The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

July 10, 2018

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

RE: Docket No. DE 16-576, Development of New Alternative Net Metering Tariffs and/or Other Regulatory Mechanisms and Tariffs for Customer-Generators
Value of DER Study Scope and Timeline Final Report

Dear Director Howland:

Thank you for the opportunity to provide written comments relative to the Public Utility Commission (PUC) docket DE 16-576 "Value of Distributed Energy Resources Study Scope and Timeline Report" that was filed by Commission Staff on May 8, 2018.

During the development of the proposed Value of Distributed Energy Resources (VDER) scope, the VDER study working group identified 19 study parameters to evaluate as part of a DER "value stack." The study working group was able to reach consensus on a majority of these parameters. In a few instances, there were differences of opinion among the stakeholders regarding either the evaluation approach or whether to include an item. The NH Department of Environmental Services (NHDES) has elected to focus its comments exclusively in support of parameter No. 16 – "Externality Benefits," with which NHDES has some level of familiarity and direct knowledge. NHDES recommends that item No. 16 should be maintained within the scope of the VDER study. In this letter, NHDES highlights information presented previously, and offers additional studies that the Department feels should be considered in the development of the final VDER study scope.

Small-scale renewable distributed energy resource (DER) projects, such as solar and hydro, are non-emitting energy resources and are, therefore, a key strategy for reducing the emissions of air pollutants and greenhouse gases from electric generation. In addition, renewable energy has long been recognized as an economic development opportunity for the state. In 2007, Ross Gittell was commissioned to conduct a study of the economic costs and benefits of a Renewable Portfolio Standard (RPS) in New Hampshire. His team's analysis found that, while there are costs associated with a RPS, the net economic and environmental benefits were expected to be positive for New Hampshire.[1] Since the release of that report, the findings that

[1] Ross Gittell and Matt Magnusson (2007). Economic Impact of a New Hampshire Renewable Portfolio Standard, University of New Hampshire, https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/documents/unh_rps_report.pdf. (Accessed on July 6, 2018)

accelerating the deployment of renewable energy will fuel economic growth and create new employment opportunities have been replicated at the regional,[2] national,[3,4] and international[5] levels.

Net-metering is intended to provide reasonable opportunities for electric customers to invest in and interconnect customer-generator facilities and receive fair compensation for such locally produced power, while ensuring costs and benefits are fairly and transparently allocated among all customers. NHDES supports the completion of a comprehensive study of the value that distributed renewable generation provides in order to develop an appropriate compensation rate to for customer-generators in exchange for the full range of services that they provide to the grid, local distribution network, ratepayers as a whole, and the state. Such compensation rate is anticipated to support the expansion of DERs and result in positive environmental and economic benefits for the state.

Externality Benefits Review

As noted above, NHDES has elected to focus its comments exclusively in support of parameter No. 16 – "Externality Benefits." The inclusion of this parameter arose from PUC Order No. 26,029, in which the Commission noted, based on expert testimony, that the VDER study design parameters:

> *"may also include consideration of demonstrable and quantifiable net benefits associated with relevant externalities (such as environmental or public health benefits), provided that the potential for double-counting of such externalities is adequately mitigated."*

Between November 2017 and April 2018, the PUC heard support for this parameter to be retained, as well as recommendations that it should be removed entirely. The recommendations that it be removed were based on the following suppositions:

1. Public Policy: the inclusion of externalities are policy issues to be determined by the legislature;
2. Existing Environmental Programs: externalities are already addressed in parameter No. 1, "Avoided Cost of Energy," as environmental program costs are incorporated in the wholesale electric rates; and
3. Alternative Support Mechanisms: the externality benefits of DERs are currently reflected in the support provided by several other incentive programs (*e.g.*, rebates, local and federal tax incentives, Renewable Energy Certificates (RECs)).

While NHDES acknowledges that there is some merit to each point, we contend that not all benefits of various externalities are captured via the above mechanisms and, therefore, there is not sufficient justification to eliminate the parameter No. 16 entirely. Instead, NHDES suggests maintaining externality benefits within the

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[2] Synapse Energy Economics (2017). An Analysis of the Massachusetts Renewable Portfolio Standard, NECEC Institute in partnership with Mass Energy Consumers Alliance. https://www.necec.org/files/necec/pdfs/An%20Analysis%20of%20the%20Massachusetts%20Renewable%20Portfolio%20Standard.pdf (Accessed on July 6, 2018)

[3] BNEF (2018). 2018 Sustainable Energy in America Factbook. Business Council for Sustainable Energy in partnership with Bloomberg New Energy Finance. http://www.bcse.org/sustainableenergyfactbook/. (Accessed on July 6, 2018)

[4] DOE (2017). 2017 U.S. Energy and Employment Report.US Department of Energy. https://www.energy.gov/downloads/2017-us-energy-and-employment-report. (Accessed on July 6, 2018)

[5] IRENA (2016). Renewable Energy Benefits: Measuring the Economics. IRENA, Abu Dhabi, http://www.irena.org/documentdownloads/publications/irena_measuring-the-economics_2016.pdf. (Accessed on July 6, 2018)

VDER study scope, potentially including it as a component in the total value stack, and utilizing an evaluation methodology that will ensure that double counting of benefits does not occur.

The Department offers the following specific responses to the three listed concerns:

1. Public Policy:

NHDES notes that the General Court has weighed in on the importance and value of environmental and public health *numerous* times in New Hampshire statutes over several decades in chapter law and in state statutes.

The purpose statement of HB 1116 (2016), NH Laws Chapter 31, which ultimately directed the PUC to open docket DE 16-576, noted that:

> *"The general court continues to promote a balanced energy policy that supports economic growth and promotes energy diversity, independence, reliability, efficiency, regulatory predictability, environmental benefits, a fair allocation of costs and benefits, and a modern and flexible electric grid that provides benefits for all ratepayers."*

In several energy related statues, the statutory language often directly identifies the public health and environmental benefits of avoiding sulfur dioxide (SO_2), oxides of nitrogen (NO_x), carbon dioxide (CO_2), mercury (Hg) and particulate matter (PM) emissions. These statutes include (specific language included in the appendix at the end):

A. Chapter 125-O Multiple Pollutant Reduction Program[6]

   Section 125-O:1 Findings and Purpose.

B. Chapter 362-A Limited Electrical Energy Producers Act[7]

   Section 362-A:1 Declaration of Purpose.

C. Chapter 362-F Electric Renewable Portfolio Standard[8]

   Section 362-F:1 Purpose.

D. Chapter 374-F Electric Utility Restructuring[9]

   Section 374-F:3 Restructuring Policy Principles.

   Subsection VIII.

   Subsection IX.

E. Chapter 378 Rates And Charges: Least Cost Energy Planning[10]

   Section 378:37 New Hampshire Energy Policy.

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[6] http://www.gencourt.state.nh.us/rsa/html/x/125-o/125-o-mrg.htm

[7] http://www.gencourt.state.nh.us/rsa/html/XXXIV/362-a/362-a-mrg.htm

[8] http://www.gencourt.state.nh.us/rsa/html/XXXIV/362-f/362-f-mrg.htm

[9] http://www.gencourt.state.nh.us/rsa/html/XXXIV/374-F/374-F-mrg.htm

[10] http://www.gencourt.state.nh.us/rsa/html/XXXIV/378/378-mrg.htm

2. Existing Environmental Programs:

Certain existing environmental and energy programs are designed to incentivize a reduction in air pollutants in recognition of the environmental and public health impacts associated with specific generating resources. Environmental programs pursue air-pollutant reductions by: setting facility-emission limits (*e.g.*, mercury); setting regional and national emission caps within market-based programs (*e.g.*, NO_x, SO_2, CO_2); or incentivizing renewable low- and non-emitting resources (*e.g.*, RPS).

Where there are cost differentials associated with generating energy from specific sources (i.e., emitting vs. low- and non-emitting resources), those costs are built into the wholesale rates and would be incorporated in the value of avoided energy cost parameter (No. 1). However, additional study is needed to determine whether we are properly monetizing the full environmental and public-health benefits attributable to renewable non-emitting distributed generation such as solar and hydro.

For instance, the most recent auction prices for Regional Greenhouse Gas Initiative (RGGI) was $3.79 per ton of CO_2 in March 2018 and $4.02 in June with the highest price at $7.50 in December of 2015. This market-based cost is captured in the wholesale rate. In contrast to the RGGI allowance prices, the US Environmental Protection Agency (EPA) established a social cost of carbon (SCC) at $36 per ton for 2015. However, other sources have suggested that even higher carbon costs may be justifiable, noting that the EPA utilized models that minimized or ignored risks of extreme events, and rely on traditional, somewhat dated estimates of future damages. The Avoided Energy Supply Components in New England (AESC): 2018 Report[11] utilized a different methodology, concluding that marginal abatement costs were a better measure than estimating damages, and found a total environment cost of $100 per ton of CO_2 emissions based on global costs and $174 per ton of CO_2 emissions based on New England abatement costs. These carbon values strongly suggest that RGGI allowance prices only partially reflect the cost of carbon.

Similarly, the costs associated with compliance with other air pollution programs (*e.g.*, NO_x, SO_2 and Hg), which are also built into the current wholesale rate structure, were not intended to reflect the full external costs imposed on society and the environment. The programs were designed to incentivize reductions through a number of mechanisms rather than capture the value of damages associated with these pollutants, such as the health impacts of smog and mercury exposure, or the water quality impacts of acid rain. As such, the difference between the individual program costs and more complete external costs should be evaluated for each of these criteria pollutants.

3. Alternative Support Mechanisms:

Specific stakeholders raised concerns that rebates, tax credits, and RECs that support renewable energy development should be considered adequate compensation for externality benefits. NHDES recognizes that incentives provide support for renewable investment, but asserts that the value of these incentives should be accounted for with caution as the current and historical incentives and investments by local, state, and federal programs in other forms of energy, such as coal, oil and natural gas, are not proposed to be part of this analysis. NHDES believes that the accounting for the value of all renewable DER incentives would require a similar analysis for all forms of energy in order to balance both sides of the equation (*i.e.*, DERS vs. non-DERs, and renewable vs. non-renewable). NHDES believes an attempt to determine the value of the incentives

[11] Synapse Energy Economics (2018). Avoided Energy Supply Components in New England: 2018 Report. http://www.synapse-energy.com/sites/default/files/AESC-2018-17-080.pdf (Accessed July 5, 2018).

provided for all forms of energy would likely be very costly. To the extent that incentives are not reflected in any other parameter (e.g., tax credits), they should be excluded from the study.

Even recognizing some of those incentives do have an impact on wholesale rates, NHDES does not feel that they necessarily provide an economic benefit sufficient to match the externality benefit value. For instance, the RPS was intended to reflect *some* of the value of externalities that are not accounted for in the price of other forms of energy. However, the value of the NH RPS's Alternative Compliance Payments are artificially low so the full externality benefits are not addressed by this program either.

Externality Benefits Study Methodology

In order to assess the value of the externality benefits that could be included in the VDER value stack, NHDES recommends that an analysis be conducted that accounts for the marginal value that DERs provide by avoiding the emission of critical pollutants (*i.e.*, NO_x, SO_2, CO_2, HG, PM). The externality benefits should be determined by calculating the externality benefit of the displaced energy sources and subtracting out any the partial externality benefit values already embedded in No 1. – Avoided Energy Costs. As there may be a range of values that could be presented for each pollutant, the final values could be expressed as a sensitivity (*e.g.*, high, medium, and low).

Potential Methodology Reference:

A. New York Public Service Commission issued an Order (RE: CASE 15-E-0751 and CASE 15-E-0082) that recommended that resources shall receive the higher of the Tier 1 REC price (valued at $17.01/MWh in 2018)[12] or the SCC, net of the expected RGGI allowance values, as calculated by Staff per the Benefit Cost Analysis Framework Order.[13]

B. Acadia Center (2015). Value of Distributed Generation: Solar PV Methodology, https://acadiacenter.org/wp-content/uploads/2015/04/AcadiaCenter_ValueofDistributedGeneration_StudyMethodology_FINAL_2015_0414.pdf (Accessed June 27, 2018).

Possible Data Sources:

A. The ISO-NE Annual Emission report could be used to develop projections of marginal pollutant emissions values for baseline.[14]

[12] NYSERDA (2018). 2018 Compliance Year, Clean Energy Standard, https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Standard/REC-and-ZEC-Purchasers/2018-Compliance-Year (Accessed June 27, 2018).

[13] PSC (2017). Order on Net Energy Metering Transition, Phase One of Value of Distributed Energy Resources, And Related Matters, New York Public Service Commission, http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b5B69628E-2928-44A9-B83E-65CEA7326428%7d (Accessed June 27, 2018).

[14] ISO-NE 2016 ISO New England Electric Generator Air Emissions Report, https://www.iso-ne.com/system-planning/system-plans-studies/emissions/.

B. To value the avoided costs of carbon, the study could use, as a conservative future price of RGGI costs in order to avoid double counting, the cost containment trigger price of $10 in 2017 rising at 2.5% until becoming $13 starting in 2021 (rising over time at 7%) to $23.89 in 2030.[15]

   This could be compared against the 2016 EPA social cost of carbon[16] values for starting at $36 in 2015 and rising to $50 per ton in 2030.[17] This value has been reviewed and vetted by multiple sources.[18] As part of a sensitivity analysis, the AESC 2018 carbon values could be used.

C. Additional information on benefits may be found in recent US DOE report entitled, "Environmental Quality and the U.S. Power Sector: Air Quality, Water Quality, Land Use and Environmental Justice."[19]

D. The EPA's *AVoided Emissions and geneRation Tool* (AVERT) model could be used to provide NOx, SO_2 and PM impacts values. This tool is specifically intended to estimate the emissions benefits of energy efficiency and renewable energy policies and programs.[20]

NHDES notes that additional methodologies and sources of data can be investigated once the scope is finalized and a consultant hired. The Department looks forward to contributing to that research and investigation.

Thank you again for the opportunity to provide comments on DE 16-576. NHDES looks forward to collaborating with the PUC and other stakeholders to complete the VDER study over the next few years and

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[15] CO_2 cost containment reserve trigger price, or CCR trigger, RGGI Model Rule, pg. 6. Price, https://rggi.org/sites/default/files/Uploads/Program-Review/12-19-2017/Model_Rule_2017_12_19.pdf.

[16] The SCC is an estimate the monetized damages associated with an incremental increase in carbon emissions in a given year" based on "a defensible set of input assumptions that are grounded in the existing scientific and economic literature." Interagency Working Group on Social Cost of Carbon, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 (2010) ("TSD 2010").

Note: In New York and Illinois, the social cost of carbon serves as the basis for the value of "zero emission credits" paid to utilities under state clean energy legislation. In Colorado, utilities are now required to use the federal social cost of carbon in their resource planning. The estimation methodology is also being considered for adoption by the Mexican government and by regulatory agencies in California and Minnesota. Source: http://www.rff.org/research/collection/rffs-social-cost-carbon-initiative).

Summary of SCC development process available here:
http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg_ipptf/meeting_materials/2018-04-23/SCC%20PowerPoint%20for%20NYISO%20Meeting%204.23.pdf

[17] Values are 2007 dollars per metric ton CO_2. EPA (2016). The Social Cost of Carbon, https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html.

[18] Endorsed by: 1) U.S. Government Accountability Office. Government Accountability Office, Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates 12-19 (2014), http://www.gao.gov/assets/670/665016.pdf, (Accessed on June 27, 2018); 2) NAP (2017) , Valuing Climate Damages: Updating Estimates of the Social Cost of Carbon Dioxide 3, National Academies of Sciences, Engineering, and Medicine, https://www.nap.edu/download/24651 (Accessed on June 27, 2018); and 3) NAP (2016). Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update 1, National Academies of Sciences, Engineering, and Medicine (2016), https://www.nap.edu/download/21898, (Accessed on June 27, 2018).

On August 8, 2016, the U.S. Court of Appeals of the Seventh Circuit upheld the Department of Energy's use of the social cost of carbon in a cost-benefit analysis for updated refrigerator efficiency standards. *Zero Zone, Inc. v. Dep't of Energy*, 832 F.3d 654, 679 (7th Cir. 2016). https://www.eenews.net/assets/2016/08/09/document_gw_01.pdf, (Accessed on June 27, 2018).

[19] ORNL (2017). Environmental Quality and the U.S. Power Sector: Air Quality, Water Quality, Land Use and Environmental Justice, https://energy.gov/sites/prod/files/2017/01/f34/Environment%20Baseline%20Vol.%202--Environmental%20Quality%20and%20the%20U.S.%20Power%20Sector--Air%20Quality%2C%20Water%20Quality%2C%20Land%20Use%2C%20and%20Environmental%20Justice.pdf.

[20] EPA (2018). AVoided Emissions and geneRation Tool. https://www.epa.gov/statelocalenergy/avoided-emissions-and-generation-tool-avert (Accessed on July 3, 2018).

ultimately ensure that New Hampshire's renewable energy programs provide a significant environmental and economic benefit to New Hampshire citizens.

Respectfully,

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