment, decision support and network control to automatically reroute power around outages – limiting households and businesses affected to those closest to the damaged equipment. Customers whose power can't be restored remotely will still see shorter outage times, as the system analyzes the outage cause and immediately dispatches the best resources to fix the problem. PSNH has deployed this system on three circuits affecting approximately 32,000 customers. The project included the installation of automated switches, new communication networks and a new distribution management system. Early results have been impressive, showing a 50 percent improvement in reliability.

We are also making important investments in technologies that are providing us with greater situational awareness to improve our customer facing processes. For example, we have invested in new web-based software to tap a centralized callout and crew management database for deploying crews to restore electric service and trim service restoration times by several minutes. We have also reduced restoration times by upgrading our outage management systems to provide a more efficient and automated method to track the outage restoration process, which also enhances information available to customers.

We believe cost-effective grid modernization and automation investments are important. One element highlighted in the draft strategy as a potential tool is Advanced Metering Infrastructure or AMI. At this time, NU and PSNH believe that a broad-based deployment or a multi-stage roll-out of AMI is not cost-effective. On the cost side, AMI deployments experience a set of high fixed upfront costs beyond the smart meters themselves. Investments in communications, meter data management, billing and other IT systems are required before benefits can be accrued. In addition, there are significant O&M costs required to manage the systems and the data provided by AMI. Cyber-security and data privacy are important considerations at the time of an AMI deployment as well. Finally, there might be other alternatives that could leverage third-party investments in communication technologies (e.g., Nest thermostats) that could provide similar capabilities than AMI at lower costs to our customers.

Several of the benefits that AMI provides require making assumptions about customer behavior that are difficult to quantify. Pilot programs have shown that residential customers who engage in dynamic pricing do shift load in response to price signals and that the response is stronger when linked to smart thermostats. However, there is no consensus on "engagement" levels, and pilot results show very low penetration rates (e.g., in the 2-5 percent range). Commercial and industrial response rates to dynamic pricing are less understood and thus more difficult to predict. Finally, very low utilization of central air conditioning in New Hampshire negates much of the value of dynamic pricing and its impact on peak load reduction in today's markets.

PSNH believes that many more effective grid modernization and automation investments exist, and continue to be developed, that can provide customers with better reliability and lower costs. However in order to fully capitalize on these opportunities, the regulatory model needs to evolve to encourage utilities to make these investments. These investments carry a higher level of uncertainty given the nascent nature of most of the technologies being deployed. Regulatory models that address this uncertainty and incent utilities appropriately could be a catalyst to ensure New Hampshire captures the opportunities provided by new technologies. For example, the existing Reliability Enhancement Program (REP) implemented at PSNH has proven to be a great tool in allowing the company to undertake grid modernization and automation investments. Similar mechanisms exist for system hardening investments in our Connecticut subsidiary and are being considered for grid modernization efforts in Massachusetts.

In summary, PSNH believes that opportunities to modernize the grid in New Hampshire exist. A focus on cost-effective investments, with the proper regulatory model, will allow PSNH and other utilities to make these investments in a timely manner and will lead to greater reliability, lower costs and a more engaged and satisfied customer base.

Grid Modernization and Automation Recommendations

- Develop mechanisms that support increased investments in grid modernization and automation (1) reduce the frequency of outages; (2) reduce the effect of outages; and (3) improve situational awareness to provide greater customer service.

- Establish a recovery mechanism (similar to the REP) to encourage the needed investments in grid modernization and automation that provide benefits to our customers.
- Focus on cos- effective grid modernization and automation investments and question technologies that have high costs and an unclear set of benefits.

RENEWABLE ENERGY

New Hampshire currently hosts approximately 900 MW of renewables (solar PV – 7 MW, biomass – 267 MW, onshore wind – 171 MW, and small hydro – 455 MW) as noted in the draft strategy report. PSNH has a strong history and position in the area of renewable energy and has helped to develop and interconnect a variety of resources. PSNH's overarching 'all of the above' strategy for energy in New Hampshire supports renewable energy as a key ingredient as the state looks to diversify its resources. The company will continue to look for opportunities to provide clean renewable and reliable energy to its customers at the lowest possible cost.

PSNH has supported specific renewable energy projects in New Hampshire including: Lempster Wind, Northern Wood Power at Schiller Station, Burgess Biopower, a solar PV system on our Manchester headquarters building and efficiency upgrades at PSNH hydroelectric stations. New Hampshire in general has seen a healthy amount of new renewable projects including Groton Wind and Granite Reliable Wind, as well as others currently in queue. PSNH is also a strong supporter of the Renewable Portfolio Standard (RPS) program that was enacted in 2008. Since then, PSNH customers have contributed more than $60 million dollars to renewable energy initiatives via the inclusion of RPS compliance costs in electric rates. Included in the $60 million is almost $27 million in contributions to the Renewable Energy Fund (REF). Between 2014 and 2025, PSNH estimates that New Hampshire utilities and energy suppliers will contribute, on behalf of their customers, more than $1 billion related to RPS compliance.

Micro-hydro facilities, small scale solar PV arrays and renewable fuels used at customer facilities or homes are all part of a future energy strategy. They, like all elements of fuel diversity and renewable energy supply, are positive and needed contributions. PSNH is taking steps to support further use of these resources. For example, in collaboration with the New Hampshire Office of Energy Planning (NHOEP), PSNH is an active participant on the US DOE SunShot Solar Rooftop Challenge. PSNH also has taken steps to simplify the interconnection process for customer-sited solar projects and is committed to working with NHOEP to identify and implement additional measures to make this a streamlined process that promotes a safe and reliable electrical system.

PSNH is willing to further investigate ways to help customer-sited Distributed Generation (DG) programs that sensibly fit the long-term vision of New Hampshire's energy future. However, PSNH is also concerned about potential cross subsidization issues associated with net metering rules and is willing to participate in efforts to restructure this incentive mechanism to ensure that all customers pay their fair share of system costs.

PSNH agrees with the Navigant conclusion that RSA 374-G has been underutilized to-date. This statute allows New Hampshire electric utilities to invest in renewable and clean distributed energy resources, recognizing that these resources can increase delivery efficiency, provide energy security and increase fuel diversity. PSNH supports legislative or regulatory action to better define the parameters by which a utility-proposed DG project will be reviewed and approved for cost recovery.

Finally, PSNH supports expanded use of the Renewable Energy Fund (REF). The REF is already used to support various renewable energy grants and programs, and PSNH agrees with efforts to ensure that its funds are made available to additional qualifying projects.

Renewable Energy Action Items

- Implement an "all of the above strategy" that includes renewables as a key element to meet New Hampshire's energy needs.
- Investigate ways to help customer-sited distributed generation programs that make sense for customers, the state and the company as part of New Hampshire's long-term energy vision.
- Identify better incentive mechanisms to support distributed generation to ensure that all customers pay their fair share of system costs.
- Identify an effective process and parameters by which a utility-proposed distributed generation project will be reviewed and approved for cost recovery.
- Expand the use of the REF.

TRANSPORTATION

PSNH and NU recognize that energy expenditures in the transportation sector make up about 46 percent of total energy expenditures in New Hampshire. Increasing consumer access to alternative fuel transportation options, such as electric vehicles and plug-in hybrids, can reduce consumer energy expenditures, reduce greenhouse gas emissions and increase energy independence.

There are more than 15 highway-capable plug-in cars available in the American market from nine major car manufacturers, plus several models of electric motorcycles, utility vans and neighborhood electric vehicles (NEVs). However, not every model is available in New Hampshire. Certain vehicles, such as the Chevrolet Spark EV, are only available in California and selected states that have adopted the California Zero Emissions Vehicle (ZEV) program. Even with limited availability in New Hampshire, customers are increasingly considering electric vehicles (EVs) as a viable transportation alternative, offering a clean, lower-cost fuel option. At the end of 2013, there were more than 600 plug-in EVs registered in New Hampshire.

The draft strategy document describes well the technologies, infrastructure and methods to reduce vehicle miles traveled, while at the same time supporting the needs of residents and the state's economy. This vision could be expanded to also describe the availability of alternative fueled vehicles. Alternative fueled vehicles should be as easy to purchase as conventional vehicles. Automobile dealers, utilities and other businesses can work together to eliminate barriers to consumers interested in driving an electric vehicle. In addition, the message that alternative fueled vehicles will lower consumers' total energy bills could be strengthened.

The draft energy strategy identifies the key elements in a comprehensive transportation strategy, vehicle performance and availability, fueling infrastructure and programs to reduce vehicle miles traveled. As explained in the draft, vehicle standards play a role in advancing the goals of New Hampshire. Consumer

awareness and interest will be important to the success of the transportation vision. According to a new consumer survey from Navigant Research[1], favorability ratings for alternative fuel vehicles remain high, with all three types of vehicles (hybrid, electric, and natural gas) above the 50 percent mark for favorability. Consumer awareness of specific models, however, is still relatively low: 44 percent of the respondents are familiar with the Chevrolet Volt, but less than one-third are familiar with the Nissan Leaf, the Tesla Model S, Ford's C-Max Energi and BMW's i3.

Promoting the availability and effective marketing of all plug-in electric vehicle models is an important priority. Many parties should be engaged in this collaborative effort, including automakers, dealers, Clean Cities programs, associations and utilities. PSNH and NU can provide a valuable link to consumers by acting as a resource for them to learn more about electric vehicles and the infrastructure to fuel them.

The energy strategy should highlight the importance of consumer awareness. While many parties should be included in this effort, PSNH and NU are ready to partner with New Hampshire to collaboratively take on this challenge. Since 2013, we have offered an electric vehicle information center hotline, 855-463-6438, staffed Monday through Friday from 8 a.m. to 5 p.m. with a team of specialists dedicated to providing customers with helpful information about electric vehicles and supporting technology. We also launched a Plug My Ride (http://psnh.plugmyride.org/) resource website to provide our customers with fast access to EV information and resources at any time.

PSNH and NU can collaborate with New Hampshire on off-peak EV charging research. EV charging is unique for a variety factors. Usage characteristics (such as time, rate and location) are flexible and can be shaped with technology and consumer behavior. EVs are parked for long periods of time for overnight charging, and demands on the utility system are low during this time. However, because the EV market is in its early stages and will be driven primarily by customer behavior, it is not possible to address all potential system impact issues at this time.

In the long-term, the prospect of opening up the transportation sector to electricity has the potential to increase kWh sales for EV charging and allow the spread of fixed costs across a larger base of customers. The key to realizing this potential in New Hampshire is to integrate this load into the grid in a cost-effective way, where the cost of utility infrastructure investments are less than the revenues from the sector.

In both the short-term and long-term, however, the utility must ensure that the electric distribution system has sufficient capacity to serve private residential EV charging. The technologies that are currently available and under development hold promise in supporting utility efforts to mitigate grid impacts and provide additional incentives to EV drivers. Utility research and pilot projects can provide valuable insights to guide future direction.

In summary, the draft energy strategy provides a positive vision to move forward. PSNH and NU are prepared to help partner with New Hampshire on increasing consumer awareness of EVs and performing research on off-peak charging alternatives.

---

[1] 2013, Navigant Research, Electric Vehicle Consumer Survey Consumer Attitudes, Opinions, and Preferences for Electric Vehicles and EV Charging Stations

Transportation Action Items

- Identify mechanisms for collaboration across multiple stakeholders, including utilities, to promote consumer awareness of the availability and benefits of all models of plug-in electric vehicles.
- Establish mechanisms to determine the best approach for off-peak EV charging in order to integrate this new load into the grid in a cost-effective way, where the cost of utility infrastructure investments are less than the revenues from the sector.
- Support efforts by utilities to mitigate grid impacts from EVs and propose potential rate design methodologies that account for the comprehensive impacts of EV charging to the utilities and customers.

CONCLUSION

PSNH has a long history of partnering with the State of New Hampshire to help improve many areas of the state's economy, and I am appreciative of the opportunity to continue this partnership. I look forward to working with you and the state Energy Advisory Council as you finalize an energy plan that sets New Hampshire on an exciting and well-grounded course to successfully achieve its desired energy future.

Thank you for this opportunity, and I look forward to a continued dialogue.

Sincerely,

William J. Quinlan
President and Chief Operating Officer