

**STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION**

DE 16-576

**Development of New Alternative Net Metering Tariffs and/or
Other Regulatory Mechanisms and Tariffs for Customer-Generators**

Order Approving Value of Distributed Energy Resources Study Scope

ORDER NO. 26,316

December 18, 2019

This order approves the scope and timeline of a value of distributed energy resources study that will inform future net metering tariff development. The order directs Commission Staff to issue a request for proposals to engage a consultant to design and perform the study based on the approved scope, with appropriate stakeholder engagement. The results of the study will be submitted to the Commission.

I. PROCEDURAL HISTORY

The Commission opened this docket on May 19, 2016, pursuant to RSA 362-A:9, XVI. The purpose of the docket is to develop new alternative net metering tariffs and determine whether those tariffs should be limited in availability within each electric distribution utility's service territory.

In Order No. 26,029, issued on June 23, 2017 (June 2017 Order), the Commission approved the adoption of a new alternative net energy metering tariff. That tariff was designed to be in effect for a period of years while additional data is collected and analyzed, pilot programs are implemented, and a value of distributed energy resources study (VDER Study) is conducted. In the June 2017 Order, the Commission specified certain parameters for the design and performance of a VDER Study, stating that

it should be a long-term avoided cost study using marginal concepts and incorporating both [total resource cost] and [ratepayer impact measure] test criteria, and it 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. With respect to double-counting of externality benefits, if a potential DG benefit is included in wholesale electricity market price formation, either directly or indirectly, then it should not be included in the study scope.

June 2017 Order at 60. The Commission stated that the VDER Study should focus primarily on solar photovoltaic systems and hydroelectric facilities, and should use a methodology that is “generally consistent with that used to evaluate energy efficiency resource standard program investments.” *Id.* at 60-61. The Commission determined that the VDER Study period should be 10-15 years, consistent with typical system planning horizons, and should include present value analysis using appropriate discount rates. *Id.* at 61.

The June 2017 Order directed Commission Staff (Staff) to convene a working group of stakeholders to assist in the further development of the VDER Study scope and timeline. The Commission required Staff to file a final report containing the proposed VDER Study scope and timeline within eight months for review and approval by the Commission prior to engaging the study consultant. *Id.* at 61-62. In the months following the June 2017 Order, Staff held a series of stakeholder working group sessions, and on May 9, 2018, filed its Value of Distributed Energy Resources Study Scope and Timeline Report (Report).

The Commission held a public comment hearing on June 29, 2018, and received comments from: Acadia Center, Alliance for Solar Choice, Borrego Solar, the City of Lebanon, Conservation Law Foundation, Energy Freedom Coalition of America, Granite State Hydropower Association, New Hampshire Sustainable Energy Association, ReVision Energy, and Vote Solar (collectively, Joint Stakeholders); Public Service Company of New Hampshire

d/b/a Eversource Energy (Eversource); New England Ratepayers Association (NERA); Pentti J. Aalto; New Hampshire Department of Environmental Services (DES), and the Warner Community Power Project.

On February 20, 2019, the Commission approved the proposed scope and timeline for a separate locational value of distributed generation study (LVDG Study), the results of which will be incorporated into the VDER Study. *See* Order No. 26,221 (February 20, 2019), *clarified by* Order No. 26,227 (March 20, 2019).

The June 2017 Order, the Report, the transcript of the June 29, 2018, public comment hearing, the parties' written comments, and other documents related to this matter, other than any information for which confidential treatment is requested of or granted by the Commission, are posted at <http://puc.nh.gov/Regulatory/Docketbk/2016/16-576.html>.

II. POSITIONS

A. Commission Staff

In its Report, Staff outlined the scope, methodology, and timeline for completion of the VDER Study. Staff described the process through which the VDER Study scope and timeline proposal was developed and indicated which study scope components it proposed as a result of stakeholder consensus. Report at 5-6. The VDER Study is intended to provide detailed information regarding costs avoided by net-metered distributed generation (DG) under general conditions, as well as at specific times and at particular locations, with input from the related locational value of distributed generation study. The VDER Study will evaluate respective benefits and costs from the perspective of the electric distribution utilities, customer-generators participating in net metering, and non-participating electric ratepayers. *Id.* at 4. The VDER Study should focus on DG that is eligible for net metering and is interconnected to the electric

distribution system owned by a regulated electric utility. *Id.* The study should focus on impacts within New Hampshire with consideration of regional energy market effects where appropriate.

Id.

The Report stated that the VDER Study should assess the relative benefits and costs of net-metered DG from the perspectives of the utility system as a whole, participating net metering customer-generators, and other electric utility ratepayers. *Id.* Total resource cost test criteria should be used to analyze and measure the total net costs of net-metered DG to both participating customer-generators and to the electric utilities. Ratepayer impact measure test criteria should be used to analyze and measure impacts on utility ratepayers resulting from avoided costs, changes in utility revenues, and costs associated with operating and administering net metering. *Id.* The study may also include sensitivity analyses to determine the demonstrable and quantifiable net benefits associated with relevant externalities, such as environmental benefits, while adequately mitigating the potential for double counting of such externalities. *Id.* at 4-5.

According to Staff's Report, the VDER Study should maintain consistency with energy efficiency cost-effectiveness evaluation, including use of standard benefit-cost analysis criteria. The study should incorporate, where appropriate, modeling tools, methods, criteria, and data from the New England Avoided Energy Supply Cost Study (AESC Study). *Id.* at 5. Avoided costs should be evaluated over a 15-year time horizon, with three to five years of historic data reviewed, where possible, to verify and validate any forward projections. *Id.* Net avoided costs should be presented on a net present value basis using appropriate discount rates. *Id.* Certain relevant avoided costs are time- and/or location-dependent, and the study should determine hourly avoided cost values, thereby enabling a technology-neutral analysis of marginal avoided cost components. *Id.* By mapping those hourly values to DG production curves, relatively more

precise value estimates should be determined for various DG technologies, including solar photovoltaic and hydroelectric. *Id.*

The Report stated that data and analysis derived through the separate LVDG Study should be used in the VDER Study to evaluate DG avoided cost values based on specific locations on the utility distribution system. In addition, locational analysis should be used to ascertain more precisely the potential value of DG to avoid or defer distribution system upgrades or to reduce or mitigate distribution system costs. *Id.* Staff recommended that the VDER Study not include sensitivity analyses based on a high DG penetration scenario, in view of the current level of DG penetration and available forecasts for DG deployment from ISO New England (ISO-NE). *Id.*

The VDER Study should determine avoided costs attributable to load reduction values associated with DG system production. *Id.* at 6. Hourly load reduction values should be calculated using a model capable of mapping value to technology-specific DG production curves. *Id.* The model should also provide flexibility in criteria values and other data inputs, to the extent possible, and cover all hours over the study period. *Id.* A separate analysis focused on market resource value, intended to calculate the monetizable values of aggregated DG resources participating directly in relevant wholesale power markets, may be included in the study scope if it can be conducted at a reasonable cost. *Id.* The models used should analyze values associated with load reduction. In the market resource value alternative, those values should be analyzed with market participation of aggregated DG systems as passive resources only. *Id.* The analysis should “assume optimal power injection to meet capacity commitment requirements for passive resource participation in [the] ISO-NE market.” *Id.*

Staff's Report summarized each avoided cost item to be evaluated in the study, the relevant data proposed to be analyzed, and the methodology through which that data should be evaluated. *Id.* at 7. The avoided costs to be analyzed include:

1. Energy costs
2. Capacity market costs
3. Ancillary services and load obligation charge;
4. RPS compliance costs
5. Transmission charges
6. Transmission capacity costs
7. Distribution capacity costs
8. Distribution system operating expenses
9. Transmission line losses
10. Distribution line losses
11. Wholesale market price suppression effects
12. Hedging/wholesale risk premiums
13. Distribution utility administrative costs and expenses
14. Transmission and distribution system required upgrade costs
15. Utility lost revenues
16. Externality benefits
17. Distribution grid support services
18. Resilience services
19. Customer installed net costs.

Id. at 7-14. In a number of instances, Staff recommended that a qualitative review of an avoided cost item be completed in lieu of, or in addition to, a quantitative analysis. *Id.* Qualitative review consists of "literature review and synthesis of primary research relating to a criterion without assigning a quantitative value." *Id.* at 15. It can act as a "placeholder" until further research is available, and can inform the study of a value or cost "which cannot currently be quantified to a level of precision and rigor considered necessary for monetary valuation, but that is potentially significant and should be considered in application of the research." *Id.* Staff believes it may be worthwhile to include qualitative analysis of certain relevant issues in the VDER Study, "provided that the cost of such analysis is not excessive." Staff recommended that

prospective consultants provide a separate cost estimate for certain avoided cost analyses that should be based on a qualitative review or analysis. *Id.* at 16.

The Report referenced the potential to use proxy values and secondary research estimates. *Id.* For example, there may exist a body of research performed to a rigorous standard that reflects parameters and circumstances relevant to value study criteria which can be used as an approximation, or “‘proxy value,’ with a reasonable level of confidence for its precision and accuracy in regard to New Hampshire-specific valuation issues.” *Id.* National, regional, or state-specific studies relating to specific criteria may also be available for review and appropriate for qualitative or quantitative consideration in lieu of primary research. *Id.* Where multiple studies exist, literature review and analysis may be used to calculate an estimated value reflective of the research available in the field, without the need for original data collection or analysis. *Id.* Staff notes that proxy values or estimates based on secondary research “may include a discount factor to account for uncertainty.” *Id.*

According to Staff, the VDER Study is intended to be informed by the data collection, studies, and any pilot programs initiated under the June 2017 Order, in order to “[incorporate] learning and results from other [net metering] docket projects.” *Id.* As a result, the proposed timeline for completion of the VDER Study must accommodate those other initiatives. *Id.* Staff anticipated that the engaged consultant would begin the VDER Study during 2019 and complete it in 2020. *Id.* at 18. The defined VDER Study scope and timeline, once approved by the Commission, should represent the scope of work specified in a request for proposals issued to engage an independent consultant to perform the VDER Study. *Id.* The consultant should receive input from the VDER Study stakeholder working group to refine the study scope and

methodology, collect the required data and perform the necessary research and analysis, and submit a report to the Commission. *Id.*

B. Joint Stakeholders

i. Study Parameters and Methodology

The Joint Stakeholders concurred with the Report in most areas, including use of proxy values where appropriate. Joint Stakeholder Comments on the Proposed Scope of the VDER Study, July 10, 2018, at 1-2. They recommended that parties be provided additional opportunities for stakeholder input into the scope of the study once a consultant is selected. They also recommended technical sessions to allow for input and information exchange with the consultant. *Id.* at 1. They recommended that the consultant have the discretion to assess whether additional sensitivity analysis may be effective and appropriate, especially in relation to higher distributed energy resource (DER) penetration levels. *Id.*

The Joint Stakeholders asserted it is well-established that no material non-zero values should be excluded from valuation, citing the National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources. *Id.* at 2-3. The Joint Stakeholders supported the use of qualitative review or quantitative proxy estimates, as elaborated by the National Energy Efficiency Screening Project, where appropriate to conserve time and cost. *Id.* They agreed with the focus on hydroelectric and photovoltaic generation; however, they requested that the Commission direct the consultant to determine the extent to which the valuation formula can reasonably accommodate variables such as “solar plus storage, solar plus locational value, or renewable-fuel-based combined heat and power (CHP).” *Id.* at 2.

The Joint Stakeholders do not support a focus on total resource cost and ratepayer impact measure test criteria for benefit-cost analysis. *Id.* at 3. They noted that the ratepayer impact

measure test has been discredited by multiple authorities. *Id.* at 3-7. They support utilizing the total resource cost test, also including externality benefits, and recommended replacing the ratepayer impact measure test with a combination of the utility cost test and consumer bill impacts analysis. *Id.* at 3.

The Joint Stakeholders generally agreed with Staff that components of the New England Avoided Energy Supply Cost Study (AESC Study) should be utilized in the VDER analysis. They argued that it is applicable, reliable, and can be used to save time and cost in certain instances. *Id.* at 7. They stated that the AESC Study includes avoided energy values by hour, which could be used to value storage, load management, and rate programs. *Id.*

ii. Avoided Cost Criteria and Methodology¹

No. 5 - Transmission Charges

The Joint Stakeholders argued that transmission charges and future forecasted expenses should be part of the study scope, citing Vermont and New Hampshire initiatives to use customer-facing programs to manage transmission expenses. *Id.*

No. 6 – Transmission Capacity

The Joint Stakeholders agreed with Staff that a qualitative review or quantitative proxy estimate should be used to determine avoided transmission capacity costs. *Id.* at 8. They argued that the transmission capacity value should be quantified and included as an avoided cost to the utilities based on the value of avoided and deferred transmission capacity costs from load-reducing DER. *Id.*

¹ The number referenced for each respective avoided cost study criterion corresponds to the numbering used in the Report filed by Staff.

No. 8 – Distribution System Operating Expenses

The Joint Stakeholders agreed with Staff that a qualitative review or quantitative proxy estimate should be used to assess distribution system operating expenses. *Id.* They cited purported benefits of “stacked” DER capabilities that they argued should be assessed and quantified, or should be estimated and applied, to reflect distribution system operating expenses that can be reduced or deferred by DER service capabilities. *Id.*

No. 12 – Hedging/Wholesale Risk Premiums

The Joint Stakeholders agreed with Staff that a qualitative review or quantitative proxy estimate should be used to assess the impact of DER on hedging/wholesale risk premiums. *Id.* at 9. They claimed that the utilities’ assertion that they do not hedge is irrelevant because risk premiums or hedging costs are included in default service bids. *Id.* According to the Joint Stakeholders, granting the consultant access to confidential information regarding default service bids could aid in estimating hedging costs embedded in those bids. In addition, qualitative review of literature regarding the impact of DER on risk premiums can facilitate risk assessment, and the AESC Study regional low-cost proxy value assumption may serve as a cost-effective substitute for developing a state-specific estimate. *Id.*

No. 14 – Transmission and Distribution Upgrades Required

The Joint Stakeholders argued that transmission and distribution upgrade savings can be achieved from the presence of DER and passive load reduction. DER capabilities flowing from distribution grid support services may, to the extent that they are not represented in that category of analysis, apply to defer or offset transmission and distribution upgrades. *Id.* They asserted that a higher level of DER penetration is not directly related to higher utility costs for system

upgrades because DER coordination and operations management can provide capacity expansion that reduces upgrade costs. *Id.* at 10.

No. 15 – Utility Lost Revenue

The Joint Stakeholders agreed that utility lost revenue is within the scope of the study; however, they disagreed with Staff’s recommendation that no consideration be given to how potential increased electrical usage by DG customers may impact lost revenue. *Id.* According to the Joint Stakeholders, the assumption that lost revenue equates to net behind-the-meter usage could be inaccurate given the trends in “beneficial electrification.” *Id.* They stated that existing data should be readily available to discern whether there is a correlation between increased gross electricity consumption and net-metered DG. *Id.* at 11. They argued that the VDER Study does not need to make a costly quantitative analysis of causation in order to discern if there is a correlation, and that any secondary impacts of correlated increases in electricity use are not within the scope of the study. *Id.* at 11-12.

No. 16 – Externality Benefits

The Joint Stakeholders argued that public health and environmental benefits have already been determined to be within the scope of the VDER Study, and should be included in the “value stack” rather than a sensitivity analysis because those benefits are integral to state policy. *Id.* at 12 (citing several authorities). Alternatively, they expressed a willingness to agree with Staff’s recommendation to evaluate the external benefits in a sensitivity analysis. *Id.* They disagreed with the position that any value from externalities is already fully captured by wholesale electricity costs or addressed by federal or state policies; instead, they maintained that the total value of the benefits exceeds the sum of the relevant market values and policies. *Id.* at 13-14.

They referenced the Environmental Protection Agency's Social Cost of Carbon as a potential value to be netted with compliance costs. *Id.* at 14.

No. 19 – Customer Installed Net Costs

The Joint Stakeholders recommended eliminating customer installed costs as a category for study, based on their position that the costs of customer-borne private investments have no bearing on the values provided by DERs to the grid and to other ratepayers, or on utility costs for integrating DER. *Id.* at 15. While they acknowledged Staff's position that the data will help comply with the relevant legislation,² they did not agree with Staff's recommendation. As an alternative, they suggested that reasonable compensation and price signals for the value of DER accomplishes that goal. *Id.* In support of that position, they argued that the goal of regulation is to strengthen competition and reduce barriers, while ensuring customer education and access, and not to scrutinize prevailing investment costs. *Id.* They recommended including permitting costs in the study, and that if the Commission includes customer installed costs that those costs should be limited to publicly available information, and that no proprietary or customer data should be shared. *Id.*

C. Office of the Consumer Advocate

The OCA expressed agreement with the scope and timeline of the VDER Study, and recommended that deference be given to any consensus reached by the parties, because that consensus was attained through a collaborative stakeholder process. Hearing Transcript of June 28, 2018, (Tr.) at 48. According to the OCA, Staff's recommendation to use qualitative review or quantitative proxy estimates to address a number of relevant valuation issues is reasonable. *Id.* at 50.

² House Bill 1116, 2016 N.H. Laws Chapter 31 (HB 1116).

D. Eversource

i. Study Parameters and Methodology

Eversource generally expressed support for the proposed VDER Study scope and timeline, but noted that it does not interpret the term “consensus” to mean anything other than general agreement about the scope of the study. Eversource Comments on the Proposed Scope of the VDER Study, July 10, 2018, at 1. Eversource explained that “consensus” does not necessarily equate to concurrence with the recommended approach or methodology of the study, and that it does not foreclose any future comment on, or disagreement with, the study or its results. *Id.* Eversource proposed that the VDER Study be required to be clear and explicit about the baseline costs and benefits (*i.e.*, what scenarios the calculated value of DER is derived from or compared against). *Id.*

Eversource recommended that the consultant have the ability to offer alternative methodologies to the AESC Study or alternatively be required evaluate and document whether the AESC Study is appropriate for the evaluation of intermittent sources of generation. *Id.* at 2.

Eversource argued that the “load reducer value” methodology be used for rooftop solar and other small-scale resources, while the “market resource value” methodology should be used for large-scale solar photovoltaic and most hydro-electric resources, to evaluate the economic impacts of registering net metered assets in the ISO-NE markets. *Id.*

ii. Avoided Cost Criteria and Methodology

In general, Eversource opposed the use of future forecasting or projection in evaluating study scope components involving energy, capacity market costs, ancillary services, renewable portfolio standard compliance, and/or transmission charges. *Id.* With special emphasis on energy, it supported the use of historical data from the last three to five years for those five

criteria. *Id.* According to Eversource, ample historical data exists that should be used before forecasting future prices. It stated that forecasting will involve considerable effort, uncertainty, and cost, and will result in enhanced disputes over the results of the study. *Id.* To the extent forecasting is used, Eversource suggested that the declining cost of solar equipment should also be considered. *Id.*

No. 3 – Ancillary Services and Load Obligation Charges

Eversource pointed out that this category is a good example of the difference between load reducer value and market resource value analysis, and recommended that the VDER Study focus on the value of ancillary services that DG can provide over the charges that can be avoided. *Id.* at 3. Eversource stated that the true valuation of DG should only include avoided costs, not avoided charges that are shifted to others. *Id.*

No. 12 – Hedging/Wholesale Risk Premium

Eversource identified hedging/wholesale risk premiums as another category where the difference between avoided charges and avoided costs should be considered. According to Eversource, suppliers will likely need to charge higher risk premiums as solar penetration increases because solar is a “volatile resource.” *Id.* Eversource argued that this criterion should be excluded from the VDER Study or, alternatively, the study should include a consideration that increased solar penetration may result in higher risk premiums to all customers, including non-solar customers. *Id.*

No. 16 – Externality Benefits

Eversource argued that any evaluation of externality benefits must be limited to demonstrable and quantifiable net benefits without double counting. It stated that including these scope components in the VDER Study, even as a sensitivity, may be inconsistent with the

guidance from the June 2017 Order. *Id.* at 3-4. In support of that position, Eversource cited the National Association of Regulatory Utility Commissioners' Manual on DER Rate Design and Compensation. Eversource argued that environmental credits and benefits that are separately tracked through issuance of renewable energy certificates or other mechanisms such as the Regional Greenhouse Gas Initiative would be double counted if they were also included on the Value of Resource list. *Id.* at 4.

No. 17 – Distribution Grid Support Services

Eversource commented that the distribution grid support services criterion will be an important component of grid modernization. According to Eversource, however, the potential value of any grid support services may not be fully realized without the related costs of other grid modernization infrastructure, including DG deployment as covered under the transmission and distribution system required upgrade costs criterion. *Id.* Eversource argued that the future value of DER grid support services should factor in grid infrastructure costs associated with achieving a level of coordination between customers, utilities, developers, and dispersed DERs. *Id.*

No. 19 – Customer Installed Net Costs

Eversource agreed with Staff that customer installed net costs are within the scope of the study and would provide relevant data and analysis on the installed costs of customer-sited solar energy generation systems, net of incentives, using a variety of metrics. *Id.* Eversource cited the June 2017 Order and Staff's Report to support inclusion of that criterion within the study scope, and suggested using the "levelized cost of energy" or "investment payback period" methods to evaluate the costs of customer-sited systems. *Id.*

E. Unitil

i. Study Parameters and Methodology

Unitil generally expressed support for the VDER Study scope and timeline, but noted that it reserved the right to disagree with any assumptions and/or results presented in the study. Tr. at 29. Unitil maintained that the study results are not intended to predetermine future Net Metering tariff designs or rates, but rather to inform further net metering tariff development proceedings. *Id.* Unitil supported a “robust” sensitivity analysis to understand the impact of all assumptions and to determine demonstrable and quantifiable net benefits. *Id.* at 30. Unitil urged an emphasis on quantitative over qualitative values, stating that if a value cannot be quantified, then it should not be considered for inclusion in the VDER Study. *Id.* According to Unitil, the costs associated with DG interconnections may result in unreimbursed system upgrade costs and a “negative value.” *Id.*

i. Avoided Cost Criteria and Methodology

No. 5 – Transmission Charges

Unitil argued that transmission-related avoided costs should be outside the scope of the VDER Study because ISO-NE performs transmission capacity planning, and DG does not impact the costs related to transmission capacity additions or upgrades. *Id.* at 31.

No. 8 – Distribution System Operating Expenses

Unitil agreed that distribution system operating expenses should be within the scope of the VDER Study. Unitil stated that operating expenses should be evaluated to determine any potential increases in operating expenses in addition to any potential decreases or deferrals. *Id.* at 31.

No. 12 – Hedging/Wholesale Risk Premiums

Unitil argued that hedging and wholesale risk premiums should be outside the scope of the VDER Study. *Id.* Unitil explained that any risk premium in the retail default energy service price is related to market and consumer volatility. Unitil believes that high DG penetration may increase that volatility, thereby increasing risk premiums passed on to the general customer base. *Id.* at 31-32. According to Unitil, there are no hedging costs that can be avoided. *Id.*

No. 16 – Externality Benefits

Unitil argued that externality benefits should be outside the scope of the VDER Study. *Id.* at 32. Several incentive programs support DER, including rebates, tax incentives, and renewable energy certificates, which are a reflection of their value. It would be difficult, therefore, to meet the double counting exclusion restriction under the June 2017 Order. *Id.* at 32-33.

No. 19 – Customer Installed Net Costs

Unitil agreed that customer installed costs should be within the scope of the VDER Study. *Id.* at 33. According to Unitil, either New Hampshire- or industry-specific estimates of customer installed systems are appropriate. In addition, various categories of solar (residential, small commercial, and large group host) should be examined, net of subsidies, incentives, and “preferential accounting treatment.” *Id.* at 33-34. Unitil suggested that the results should be in standard metrics, “such as levelized cost of electricity and/or investment payback period under various [net metering] tariff scenarios.” *Id.* at 34.

F. New England Ratepayers Association's Comments

i. Study Parameters and Methodology

NERA agreed that there was consensus among the parties on many of the issues; however, it stated there were elements of compensation in the net metering tariff that should not be included. NERA supported formal evaluation of the costs and benefits of DERs so that they can be appropriately applied to the net metering tariff. New England Ratepayers Association Comments on the Proposed Scope of the VDER Study, July 16, 2018, at 1. According to NERA, any components included in a net metering rate design must be directly related to the benefits received and must be quantifiable. *Id.* NERA commented on discount rates to be used in the VDER Study, and their use in renewable energy projects generally, arguing that the rate assumptions used are often unrealistically low. *Id.* at 6-7. NERA recommended that the consultant provide analysis about likely rates and provide a sensitivity analysis that shows value across a range of discount rates from 3 to 12 percent. *Id.*

ii. Avoided Cost Criteria and Methodology

No. 6 – Transmission Capacity

NERA commented on the transmission capacity scope component, arguing that the current net metering tariff's assessment value is "egregious." NERA believes that a quantitative assessment of value is appropriate. *Id.* at 1-2. NERA argued that proxy values are not appropriate, and if a specific value cannot be quantified, then that value should be excluded from the study and "should not be included in any net metering tariff." *Id.*

No. 7 – Distribution Capacity

NERA agreed with Staff that the separate LVDG study is the best approach to value distribution capacity. *Id.* at 2. It stated, however, that it also believes the VDER Study should

assess and develop a method of compensation that identifies specific and real benefits. The study should avoid any universal assessment that benefits DG installations generally when more properly attributable to specific installations. *Id.* According to NERA, in most circumstances the current net metering tariff rate applicable to existing DG systems is far above any actual benefit. *Id.* at 2-3. NERA asserted that the benefits related to this component are limited to local areas with congestion problems and locations where upgrades can be avoided as a result of distributed generation. According to NERA, most local areas will not benefit as they are not in that situation, and DG compensation should be based on whether it is the least cost solution to a specific congestion problem. *Id.* NERA recommended the study assess a methodology and/or criterion which can be used to allocate distribution capacity value to those systems that truly provide benefits. NERA argued that the study should use real data rather than engineering models to ensure proper price signals are provided, so that DG is deployed where it is most needed, and cost shifting is avoided. *Id.* at 3.

No. 8 – Distribution System Operating Expenses

NERA stated that it is “highly skeptical” that the distribution system operating expenses component could be studied effectively through proxy values, or that this metric can produce a positive value. *Id.* at 3-4. It recommended that the costs of that part of the study be individually priced to aid in evaluating its usefulness compared with cost, and that it be excluded if it cannot produce useful metrics or if the costs are unreasonable. *Id.*

No. 12 – Hedging/Wholesale Risk Premiums

NERA opposed the consideration of hedging/wholesale risk premiums in the VDER Study. NERA argued that it would be highly speculative in terms of real value provided, and cited the utilities’ statements that they do not hedge and do not have direct actual costs in this

area. *Id.* at 4. NERA opposed a proxy value based on lack of justified costs, and opposed spending time and money to evaluate it. *Id.*

No. 16 – Externality Benefits

NERA opposed the inclusion of externality benefits because it believes that externalities are already embedded in electricity rates. *Id.* at 4-6. NERA believes that only the direct costs and benefits of electricity are properly included in the net metering tariff, and that the externality benefits the DER advocates seek to consider for compensation should be provided through the legislative process. *Id.* NERA is opposed to using the social cost of carbon established by the U.S. Environmental Protection Agency and offered to provide additional analysis to support its characterization of that metric if the Commission decides to use it. *Id.* NERA cited language in HB 1116 to support its position that the value for externalities is a legislative consideration. *Id.* NERA argued that forcing ratepayers to “compensate for something that is already being done by the general court programs would certainly appear to be an unjust and unreasonable tariff mechanism.” *Id.* at 6.

G. Pentti J. Aalto

Mr. Aalto generally supported the VDER Study, and recommended that the consultant evaluate a load-weighted pricing structure for utility delivery services to evaluate externalities, the proper valuation of DG, and energy efficiency. PJA Energy System Design Comments on Proposed Scope of the VDER Study, July 16, 2018, at 1-4. Mr. Aalto submitted his own modeling to demonstrate his preferred methodology. *Id.* He argued that his approach would provide more appropriate pricing signals to both customer load and generation, while mitigating potential lost revenue. *Id.*

H. New Hampshire Department of Environmental Services

DES commented that the externality benefits criterion should be within the scope of the VDER Study. DES Comments on Proposed Scope of VDER Study, July 11, 2018, at 1. DES maintained that all avoided costs are not included in current policies, that existing environmental programs and alternative support mechanisms do not sufficiently reflect the full environmental costs of pollutant emissions, and that no compelling justification has been presented to remove consideration of externality benefits from the study. *Id.*

DES recommended including externalities in the total “value stack” and utilizing an evaluation methodology that will ensure that double counting of benefits does not occur. *Id.* at 2. DES listed a number of “criteria pollutants” (such as sulfur dioxide, nitrogen oxides, and mercury), along with the programs designed to provide incentives for reduction of those pollutants, and it stated that more complete external costs should be evaluated for each of those pollutants because it believes there is a difference between existing program costs and the full value of the avoidance or reduction of those pollutants. *Id.* at 4. According to DES, consideration of other incentives not specifically designed to represent externality costs in avoided costs for DG would require similar analysis for all forms of energy. *Id.* at 4-5. DES recommended potential study methodologies and data sources for calculating environmental externality benefits. *Id.* at 5-6.

I. Consumer Energy Alliance

The Consumer Energy Alliance stated that it supports diversified energy supplies from all resources. Tr. at 41-42. The Consumer Energy Alliance provided a recent report that it published entitled *Incentivizing Solar Energy: An In-Depth Analysis of U.S. Solar Incentives*, which includes a New Hampshire-specific analysis. *Id.* at 43. It commented on the customer

installed net costs study scope component by highlighting several of the statistics in its report relating to energy prices in New Hampshire, levels of incentives for solar projects in New Hampshire, and purported cost-shifting to non-solar customers. *Id.* at 44-45. According to the Consumer Energy Alliance, its primary interest in the VDER Study is ensuring that costs remain fair and equitable. It believes that New Hampshire's incentive policies should keep pace with changes occurring in the market; promote continued growth of distributed energy, solar, grid modernization, and a reliable and resilient electricity grid; and maintain the lowest possible overall rates. *Id.* at 45-46.

J. Representative Clyde Carson

Representative Clyde Carson appeared on behalf of the Town of Warner's Energy Committee to advocate for a proposed pilot project based on a model using solar panels, battery storage, smart meters, and time of use pricing. *Id.* at 8-13. He argued that this project offered a high probability of success and would contribute useful data to the VDER Study. *Id.*

III. COMMISSION ANALYSIS

This order establishes the scope of a VDER Study as contemplated by the June 2017 Order. The VDER Study will provide information addressing statutory elements, including the costs and benefits of customer-generator facilities, avoidance of unjust and unreasonable cost shifting, and rate effects on all customers.

In the June 2017 Order, the Commission required a number of actions be taken to collect data and develop a more comprehensive factual record, including the design and performance of a VDER Study. In Order No. 26,221, issued on February 20, 2019, the Commission approved

the scope and timeline for an LVDG Study and Staff has engaged a consultant to conduct that study.³ The results of that study are expected to be incorporated into the VDER Study.

We have reviewed Staff's Report and the comments filed by stakeholders, and we find Staff's proposed scope and timeline to be reasonable and appropriate, subject to the modifications described below. Accordingly, we approve the study scope and timeline, subject to certain clarifications and modifications. We direct Staff to engage a consultant to design and perform the VDER Study, with appropriate stakeholder engagement, and submit the results to the Commission. We emphasize that, notwithstanding the name of the VDER study, it will not address all distributed energy resources but only distributed generation that is eligible for net metering; therefore, the study results may not be relevant in other contexts or for other purposes, such as energy efficiency program evaluation or consideration of grid modernization initiatives.

A. Timeline and Stakeholder Participation

On the issues of timeline and ongoing stakeholder participation, we note that the Report states that the Commission should approve a study scope and issue a request for proposals for consulting services in 2018, with a study report and findings delivered in 2020. The initial focus on the LVDG Study has delayed our approval of the VDER Study scope, rendering Staff's proposed timeline unattainable. Consistent with Staff's general timeframe, we direct Staff to issue a request for proposals in the first quarter of 2020 and engage a consultant to perform the VDER Study, with a study report and findings delivered by the end of the second quarter of 2021.

With respect to stakeholder participation in the study process, we direct Staff to follow a procedure similar to that implemented for the LVDG Study. Staff should hold stakeholder

³ Order No. 26,221 was clarified in certain respects by Order No. 26,227 (March 20, 2019).

working group meetings to provide status updates and answer questions during the study process, at least once every two months. In addition, Staff should convene a stakeholder working group meeting in connection with any major step in the study process, even if that meeting would be held sooner than would otherwise occur under the bi-monthly schedule. We also direct Staff to provide to the stakeholder working group material documentation, such as reports and analyses completed in the study process, on an interim basis during the study period.

B. Study Scope

We reiterate that the purpose of this study, together with the LVDG Study, is to build a record to inform future net metering tariff development. June 2017 Order at 60-61. The VDER Study should be a 15-year forward-looking study focused on solar photovoltaic (with or without associated storage) and hydroelectric technologies. *Id.* The VDER Study will use the identified DG technologies as test cases for evaluating the value of resources eligible for net metering. Staff should work with the consultant to develop and make available, to the extent possible, a flexible and accessible valuation model that can be used to evaluate a number of different DG technologies other than those that are the focus of the study.

We recognize that most parties objected to the inclusion of at least one of the recommended avoided cost criteria; however, we are not persuaded that the scope of the study should be modified to exclude any criteria that were recommended by Staff following the stakeholder working group's collaborative consultation process.

C. Study Methodologies

With respect to Eversource's comment regarding evaluation of market resource values for larger DG facilities, the emphasis of the VDER Study should remain focused on load reducer values, as that is the primary way in which DG will achieve utility cost avoidance, in particular

given the current size limit on customer-generators to participate in net metering. We direct Staff to work with the consultant to determine whether market resource value analysis may be appropriate for larger DG as a study sensitivity.

We find using a combination of the utility cost test and consumer rate and bill impacts analysis to be the better approach to determining the effects on utility ratepayers and the potential for cost shifting between customers participating and those not participating in net metering. To the extent that conclusion may be deemed inconsistent with the Commission's endorsement of ratepayer impact measure test criteria in the June 2017 Order, we hereby modify that order pursuant to our authority under RSA 365:28. We direct Staff to work with the consultant with input from the stakeholder working group to further refine the parameters of the specific testing methodologies, including in particular the rate and bill impacts analysis.

With respect to comments on the applicability of the AESC Study and related data, we reiterate that consistency with energy efficiency benefit-cost analysis, where appropriate, is an underlying priority of the VDER Study. We acknowledge that AESC Study data was gathered to evaluate energy efficiency and not net metering; however, to the extent the value of DG is based on its ability to reduce load on the regional bulk power system, many of the avoided cost benefits should be substantially similar to those achieved through energy efficiency measures. In addition, AESC Study data is relatively current and has been used in energy efficiency program dockets familiar to many stakeholders, therefore its relative merits should be well known to the parties in this docket. Moreover, use of relevant AESC Study data likely will result in both time and cost savings.

We direct Staff to work with the consultant to ensure appropriate transferability of AESC Study data to DG avoided cost values.

Discount rates, baseline costs, and technology utilization represent important details that should be addressed through development of specific study parameters. We direct Staff to address those points with the consultant, with appropriate input from interested stakeholders.

Eversource has argued that the VDER Study should use available historical data in the evaluation of certain avoided costs criteria (*i.e.*, energy, capacity, ancillary services and load obligation charges, renewable portfolio standard costs, and transmission charges). Eversource argued that the study should carry forward historical trends rather than relying on inherently speculative forward projections. We disagree with that view, in particular to the extent the AESC Study incorporates forward projections of wholesale market prices and related cost items. Because those projections are used in the evaluation of energy efficiency measures, it seems appropriate to rely on them when determining the avoided cost load reduction value of DG in the net metering context. We acknowledge the relevance of historical data, however, and approve Staff's recommendation that, wherever possible, three to five years of historical data should be reviewed to verify and validate any forward projections used in the study.

D. Qualitative Review and Quantitative Proxy Values

A number of parties reserved the right to challenge study results based on qualitative review or quantitative proxy values, while other stakeholders withheld consensus from certain individual avoided cost criteria because they do not believe that a qualitative review or quantitative proxy value will yield useful results. We find that the use of qualitative review or quantitative proxy values is a reasonable means of cost effectively addressing hard-to-quantify values without ignoring particular avoided cost categories or assigning them no value. We reserve the right to later determine how much weight will be given to any specific valuation resulting from the use of such less precise study methods. We approve Staff's recommendations

to use appropriate qualitative review and/or quantitative proxy values to describe or estimate particular avoided cost values.

E. Specific Avoided Cost Criteria

We now address stakeholder comments regarding specific avoided cost criteria. Except as otherwise stated, we approve Staff's recommendations regarding the proposed VDER Study scope criteria.

With respect to criteria No. 3 (Ancillary Services and Load Costs) and No. 5 (Transmission Charges), we address Eversource's argument that avoided regional load-based charges should not be considered because they do not actually represent avoided costs. To the extent that such charges assessed by ISO-NE based on hourly or peak load or other criteria may be shifted away from New Hampshire customers as a result of DG-related load reduction, those avoided charges should be counted as benefits to New Hampshire utility ratepayers. That treatment of such costs is consistent with the Commission's evaluation of the respective benefits and costs of Liberty's battery storage pilot program in Docket No. DE 17-189. *See Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities*, Order No. 26,209 at 4, 19-20, and 37 (January 17, 2019). The evaluation of such avoided charges should also include any related administrative charges assessed by ISO-NE or the relevant utility.

With respect to criterion No. 6 (Transmission Capacity), we acknowledge Unitil's and NERA's comments regarding the unlikelihood that small-scale DG development will have any significant impact on transmission planning and related upgrade costs. We believe, however, that this avoided cost category should be included in the study scope because it is covered in the AESC Study and is the subject of ongoing regional DG interconnection forecasting used for

ISO-NE system planning purposes.⁴ We accept Staff's recommendation to use a qualitative review or quantitative proxy estimate to assess the potential that any such avoided cost savings will be achieved within the time horizon for the VDER Study.

Criterion No. 7 (Distribution Capacity), is the subject of the LVDG Study. The VDER Study should primarily use the inputs and conclusions from that separate study. To the extent that the LVDG Study does not determine any system-wide values for lower-order distribution investment deferrals, that determination would be an appropriate component of the VDER Study. We direct Staff to work with the consultant to include that analysis in the detailed study scope.

With respect to criterion No. 12 (Hedging/Wholesale Risk Premiums), we acknowledge the argument of certain stakeholders that higher DG penetration may increase the volatility of load levels, resulting in greater risk premiums borne by utility default service customers and potentially other ratepayers. While approving Staff's recommendation that a qualitative review or quantitative proxy estimate approach be used to assess this criterion, we direct Staff to work with the consultant to determine whether the effects may tend to increase rather than reduce customer costs. Staff should work with the consultant, with input from the stakeholder working group, to evaluate whether the AESC Study wholesale risk premium assumption is appropriate and the weight it should be given in the study analysis.

Regarding Criterion No. 14 (Transmission and Distribution System Upgrades Required), we acknowledge Until's comment that DG interconnection costs should be included in the analysis; however, we agree with Staff that transmission or distribution system interconnection costs attributable to DG installation and operation should only be considered to the extent they are not covered by directly-assigned costs paid by DG developers. To the extent that individual

⁴ See AESC Components in New England: 2018 Report at 195-216 (amended October 24, 2018); ISO New England 2019 Regional System Plan at 23-24, 41-44 (October 31, 2019).

customer-generators bear the costs of interconnection and integration of their facilities, the related costs should not be included in the VDER Study analysis because those costs will not be assessed to other utility ratepayers. Conversely, to the extent that distribution system upgrades funded by interconnecting customer-generators (such as transformer replacements) can be demonstrated to benefit other utility ratepayers, those avoided cost savings may be taken into account in the study. The relative merits of any proposal for collective sharing of DG interconnection and integration costs, either on a locational or system-wide basis, is beyond the scope of the VDER Study. We therefore accept Staff's recommendation and direct Staff to work with the consultant to develop an appropriate qualitative review or quantitative proxy estimate to evaluate this criterion.

With respect to criterion No. 15 (Utility Lost Revenues), we acknowledge the Joint Stakeholders' argument challenging the assumption that lost revenue should equal net behind-the-meter usage in view of the potential trend toward "beneficial electrification" by customers with installed DG. Staff recommended not including a separate analysis of how increased electric usage caused by DG adoption may impact lost revenues. According to Staff, it is difficult and costly to measure because it requires studying many different customer behaviors, and it also "may have second order impacts on load reduction values associated with other elements of the study." Report at 11. Staff instead proposed that a macro-level "high load growth" general study sensitivity, including consideration of effects regarding the lost revenue criterion, might be conducted subject to further development by the consultant and within study budget constraints. *Id.* We direct Staff to work with the consultant, with input from the stakeholder working group, to determine whether and how such an alternative load growth scenario may be included as a sensitivity in the study scope. That determination may be

informed through review of the alternative load growth cases developed in connection with the separate LVDG Study.

The Commission has already determined that criterion No. 16 (Externality Benefits) is properly included in the scope of the VDER Study. June 2017 Order at 60. We find that Staff's recommended treatment of that criterion as a sensitivity to evaluate externality costs not embedded in energy prices, is a reasonable and appropriate approach. We acknowledge DES' representation that not all avoided externality costs may be fully covered by market-based emissions programs or other incentives, such as the Regional Greenhouse Gas Initiative or the state renewable portfolio standard, as those programs arguably were not designed to assess the full environmental costs of pollutant emissions which might be avoided through load reduction resulting from DG installations. We direct Staff to work with the consultant, with input from the stakeholder working group, to determine which specific non-embedded environmental costs are most appropriate and cost-effective to include for evaluation in the VDER Study, with attention given to the list of potential sources provided by DES.⁵ We reiterate that adequate measures must be taken to ensure that any such benefits are not double counted if they are in fact embedded in market pricing or through other mechanisms.

The Commission has also already determined that criterion No. 19 (Customer Installed Net Costs) should be included in the VDER Study scope in the form of New Hampshire-specific or appropriate industry estimates. *Id.* at 61. We find that Staff's proposed treatment of that criterion through analysis of three differently-scaled types of solar photovoltaic electricity projects, with the related costs considered net of all available incentives and subsidies such as

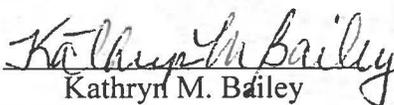
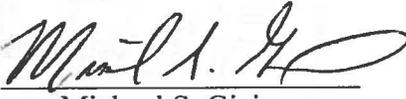
⁵ See DES Comments on Proposed Scope of VDER Study, July 11, 2018, at 5-6 (listing reports and other information available from ISO New England, the Regional Greenhouse Gas Initiative, the U.S. Environmental Protection Agency (EPA) and Department of Energy, as well as the "AVoided Emissions and geneRation Tool" model used by the EPA.

federal tax credits and state incentive programs, is reasonable and appropriate. We direct Staff to work with the consultant, with input from the stakeholder working group, to develop appropriate methods for collecting relevant customer installed cost data and evaluating the net costs of DG installation by customer-generators.

Based upon the foregoing, it is hereby

ORDERED, that Staff's proposed Value of Distributed Energy Resources Study Scope and Timeline, with the modifications and clarifications specified in the body of this order, is approved, and Staff is directed to issue a request for proposals to engage a consultant to perform that study.

By order of the Public Utilities Commission of New Hampshire this eighteenth day of December, 2019.

 Kathryn M. Bailey Commissioner	 Michael S. Giaimo Commissioner
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Attested by:


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