THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

TESTIMONY OF

David P. Littell on behalf of
Clean Energy New Hampshire

CONSIDERATION OF CHANGES TO THE CURRENT NET METERING TARIFF STRUCTURE, INCLUDING COMPENSATION OF CUSTOMER-GENERATORS

Docket No. DE 22-060

December 6, 2023

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Exhibits:

I. INTRODUCTION AND PURPOSE OF TESTIMONY

Q. Please state your full name and business address.

A. My name is David Littell. My business address is 100 Middle Street, West Tower, 6th Floor, Portland, Maine 04101.

Q. For which party are you testifying, with whom are you employed, and in what capacity?

A. I am testifying as a policy expert for Clean Energy New Hampshire ("CENH") along with Thomas Beach of Crossborder Energy who is a highly regarded technical expert on rate design, ratemaking, and bill impact analysis. I am a Shareholder at Bernstein Shur Sawyer & Nelson ("Bernstein Shur"). Bernstein Shur is a New England-based law firm that advises clients across the United States and around the world.

Q. Please summarize your professional and educational background.

A. I have worked in the regulatory sector for my entire professional career. I have worked as an attorney and advisor in private practice for many years. I also had the honor of serving as deputy commissioner and then commissioner of Maine's Department of Environmental Protection, as a member of the Governor's cabinet from 2003 to 2010. From 2010 to 2015, I served as a commissioner on the Maine Public Utilities Commission. I have then subsequently advised many state commissions, energy and environmental agencies. My background is presented in more detail in **Exhibit DPL-5**.

Q. Have you ever testified before a public utility regulatory agency?

A. Yes, I have testified, often in the role of invited expert or a commission advisor.

Q. In what matters have you testified?

A. I can provide a few examples. I have testified before the Maryland Public Service Commission on matters related to Public Conference 44.[1] I have also testified before the Public Utilities Commission of Ohio on performance based regulation as part of its Power Forward Initiative.[2] I also assisted the Michigan Public Service Commission on performance based regulation.[3]

I testified to the Massachusetts Attorney General's Office ("MA AGO") in 22-GREC-01, 22-GREC-02, 22-GREC-03, 22-GREC-04, 22-GREC-05, and 22-GREC-6. I have also acted as a non-testimonial expert in other Massachusetts Department of Public Utilities dockets as a consulting expert. Again, I have undertaken similar consulting expert roles for a number of other commissions and energy offices in adjudicatory and non-adjudicatory matters.

Q. What is your expertise in Net Energy Metering ("NEM")?

A. I have worked with NEM matters for over a dozen years including as a commissioner and an expert advisor. I have also addressed more broadly distributed energy resources ("DER") valuation, integration in state regulatory tariffs and structures, and DER optionality in the wholesale markets.

Q. Do you have any other expertise in NEM?

A. I have worked on NEM matters and dockets in a number of New England states including Maine, New Hampshire, Massachusetts, and other states in New England.

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1 *See*, *In the Matter of Transforming Maryland's Electric Distribution Systems*, P.S.C. PC44 (MD 2019).

2 *See*, Migden-Ostrander, J., Littell, D., Shipley, J., Kadoch, C., & Sliger, J., *Recommendations for Ohio's Power Forward Inquiry*, Regulatory Assistance Project (February 2018), https://www.raponline.org/wp-content/uploads/2018/02/rap-recommendations-ohio-power-forward-inquiry-2018-february-final2.pdf.

3 *See* Littell, D. & Shipley, J., *Performance-Based Regulation Options*, Michigan Public Service Commission (July 2017),https://www.michigan.gov/-/media/Project/Websites/mpsc/workgroups/pbr/RAP_PBR_options_for_MI_PSC_7_14_171.pdf?rev=e9b44b80ad8f4322a6af9b54eab7c854

Q. What is the purpose of your testimony?

A. I am testifying as an expert witness related to New Hampshire's NEM 2.0 in support of Clean Energy New Hampshire regarding positions on the New Hampshire NEM program administered by this Commission.

Q. What do you mean by NEM 2.0?

A. In this testimony, I use NEM 2.0 as do other New Hampshire parties to refer to the alternative NEM tariff established by the Commission in 2017 in Order 26,029. The prior tariff, still in place for customers grandfathered into it, would be NEM 1.0 which I do not address in this testimony

Q. How is the remainder of your testimony organized?

A. In Section II, I discuss how NEM 2.0 provides stable revenue for residential customers and small businesses developing distributed resources. In Section III, I address how NEM 2.0 represents a moderate compromise. Section IV is an overview of current NEM 2.0. In Section V, I examine issues with NEM 2.0. Section VI reviews how NEM 2.0 supports the local economy and jobs in New Hampshire. Section VII recommends modifications to New Hampshire's Commercial distributed resource NEM Tariff. Section VIII offers other important considerations related to NEM 2.0. Finally, Section IX provides a brief conclusion.

II. CURRENT NEW HAMPSHIRE NEM PROVIDES STABLE REVENUE FOR RESIDENTIAL CUSTOMERS AND BENEFITS FOR ALL RATEPAYERS.

Q. Currently, does NEM in New Hampshire Provide Customer Revenue to support DERs which customers desire?

A. Yes. New Hampshire's two NEM programs provide a stable revenue source for residential and small commercial DERs which customers have installed. New Hampshire added 40 megawatts

("MW") of NEM resources in 2022.[4] Interest in NEM resources is seen not just in New Hampshire but in other state markets as consumers respond to energy market pricing.

Q. Can you explain the value as load reducer?

A. Both the Dunsky analysis and the Unitil and related Daymark analysis from Docket No. 22-073, discussed below, illustrate that a properly balanced distributed resource program can realize more value *for New Hampshire customers* than obligating DER participation in the ISO-NE wholesale markets. Crucially, these analyses show this approach creates value for both NEM-customers and non-NEM customers.

Treating DERs as load reducers allows for both NEM-customers and the New Hampshire NEM tariff to capture value for New Hampshire customers as a whole, in excess of what they pay for the entire NEM program. The value as a load reducer includes avoided retail supply, avoided transmission and capacity charges, price suppression for retail customers, transmission, capacity, avoided distribution capacity, and avoided line losses among other benefits. All of these values do not account for the environmental and greenhouse gas benefits which are the most commonly cited reasons to pursue DER adoption.

A. NEM 2.0 Gets More Value at Lower Cost to New Hampshire Ratepayers.

Q. What value does the NEM structure provide to New Hampshire ratepayers?

A. As just noted, the New Hampshire NEM structure provides substantial value as a load reducer. These values exceed the costs (without counting any environmental or greenhouse gas benefits) as explained fully in the testimony of Tom Beach for CENH.

[4] New Hampshire DOE, New Hampshire Renewable Energy Fund, Annual Report, Oct. 1, 2023, p. 26, on the web at: https://www.energy.nh.gov/sites/g/files/ehbemt551/files/inline-documents/sonh/2023-ref-report-to-legislature.pdf.

The NEM program in place and proposed in this testimony delivers the values identified by the General Court in the enabling statute: diversity of New Hampshire's resource mix, support for customer self-generation, reduced dependence on other sources, use of New Hampshire resources, use of renewable fuels, benefits for the environment and public health, support for competitive New Hampshire markets, private investments, in-state commercial innovation, and reducing interconnection costs. The NEM statute speaks to all these values as the General Court found:

> It is found to be in the public interest to provide for small scale and diversified sources of supplemental electrical power to lessen the state's dependence upon other sources which may, from time to time, be uncertain. It is also found to be in the public interest to encourage and support diversified electrical production that uses indigenous and renewable fuels and has beneficial impacts on the environment and public health.[5] It is also found that these goals should be pursued in a competitive environment pursuant to the restructuring policy principles set forth in RSA 374-F:3. It is further found that net energy metering for eligible customer-generators may be one way to provide a reasonable opportunity for small customers to choose interconnected self generation, encourage private investment in renewable energy resources, stimulate in-state commercialization of innovative and beneficial new technology, enhance the future diversification of the state's energy resource mix, and reduce interconnection and administrative costs.[6]

Each of these values is spoken to in the reports and analysis just discussed. Notably, these findings affirm that it was the intention of the General Court in establishing the NEM program to create a thriving market for locally generated power.

Q. Does your testimony speak only to the benefits of NEM?

A. No. While I do testify to the values being realized according to the New Hampshire Department of Energy's ("DOE") New Hampshire Value of Distributed Resources by Dunsky Energy + Climate Advisors (the "Dunsky NH VDER Study"), the Unitil testimony and Daymark report submitted in Docket No. 22-073, as well as other Daymark reports and analyses, I also

[5] Testimony Section B.2 below addresses the environmental and public health benefits.

[6] Section 362-A.

testify to the balance between value and costs. The costs are quite modest, and the benefits are substantial for all ratepayers. The benefits are even greater to NEM-customers. In total, the substantial net benefits are achieved at a very modest cost. Those benefits for all customers exceed the costs even without accounting for environmental benefits.

Q. When you say benefits to all customers exceed the costs, can you clarify?

A. The costs (as analyzed by the Dunsky NH VDER Study and confirmed by Tom Beach and other studies) are substantially below the value of the DERs in the NEM program.

Q. How does New Hampshire's cost to benefit compare to other New England states?

A. Since other New England states NEM programs pay more for the same DER kWh of energy, without doing quantitative analysis, it is fairly clear that New Hampshire's NEM 2.0 program procures more value per dollar than other New England states.

Q. Is New Hampshire more frugal than other New England states?

A. Yes. New Hampshire's NEM 2.0 program is both more frugal and more thrifty than other New England states. None of the recommendations in this testimony would vary New Hampshire's status as the most frugal and thrifty New England state on net energy metering.

Q. Has DER activity increased in New Hampshire?

A. DER activity increased in New Hampshire and across the region in recent years largely as a result of the price of energy. This is a natural and expected response to increase in energy prices. Price drivers for energy include a constrained gas supply: gas is increasingly being exported from the U.S. Multiple international markets, including European markets, have experienced severe supply disruptions with the February 2022 Russian invasion of the Ukraine. As a result, prices of petroleum and gas have increased and severely increased over the last year and half.

With energy prices increasing across the board in 2021, 2022, and the first half of 2023, New Hampshire has not been immune to these market trends.[7] Customers have shown more interest in alternative resources, including distributed resources, to reduce their energy expense and exposure to volatility. At the customer level, distributed resources provide a customer hedge for a percentage of their energy needs that they are able to lock-in at specific pricing.

Q. Does this increased DER activity provide customer benefits?

A. Absolutely. New Hampshire customers are able to reduce exposure to energy price volatility for a portion of their energy needs and can reduce their energy expenditures as well.

Increased DER activity also provides more customer choice for energy products and services. This is important because energy customers, like other customers, are increasingly interested in procuring services and products designed to meet specific customer needs and preferences.

Q. Do DERs provide economic development in New Hampshire?

A. Yes, of course. DER activity resulting in new project development enhances New Hampshire's economy at a local level in multiple ways, including reducing energy spending for many small and medium-sized New Hampshire businesses and municipalities, stimulating local employment and increasing local tax base.

Q. Does the increased DER activity support grid diversity?

A. As more DER development occurs, an increasing number of diverse resources will come on line in New Hampshire. While this represents a shift to a more diversified and decentralized grid in the immediate term, it also presents opportunities for future growth.

[7] *See, e.g. https://tnhdigital.com/22090/news/cost-of-heating-is-on-the-rise-in-new-hampshire-with-winter-right-around-the-corner/.*

Q. What do you mean by future growth?

A. As an example, intermittent distributed resources can later add a battery installation installed to the same point of interconnection to provide for peak management into the evening, and grid-reliability services. Such facilities can provide capacity in the form of distribution capacity, transmission capacity, and generation capacity to provide grid support across those traditionally segregated domains to meet future grid needs as well as current and future customer needs.

Q. Are there other ways diversified or decentralized resources can help customers or the grid?

A. Diverse resources are being utilized in some jurisdictions to provide localized reliability support for specific facilities or specific distribution circuits.

Q. Are utilities taking advantage of such distributed resources now?

A. Yes, certainly. Utilities in some states are proposing distributed resources. including batteries. to support each of the goals above including localized reliability. That localized reliability supports customers and the grid, even potentially during a grid outage.

Q. Coming back to NEM in New Hampshire, do you view the New Hampshire NEM program as encouraging the current market increase in DERs?

A. The New Hampshire NEM program provides a stable revenue source for specific DER developments in New Hampshire. The NEM program supports DER activity at a stable level and, has for five years under NEM 2.0. That said, as noted above the current increase in energy prices appears correlated with the increased uptick in DER activity.

III. NEM 2.0 A MODERATE AND REASONABLE COMPROMISE OF INTEREST AND NEW PRINCIPLES

A. New Hampshire Reception

Q. Was there a reaction in New Hampshire to the 2017 NEM decision?

A. Yes, the 2017 NEM decision, which I refer to as NEM 2.0, was received well in New Hampshire. The NH Business Review noted that "both sides were pleased" in 2017 while also reporting an expected 2017 boost in customers rushing to get grandfathered under NEM 1.0.[8] The New Hampshire Sustainable Energy Association also welcomed the 2017 NEM decision as a reasonable compromise:

> Recognizing the value that DER (distributed energy resources, like solar, hydro, etc.) adds to all parts of our grid–including transmission, generation, AND distribution–comports with data seen across the country and right here in NH. The reduction in the distribution export rate to 25% of the charge is a reasonable compromise and may be adjusted going forward, depending on the result of a future PUC-led, NH-specific Value of DER study.[9]

B. National Reception

Q. Was there a national reaction to the 2017 Commission NEM decision?

A. Yes, the 2017 decision was of note nationally. The New Hampshire 2017 NEM decision was received as a common ground compromise.[10] The 2017 decision on NEM eligibility was perceived as a reasonable and moderate solution for residential NEM based on information and analysis undertaken then. In reporting on the 2017 Commission decision on the new alternative tariff, *Utility Dive* characterized more extreme positions against the approved proposal:

> The new [NEM] rates are essentially a mashup of utility- and solar-backed proposals, and represent a more collaborative approach to developing new net metering rates. (emphasis

[8] NH Business Review, "PUC decision seen as big boost to NH Solar industry." June 27, 2017, on the web at: https://www.nhbr.com/puc-decision-seen-as-a-big-boost-to-nh-solar-industry/.

[9] Green Energy Times, "NHSEA on NH PUC Net Metering Decision," June 26, 2017, on the web at: https://www.greenenergytimes.org/2017/06/nhsea-on-nh-puc-net-metering-decision/.

[10] Shallenberger, Krysti (March 13, 2017). "New Hampshire utilities, solar companies file rate design settlement proposals". *Utility Dive*. Retrieved March 17, 2017.

in original).[11]

While there were settlement proposals, the Commission ultimately decided this case to develop a new NEM 2.0 tariff. This NEM 2.0 tariff was made available for small projects, largely residential but also small commercial.

Q. Are there other data sources on how the 2017 NEM 2.0 is perceived nationally?

A. Wikipedia, interestingly enough, uses New Hampshire's 2017 NEM proceeding as an example of solar companies and utilities coming together to find common ground:

> In many states, such as New Hampshire, solar companies and utility companies are coming to the negotiation table with compromises over net metering rates. In New Hampshire, proposals put forth by both the solar companies and the utility companies in March 2017 mostly found a lot of common ground.[12]

This is of course a single data point from a commonly referenced website that speaks more to perceptions than authority.

Q. Were there other national reactions to the 2017 NEM proceeding?

A. Yes, national media, including the energy press, received the New Hampshire NEM as a reasonable compromise in a matter-of-fact manner.[13]

Q. Does that mean that NEM 2.0 is just and reasonable?

A. No, as we lay out below, we believe NEM 2.0 is under-compensating DERs.

Q. What do you mean by NEM 2.0 under compensating DERs?

A. Tom Beach's analysis lays this out in detail, showing the overall system-wide avoided costs benefits for all New Hampshire customers for all rate classes, residential, SG and LG, in excess of

[11] Utility Dive, "New Hampshire Regulators Approve New Net Metering Tariffs," June 26, 2017, on the web at: https://www.utilitydive.com/news/new-hampshire-regulators-approve-new-net-metering-tariffs/445796/

[12] Wikipedia, Net Metering in the United States, on the web at: https://en.wikipedia.org/wiki/Net_metering_in_the_United_States#cite_ref-:9_62-0.

[13] *See e.g.* Energy Toolbase, New Hampshire Makes Cuts to Net Metering Program, Sept. 1, 2017, on the web at: https://www.energytoolbase.com/newsroom/blog/new-hampshire-puc-makes-cuts-to-net-metering-program

the cost to New Hampshire customers.[14]

C. New Hampshire has the Most Frugal NEM in New England

Q. Among the six New England states, which state has the most frugal NEM program?

A. If frugal is meant to denote lowest payment for solar value and services, New Hampshire's NEM program is the most frugal and thrifty. New Hampshire pays the lowest payment for both residential scale solar and commercial scale solar of any of the six New England states.

Q. You answered that New Hampshire is the most "frugal and thrifty." What does thrifty mean?

A. Thrifty here refers to the residential rate as not just lowest payments to customers, but securing the highest value for the lowest payment. Thrifty is securing more value for lower costs, which is different from frugal which is simply a reluctance to pay.

Q. Is there agreement from other parties in this docket?

A. The Joint Utilities observed that there is a balance of interests and viewpoints in the current NEM 2.0 tariffs that came out of Docket No. DE-16-576. The Joint Utilities also observe that New Hampshire's NEM structures "remain among the most balanced in the region. Other New England states continue to maintain tariffs that provide credit to customers for energy exports to the grid at rates equal to the full sum of all applicable retail kWh charges …".[15] So, the Joint Utilities characterize the NEM structures as balanced, and I use the terms frugal and thrifty, but I believe this to be the same basic point.

Q. Is the commercial rate for up to 1 MW also thrifty?

A. I would say no. Above 100 kW for commercial sized NEM projects, the NEM 2.0 tariff provides only reimbursement at the retail energy price. There is more value that is not accounted

[14] *See R. Thomas* Beach Direct Testimony for CENH, NH PUC Dock. No. DE-22-060, Dec. 6, 2023, (hereinafter Tom Beach Test.") at, *pp. 12-17.*

[15] Joint Utilities, Data Request Response No. OCA 1-002, Dock. No. DE 22-060 (Oct. 12, 2023).

for and so financial benefit for New Hampshire ratepayers is left on the table. In other words, a truly thrifty commercial rate would incentivize more DERs to provide more benefits to all ratepayers.

Q. Can you explain the other New England NEM or other tariffs?

A. Yes, as far as comparable residential NEM tariffs in New England I shortly summarize each other New England state's programs below.

Maine's programs, called Net Energy Billing take two different forms, full NEM rates are beneficial for residential and small business customers known as Maine's KWH credit. The KWH credit includes the default service, transmission, and distribution charges. Customers are required to pay a minimum bill charge and applicable demand charges based on rate class. Using the same format as the NH PUC table for New Hampshire's NEM program, Maine's KWH program[16] looks like this:

Maine (KWH Program)	
Bill Component	**Credit or Charge**
Demand Charge	Not Applicable
Min. Bill Charge	Charge
Default Service (Energy)	Full Credit
Distribution	Full Credit
Transmission	Full Credit
System Benefits	Charge
Stranded Cost	Charge

Vermont provides a blended rate for customers with generation up to 500 kW. The Vermont credits net excess generation ("NEG") customers at a blended residential rate and carries

[16] Maine also has a NEB Tariff Rate Program which is useful for commercial customers and provides customers with a monetary dollar credit on their bill equal to 75% of the applicable Transmission and Distribution charges plus the applicable standard offer rate. Because that program is structured to provide a pure monetary credit, it can offset demand charges as well.

over to the customer's next bill. Customer charge and efficiency charge are "non-bypassable", and DG customers must pay these charges. The current Vermont blended rate is $ 0.17141. The Rate Credit is subject to "Siting Adjustor Factors" depending on size and location and whether Renewable Energy Credits ("REC") are transferred.

Rhode Island provides a full credit for the default service charges, as well as charges for distribution, transmission, and transition. DG customers are always responsible for customer and demand related charges. Rhode Island's program is allowed to be sized up to the 3-year load of the customer or 10 MW. The Rhode Island program can be summarized in the same format as the New Hampshire program as follow:

Rhode Island	
Bill Component	**Credit or Charge**
Demand Charge	**Charge**
Customer Charge	Charge
Default Service (Energy)	Full Credit
Distribution	Full Credit
Transmission	Full Credit
Transition Charge	Full Credit

Massachusetts has transitioned through different iterations of NEM and SMART programs. For smaller projects, Massachusetts provides a credit for the default service charges, as well as charges for distribution, transmission, and transition. "New solar net metering facilities" credits are based on 60% of the excess kWh generated, as opposed to 100%. Calculation of Net Metering credits does not include demand side management charges or renewable energy kWh charges.

For Connecticut, the Residential Solar Investment program ended on January 1, 2022, with existing net metering customers grandfathered until December 2039. This program allowed projects up to 2 MW. Connecticut's new program is called "Residential Renewable Energy Solutions Program" and allows projects up to 25 kW AC and locks in the rate for 20 years. There

are two options: Buy-all and Netting. For Buy-all, the utility purchases all energy and RECs generated. Excess generation at the Total Incentive Payment Rate, as set by Commission; fixed for the 20-year term of the tariff agreement. The total incentive payment equals the product of a customer's monthly Net Excess Generation, measured in kWh by the Production Meter, and their Total Incentive Payment Rate. For Netting, the utility purchases RECs for all KWh generated at the Commission established rate. Customers also receive a monetary credit at their applicable retail rate for net excess generation (energy exported to the grid and not consumed on-site). The current Eversource Buy-all payment for 20 years is set at $0.2943 and $0.0318 for the REC incentive plus a credit at the retail rate for net excess generation. These Connecticut rates compared to the Eversource full retail rate (Supply and Delivery) for a general residential customer at $0.32587 and a United Illuminating full retail rate (Supply and Delivery) for a general residential customers of $0.340391

Q. Is there a reason you do not provide a graphic table for Connecticut, Massachusetts, and Vermont?

A. Yes, these state programs are structurally dis-similar to the New Hampshire, Maine, and Rhode Island programs, so they are difficult to present in a comparative table without an incorrect suggestion of equivalence of some rows.

IV. NEM 2.0 OVERVIEW

Q. When was NEM 2.0 established and what was the major feature of NEM 2.0?

A. In June of 2017, following a full adjudication and extensive settlement discussions involving the Commission staff, the Commission issued a decision to create a new NEM tariff with the prominent features being a NEM tariff credit for net export value for new, small customer-generators for i) default energy service rate credit, ii) full transmission rate credit, iii) 25 percent credit of the distribution rate. The prominent feature was the reduction of credit for

the distribution rate component from 100 percent credit in NEM 1.0 to 25 percent credit in NEM 2.0.

Q. Did the Commission do anything to ensure there is NEM stability for customers?

A. Yes, to meet the expressed need to stable customer NEM rates, these rates were made applicable for projects up to 2040. The Commission recognized that solar companies need tariff stability for roughly 20 years under NEM 2.0 for their commercial viability.

Q. Can you describe the current NEM tariff paradigms in New Hampshire?

A. Yes, currently NEM 2.0 provides customers with small DER systems up to 100 kWac with credit for the energy default service rates, for the transmission rates and for 25 percent of the distribution charge. These credits are for exported energy. No credit is provided for the stranded cost, system benefit, and storm recovery charges portions of retail service and of course no credit for the other 75 percent of the distribution component.

A graphic from the NH DOE showing the NEM programs is shown here:

Bill Component	NEM 1.0 (Standard NEM)	NEM 2.0 (Alternative NEM)
Customer Charge	Yes	Yes
Demand Charge (if applicable)	Yes	Yes
Default Service (Energy)	Full Credit	Full Credit
Distribution	Full Credit	25% Credit
Transmission	Full Credit	Full Credit
System Benefits	Full Credit	No Credit
Stranded Cost	Full Credit	No Credit
Storm Recovery	Full Credit	No Credit
Credit Mechanism (end of each billing cycle)	Net kWh Carried Forward	kWh converted to monetary credit. Monetary credit carried forward as a bill credit.

[17]

[17] NHPUC, What is Net Metering, **Net Metering Tariff Overview 2020**, on the web: https://www.puc.nh.gov/sustainable%20energy/Net%20Metering/Net_Metering.html.

NEM 1.0 is called standard NEM and was available for projects prior to September 1, 2017 NEM 2.0 refers to NEM arrangements in effect from September 1, 2017 to date.

Q. For larger systems what are the NEM arrangements?

A. For customers net metering with systems larger than 100 kWac up to 1 MWac, or up to 5 MWac for projects whose off-takers are municipal or county electric meters, those systems can get credit only for the default energy service charge. No other NEM credit is provided for energy exported to the grid. That singular credit is shown here:

Bill Component	NEM 1.0 (Standard NEM)	NEM 2.0 (Alternative NEM)
Customer Charge	Yes	Yes
Demand Charges	Yes	Yes
Default Service (Energy)	Full Credit	Full Credit
Distribution	No Credit	No Credit
Transmission	No Credit	No Credit
System Benefits	No Credit	No Credit
Stranded Cost	No Credit	No Credit
Storm Recovery	No Credit	No Credit
Credit Mechanism (end of each billing cycle)	Net kWh Carried Forward	kWh converted to monetary credit. Monetary credit carried forward as a bill credit.

V. NEM 2.0 ISSUES WITH IT FOR ATTENTION?

Q. Are there issues with NEM 2.0?

A. Yes, while New Hampshire net metering program(s) get a lot of value for the NEM tariff credits provided (more than any other New England state), they undervalue the resource. That, in and of itself, is not as categorically bad as obtaining higher value for lower cost is valuable to customers as a whole (all customers). The result is that DERs that are cost effective and would generate benefits for all ratepayers are almost certainly underdeveloped in New Hampshire.

A. NEM 2.0 Undercompensates Solar Compared to Value.

1. New Hampshire Specific and New England Value of Distributed Solar, Hydro Studies

Q. Has New Hampshire undertaken an evaluation of the value of solar and other distribution resources?

A. Yes, the New Hampshire Commission and later the DOE administered an evaluation of the value of distributed resources. The study came out of the prior NEM 2.0 docket and was conducted by the Commission and DOE. This evaluation, the Dunsky NH VDER Study, received cooperation and substantial amount of information from the electric distribution companies but was undertaken independent of the electric distribution companies and solar companies.

Q. What were the high-level findings?

A. The Dunsky NH VDER Study modeled a New Hampshire system wide net avoided value to customers of 11¢ - 18¢ per kWh for energy produced in 2021 across different DERs evaluated. By 2023, this value would be 10¢ - 23¢ per kWh.[18]

Q. Is this the Dunsky NH VDER Study particularly insightful beyond being specific to New Hampshire?

A. First, the Dunsky NH VDER Study was administered by the New Hampshire Commission and later DOE, so it's an objective study commissioned by a New Hampshire state agency.

To come to the insightful question: yes, the Dunsky NH VDER Study focuses on the difference in which value manifests and is assessed in a restructured market environment. Value has both a perspective aspect: are you measuring value to the customer, value to the utility, value to the grid system, value to the public.

[18] Dunsky Energy + Climate Advisors, New Hampshire Value of Distributed Resources, October of 2022, p. ix, together with its Appendices and the Addendum attached hereto as Exhibits 1-3.

Third, the Dunsky NH VDER Study recognizes that value to customers is much greater when deployed as a load reducer at the retail level rather than solely as a wholesale market resource. Other studies get at this issue, but the Dunsky NH VDER Study does a particularly good job of laying out this distinction.

Q. Who are the others who recognize this load reducer concept?

A. For example, in New Hampshire, Unitil has recognized this concept in their Kingston Solar testimony, in Docket No. 22-073 which I will get to shortly.

Q. For those who want to just measure the value of DERs as wholesale ISO-NE assets, what does the Dunsky NH VDER Study tell us?

A. The Dunsky NH VDER Study quite clearly illustrates that the distributed assets evaluated are undervalued and undersold when valued only in the ISO wholesale markets. Tom Beach refines the Dunsky model to use a marginal line loss factor and a more accurate avoided distribution capacity cost calculated from FERC Form 1 data, and finally allocated marginal distribution costs among a broader set of hours of the year.[19] Mr. Beach's adjustments seem accurate as a further refinement of the Dunsky analysis. I note some refinements increase and some decrease the NEM value.

Mr. Beach then likewise refines the Dunsky rates and bills impact analysis with the following improvements:

1. to use the same solar profile as was used in the avoided cost model,
2. to ensure avoided generation capacity and demand-reduction induced price effect ("DRIPE") is counted,
3. to avoid the double avoided risk premium calculation,
4. to use only the 25% distribution value for NEM export payments per the NEM 2.0 tariff,
5. to not assume commercial customers can avoid their demand charges, and

[19] Tom Beach Test. at pp. 4-11.

6. to use the same transmission revenue adjustment as in the benefit/cost analysis.

As with benefit/cost analysis, these refinements are both positive and negative as to customer bill impact. All refinements of the Dunsky model by Mr. Beach appear accurate.

Q. Why is it the case that the wholesale markets undervalue distributed resources?

A. There are multiple reasons, but the short answer is that the market design of these markets only allow for slivers of DER value to be measured and recognized. Restructured markets were not designed in the late 1990s with DERs in mind. Furthermore, many of the values that DERs can provide are realized on the distribution system, which remains a regulated monopoly, not exposed to wholesale markets.

Q. Are there other significant findings and conclusions in the Dunsky NH VDER Study?

A. The Dunsky NH VDER Study concludes that solar combined with storage as a DER combination has more value now and will have even greater value in the future for New Hampshire's grid and customers.[20]

Q. Why is that so?

A. Solar plus storage allows more flexibility and likelihood for the solar + storage DER to generate during hours of the ISO-NE peak energy supply hours, ISO-NE capacity peak, ISO-NE transmission peak, local distribution peaks, and to be available for reliability events. So the Dunsky NH VDER Study makes sense.

Q. Do other New Hampshire studies reach similar conclusions?

A. Yes, the Unitil evaluation reaches a similar conclusion for ISO-NE peak energy supply hours, ISO-NE capacity peak, ISO-NE transmission peak, local distribution peaks.

[20] *Id.* at 32.

Q. For renewable resources, does the location of the DER make a valuation difference?

A. Yes of course. I have three related answers, all of which are yes:

1. For small wind turbines, the value of the wind resource and orientation in the specific location is important.
2. Location within the distribution system can have a significant locational value component. But the aspect is addressed by another New Hampshire study and not by the Dunsky NH VDER Study. I address that shortly.
3. For solar resources the orientation of fixed solar panels matters in two different ways:
    a. Orientation of the panels toward the south will produce the most total kWh of generation because of the sun's orientation.
    b. Orientation more toward the southwest or even mostly west may have more of a grid or reliability benefit even with less total solar kWh. The Dunsky NH VDER Study does a nice job of illustrating the other non-supply valuation elements that make a more westward orientation more valuable because when there are load peaks in the evening those westward systems provide greater solar coincidence.[21]

Q. Does the Dunsky NH VDER Study examine customer costs?

A. The customer cost analysis which the Dunsky NH VDER Study undertakes reaches conclusions regarding costs for non-NEM customers and NEM customers. For non-NEM customers, there is an increased bills that are quite modest (estimated at 0.5% to 1%),[22] and I think the Joint Utilities take the same general posture on costs to non-NEM customers without endorsing or agreeing with the Dunsky NH VDER Study conclusions as to non-NEM customer costs. For NEM customers, there are cost savings; the NEM program results in large NEM customer cost reductions, which is why it has likely become more utilized in recent years.

[21] *Id.* at 26-28. The Dunsky NH VDER Study states: "West-facing commercial solar PV systems produce 6%-10% more value than south-facing commercial solar PV systems, again due to their production having greater coincidence with evening system peaks." *Id.* at 28.

[22] *Id.* at 48.

Q. Does the Dunsky NH VDER Study identify other notable benefits?

A. The Dunsky NH VDER Study identifies two notable benefits that it does not quantify.

The first is grid reliability and support services that DERs can provide. Because most DERs are inverter-based, new inverters have substantial capacity to provide reactive power, voltage, power quality and power factor correction.[23] If not enabled immediately, New Hampshire utilities and the Commission have the ability to utilize these grid reliability and support abilities in the future on a circuit by circuit basis as necessary – of course working with the DER owners. There is substantial potential reliability benefit to be had if the Commission and/or utilities decide to utilize such DER capabilities.

Q. What is the other notable benefit?

A. The second non-quantified benefit identified by the Dunsky NH VDER Study is resiliency value. Solar + storage can support customer islanding with a switch the same way a generator does now. DERs can also support microgrid configurations for businesses or neighbors, microgrids for critical public safety facilities, and controlled load shedding. While DERs will require further investments to support further customer and grid resilience, those future investments can be less as a result of DER deployments now.[24] DER deployments enable future customer and grid resilience optionality.

Q. Do other New Hampshire studies or analysis support the Dunsky approach?

A. The analysis presented to the Commission by Unitil regarding the Kingston Solar project was different, but has a common recognition with the Dunsky NH VDER Study approach in that:

1. Operation of a distributed resource as a load reducer produces more New Hampshire customer value,
2. There are avoided energy costs,
3. There are avoided regional capacity costs,

[23] *Id.* at 42.

[24] *Id.* at 42.

4. There are local transmission benefits and likely avoided costs,
5. There are regional transmission benefits and likely avoided costs,
6. There can be renewable energy certificate ("REC") savings.

The Kingston project testimony assumed a 22 percent capacity factor. Unitil estimated the solar project would provide regional capacity savings of approximately 37 percent of its nameplate (1.85 MW of the 4.875 MW capacity) would generate on the annual historic ISO-NE peak-hour. Likewise 0.6 MW of the 4.875 MW (12% of nameplate) was estimated to contribute to the monthly system peak providing local transmission benefits, ancillary service benefits, and regional transmission costs savings.[25] The net result was an analysis of a project that would return more value to ratepayers than the utility revenue requirement. Similarly, customer owned DERs, at least solar generation allowed under the New Hampshire Tariff, on average, return more value to all ratepayers than the NEM 2.0 tariff credits to NEM customers.

Q. With ISO-NE markets being what they are in New England, is the value as a load reducer greater than wholesale market value?

A. Yes, the Dunsky NH VDER Study and the Unitil Testimony in the Kingston Solar proceeding[26] both illustrate that value as a load reducer is greater than value as a wholesale market asset in the ISO-NE markets.

Q. Why is the value as load reducer greater for distributed resources in New England than in the ISO-NE wholesale markets?

A. In New England, it is easier to realize value as a load reducer where all value manifests itself when presented to the retail customer. The ISO-NE wholesale markets allow for individual components – or slivers – of value to be realized, but do not allow multiple values to be realized

[25] Unitil Energy Systems Inc., Joint Direct Testimony of Andre J. Francoeur, Todd R. Diggens, Christopher J. Goulding, and Jeffrey M. Pentz, Ex. FDGP-1, NH PUC Dock. 23-073.

[26] Unitil Energy Systems Inc., Joint Direct Testimony of Andre J. Francoeur, Todd R. Diggens, Christopher J. Goulding, and Jeffrey M. Pentz, Ex. FDGP-1, NH PUC Dock. 23-073.

for distributed resources. Moreover, avoided retail level value and avoided line losses present additional value to retail customers that is not represented in the ISO-NE markets. For that reason, both the Dunsky analysis and the Unitil analysis illustrate that a properly balanced distributed resource program can realize more customer value than participation in the ISO-NE wholesale markets will.

Q. Do the studies confirm this load reducer value concept?

A. Yes, the value and cost analysis by Dunsky, by Tom Beach, and by Daymark on behalf of Unitil all tend to confirm there is more value as a load reducer than as an ISO-NE market asset.

2. New Hampshire Locational Value of Distributed Resources Study

Q. Has any other New Hampshire specific study of the distribution values of distributed resources taken place?

A. Yes, coming out of the prior NEM docket, the Commission contracted with Guidehouse to conduct a detailed examination of the distribution system capacity value of distributed generation across different circuits and substations in New Hampshire, the New Hampshire Locational Value of Distributed Generation Study[27] (the "NH Locational Distribution Value Study").

Q. What do you mean by detailed examination?

A. Guidehouse examined the New Hampshire utilities actual circuit and substation from 696 locations and identified 122 of those locations with capacity deficiencies. This review looked backward five years and forward ten years using the utilities planning criteria. Of those 122 locations, a subset were examined for winter and summer peaking, mid-day and late-day peaking, contingency overloads and performance violations at under base, low and high load scenarios. That is what I mean by a detailed New Hampshire specific examination.

[27] Guidehouse, New Hampshire Locations Value of Distributed Generation Study, Final Report for the New Hampshire Public Utilities Commission, July 31, 2020, attached hereto and incorporate herein as DPL-4.

Q. What is the potential significance of this NH Locational Distribution Value Study for a NEM tariff?

A. The NH Locational Distribution Value Study is a New Hampshire-specific review of the distribution system capacity value that distributed generation may be able to provide. The study is location specific, of course, and shows the value of avoided distribution capacity investments ranges from under $1 per kW/hr to over $4,000 per kW/hr.

Q. Why is this important for New Hampshire NEM tariff setting?

A. The NH Locational Distribution Value study shows that there is distribution system value on specific New Hampshire distribution circuits and substations, even exceeding $4,000 per kW/hr. That value is in avoiding or deferring distribution system capacity upgrades.

Q. How does that connect to the current NEM tariff?

A. The NEM 2.0 tariff provides 25 percent distribution credit for distributed generation that qualifies for NEM. The NH Locational Distribution Value Study illustrates that distribution system value for ratepayers can exceed this amount substantially on some circuits and for some substations. We need to be cautious not to overinterpret this study as it is locationally specific and subject to the inputs of the study, but given the robust inputs of New Hampshire-specific distribution grid data, it meaningfully suggests the NEM 2.0 tariff is under-compensating DERs for their distribution benefits.

Q. Is the follow up information provided in this docket consistent generally with the NH Locational Distribution Value Study?

A. Yes, the data responses in this case, such as Eversource Data Response to CENH 1-007, in terms of actual distribution system peak load/capacity projects are consistent with the NH Locational Distribution Value Study potential avoided distribution capacity analysis.

3. Maine VOS – 2015

Q. Have other New England Commissions undertaken value of solar valuation studies?

A. Yes, Maine undertook a Maine Distributed Solar Valuation Study ("Maine Solar Value Study") that was issued by the Maine Commission in 2015.

Q. What did the Maine Solar Value Study conclude?

A. First just to be clear, the Maine Solar Value Study used a different methodology than the Dunsky NH VDER Study and based avoided market costs on 2015 data. The price of energy supply is now much higher than in 2015 so that Maine calculated value would be more than double.

With that caveat, the 25 Year Levelized valuation for solar in CMP territory was calculated at 33.7 cents/kWh. That includes environmental pollution reductions avoided costs from reduced public health and environmental impacts using EPA's models and data.

Q. How would the Maine results be different today?

A. As noted, the price of energy supply is much higher in 2021-2023 than in 2015, almost double, so the avoided energy supply cost element would produce a higher evaluation. The net social cost of carbon estimate would also be higher as the U.S. government has revised the prior estimates for social cost of carbon since 2015.

On the other hand, the environmental value of reduced sulfur dioxide ("SO_2") would be lower. That lower value is due to less SO_2 being avoided because less coal is being used and dispatched among the national and New England generation fleets. Less coal producing SO_2 means that there is less environmental impact to "avoid" through clean generation. The same is not true of NO_x which is produced in large degree by gas turbines which together with renewables are pushing coal out of many generation fleets.

Q. Is this Maine Solar Value Study applicable in New Hampshire?

A. This is a different study using a different methodology. Clean Power Research is a reputable energy consulting firm, and the firm and research was Commissioned by the Maine Public Utilities Commission staff. While this report was done by Maine staff, I note it was during Maine Governor Paul LePage's tenure and his appointment of the majority of the Maine Commission, so it was certainly not done by advocates for solar or renewables.

I would say the Maine Solar Value Study is an important point of reference along with the Dunsky NH VDER Study. The Maine Solar Value Study was also undertaken by the Commission, like the Dunsky NH VDER Study, so not an advocacy piece which provides a higher level of credibility.

Q. Have there been other studies for New England states?

A. Yes. Speaking of work done by advocates for advocacy purposes, there are analyses undertaken by and for clean energy groups that show the value of solar.

The first example I would cite as advocacy in the context of a Commission matter, is Daymark Energy Advisors' analysis performed for the Coalition for Community Solar Access (the "Daymark Maine NEB Report").[28] This study was done in the context of a Maine Public Utilities Commission Report to the legislature identifying potential Maine net metering costs of $160.8 million based on a full retail value NEM paradigm in Maine that allows for virtual net metering of off-site projects (as well as repackaging of existing DG into the NEM up to 5 MWs). From a customer perspective the Maine NEM paradigm is more favorable than New Hampshire NEM 2.0 because it can offset 100% of distribution costs.

[28] Daymark Energy Advisors, *Cost and Benefits of Maine's Net Energy Billing Program*, prepared for the Coalition for Community Solar Access (hereinafter "Daymark Maine NEB Report") March 11, 2021.

The Daymark Maine NEB Report models $1.8 billion in value of solar for the $160.8 million of costs. Daymark did not assess the distribution value as part of this analysis, so this $1.8 billion in value of solar for the $160.8 million of costs does not include distribution savings. On the other hand, these benefits include savings on standard supply offer, transmission savings, capacity, economic development and jobs benefits and environmental benefits[29].

A second of those studies was performed for Clean Energy New Hampshire, Renewable Energy Vermont, and Vote Solar by Synapse. This study focused on the total wholesale savings achieved in New England attributed to the actual behind the meter ("BTM") production of solar. This study used actual data from known solar generation to look backwards based on actual energy and capacity pricing data. The study did not look at transmission level savings nor any retail distribution or other retail level savings.

Nonetheless, this study concluded that savings from BTM solar amounted to 13.5 cents/kWh for wholesale energy and capacity alone and from 20.5 cents to 37.1 cents per kWh with pollutants included in the calculation.[30] The 13.5 cents/kWh savings for wholesale energy and capacity is substantial at the wholesale level and obviously more substantial if environmental and carbon reduction benefits are counted. Again, this is not compensating DERs for the value they are providing to the grid as load reducers.

B. Other Reliability and Environmental Benefits Not Counted by Tom Beach.

1. Reliability

Q. Do distributed resources provide a reliability benefit?

A. Yes, undoubtedly so. These resources provide reliable capacity on a system-wide basis.

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[29] *Id.*

[30] Patrick Knight, Steve Letendre, PhD, Erin Camp, PhD, Synapse Energy Economics, *Solar Savings in New England from 2014 to 2019, a small-scale solar in New England produced wholesale energy market benefits of $1.1 billion*, Dec. 2020.

Individually there is a risk of loss of generation from any one project, just like a circuit. But in aggregate there is a reliability benefit.

Q. Has ISO-NE recognized this benefit?

A. Yes, for quite a while ISO-NE portrayed distributed resources as a threat to grid reliability, but recently ISO-NE has recognized the reliability benefit that distributed resources are provided in New England, even solar in the winter time.

Q. In what context did this occur?

A. ISO-NE recognized this benefit in the context of explaining why it can now retire the Mystic Station that had been running under out-of-market reliability contracts for a number of years.

Q. Did ISO-NE explicitly reference BTM distributed resources as a reason for allowing the Mystic Generation Station to shutdown?

A. Yes, ISO-NE cited the acceleration of BTM resources on slides 3 and 8 of its explanation for why the ISO is now comfortable with allowing Mystic to shutdown.[31] The ISO-NE Chief Operating Officer has been quoted as saying ISO-NE is surprised to see this amount of substantial winter capacity produced by BTM resources. These resources, while intermittent, act as fuel-savers. When BTM solar is produced during cold winter days, the region's dispatchable resources are able to conserve limited on-site fuel or gas under contract. This means the region can endure longer cold snaps during times of greatest winter system constraint.

Q. What is the economic value of this reliability benefit?

A. Since the New England region has been paying tens of millions each month to support a single uneconomic cold plant in Everett, Massachusetts, we have unfortunate experience with

[31] ISO-NE states "Acceleration of behind-the-meter (BTM) PV nameplate capacity" as one of the factors now allowing Mystic to closedown." ISO-NE, *Winter 2024-2025 Analysis; With and Without Everett Marine Terminal*, May 4, 2023, on the web at: https://www.iso-ne.com/static-assets/documents/2023/05/npc-2023-05-04-coo-rpt-winter-2024-25-analysis-with-and-without-everett.pdf

paying too much.

The economic costs for this reliability benefit can be measured against the cost of maintaining the Mystic plant, which again was too much in my view. So it could also be compared to the cost of generator capacity in winter or summer. The Dunsky NH VDER Study and Tom Beach analyses do that.

Q. Is this reliability benefit seasonal?

A. Yes, and this is the winter capacity assessment by ISO-NE. It bears emphasis that this ISO capacity assessment is for winter reliability, which is when the solar resource is weakest. As a result, the summer reliability contribution would be much higher in dealing with summer peaks. ISO-NE remains a summer peaking system, but that is projected to change over the next two decades.

Q. Would this reliability contribution be counted in the value of solar studies you discuss?

A. No, not generally speaking because the Mystic/Everett Terminal costs were out-of-market costs known as uplift. So those costs were not accounted for in the capacity market analysis conducted by the energy consulting firms discussed previously. So this reliability benefit is a substantial value adder for the region.

Q. Are there other recognized reliability benefits for New Hampshire DERs?

A. Yes, ISO-NE speaks to the ability to keep the New England Power grid online through emergencies in various seasons. The Dunsky NH VDER Study identifies local grid reliability support services such as voltage support, power factor correction and power quality as noted above.[32]

[32] Dunsky VDER Study at 42.

2. Environmental Values

a. Greenhouse Gas Reductions

Q. Are there greenhouse gas reductions from New Hampshire NEM program(s)?

A. Yes, most New Hampshire NEM resources are renewable, as is true nationally. These renewable resources directly offset fossil unit generation in New England. Gas turbines and combustion turbines are the generation most often on the margin in New England, so more solar, hydro and wind overwhelmingly displaces carbon dioxide emissions from gas generation.

Q. Are there other greenhouse gas benefits?

A. Yes, the upstream gas pipelines, storage, distribution, processing and extraction systems all have fugitive emissions that are either by design (for safety) or by leakage and accidental releases. In aggregate these releases of gas are substantial and composed of methane, a greenhouse gas much more potent for greenhouse gas warming than carbon dioxide. Some analyses conclude that the impact of this gas/methane leakage upstream negates any greenhouse gas benefits of using gas instead of coal. While these upstream methane release analyses vary, they agree the upstream fugitive methane releases are a big issue in terms of greenhouse gas warming potential.

The benefit of displacing generation is that there is a similar reduction in upstream fugitive methane emissions. So methane emissions are also reduced within New Hampshire, New England, and nationally.

b. Pollution Reductions

Q. Are there other pollution reduction benefits?

A. Yes NO_x emissions from gas combustion are substantial. NO_x is one of the five Clean Air Act's primary Criteria air pollutants because of its negative public health impacts. NO_x also mixes in sunlight with volatile organics that are prevalent from human sources (e.g. gasoline, paints, etc. and from natural sources) in New England to create ground level-ozone, which is another of the

five Clean Air act's primary Criteria air pollutants. When ozone levels go up in the summer and spring, hospital admissions and mortality increase by statistically measurable amounts.

Q. Do NEM resources reduce NO_x and Ozone Pollution?

A. Yes, again, most New Hampshire NEM resources are renewable, as is true nationally. These renewable resources directly offset fossil unit generation in New England. Gas turbines and combustion turbines are the generation most often on the margin in New England so more solar, hydro and wind displaces NO_x emissions from gas generation as it does carbon dioxide.

VI. NEM 2.0 SUPPORTS NEW HAMPSHIRE'S ECONOMY

A. Maryland Value of Solar Study.

Q. Do net metering arrangements provide state level economic benefits?

A. Yes, there's little question that net metering programs support state and local economic development. The projects are labor-intensive to install, so they generate quite a bit of construction, engineering, site work employment and incomes.

Q. Are there studies that support this your finding?

A. Yes, several values of solar studies have examined economic benefits including economic growth, jobs, indirect economic benefits from solar or distributed energy resource programs.

Q. What are the results of these studies?

A. Four studies that I know of have looked at the solar value to economic development. The studies that quantified the benefits are Maryland's and a study undertaken for the Sierra Club in Arkansas.

The Maryland Value of Solar Study was undertaken by Daymark Energy Advisers, a reputable consulting firm, for the Maryland Public Service Commission. That Maryland Value of Solar Study concluded that Maryland's net metering scheme was forecasted to generate 22,563 job-years, over $2.03 billion in value added for the Maryland economy, and $1.34 billion

in labor income. While the Maryland NEM program is more lucrative and Maryland is a larger state, these numbers are indicative of strong state gross domestic product, employment, and value impacts. The fact that Maryland's NEM program is more lucrative would tend to produce greater gross economic benefits from NEM activity. But I note that a thriftier program that pays less for a kWh of distributed generation would generate more net benefits to all ratepayers (net benefits to all ratepayers = value of solar stack components - cost to all ratepayers of NEM payments) , and certainly more net benefits to NEM customers (net benefits to NEM customers = value of solar value stack components + avoided payments for NEM credit components - cost to all ratepayers of NEM payments).

The Arkansas Study was undertaken by Crossborder Energy, also a reputable energy consulting firm.[33] This Arkansas solar study estimated an economic development value of $33.60 per MWh. Other studies touch on economic development benefits, but these Maryland and Arkansas studies provide a quantified value.

Q. Are there long-term economic development benefits beyond construction jobs?

A. Yes, the largest benefit if macroeconomic. Rather than exporting payments for fuel out of New Hampshire, customer revenue is invested in New Hampshire based economic investments. In addition to solar installation, engineering, construction, and electrician employment, solar installations require operations and maintenance expenses. This is particularly true of commercial scale installations. Contracts will be kept in place for commercial installations that provide permanent local jobs for those servicing these facilities.

[33] R. Thomas Beach and Patrick G. McGuire. *The Benefits and Costs of Net Metering Solar Distributed Generation on the System of Entergy Arkansas, Inc.* Crossborder Energy, pp. 28-29.

Q. Are there New Hampshire specific studies illustrating the economic benefits of distributed resources?

A. Yes, Daymark Energy Advisors performed an analysis of economic benefits for Unitil Energy Systems, Inc. submitted to the Commission in Docket No. 23-073. The analysis examined the economic benefits of a single 4.875 MWac commercial-scale solar project. The Daymark study for Unitil found that a single 4.875 MW solar installation would produce 95 employment job years with $7,461,200 in labor income and total New Hampshire economic output increase of $12,069,045.[34]

While each analysis has differences in methodology, assumptions, and models, the combination of the New Hampshire Unitil Study, the Maryland Value of Solar Study, and the Arkansas Crossborder Study illustrate the substantial state and local economic benefits of a balanced NEM program.

VII. NEW HAMPSHIRE NEM TARIFFS

A. 0 to 100 Kilowatts – Simple Small Tariff.

Q. Are there recommendations you would make to improve the small NEM tariff for customers in the 0 to 100 kW system range?

A. Yes, first, DERs of this size are typically residential or small business installations. Here and below I have a number of recommendations. First, I would recommend increasing the distribution credit to 50 percent of distribution value.

The basis for this recommendation is very conservative. Tom Beach's analysis shows that there are positive benefits for all Eversource classes from NEM 2.0. While that analysis could support a 100 percent distribution value, we suspect the New Hampshire approach to its NEM

[34] Daymark Energy Advisors, Inc., *Indirect Benefits of Kingston Solar*, prepared for Unitil Energy Systems, Inc. NHPUC, Dock. No. 23-073, Ex. GPP-2, p. 8 of 31, March 31, 2023

tariff will continue to be frugal and err on the conservative side. We are also asking for a 20-year period for any new NEM customer to be grandfathered under a NEM 3.0 tariff. For that reason, we adopt a conservative approach to ensure the benefits unquestionably exceed the costs over a 20-year period.

Q. Do you have other recommendations for the small NEM rate tariff?

A. Yes, as just noted, CENH recommends an extension beyond 2040 for customers who sign new NEM agreements after the effective date of this proceeding. Consistent and stable structures for treatment over a number of years will be important for new NEM customers. Customers who invest in NEM facilities should continue to be able to avail themselves of that NEM rate structure for 20 years after the date after the date that they commence generating.

Q. Why would the New Hampshire Commission want to increase any amount of NEM credits?

A. First, the increases CENH and I are suggesting are modest. Second, if New Hampshire establishes a NEM tariff that allows more customers to invest in DERs, those NEM customers will receive substantial benefits, which will be reinvested in New Hampshire's economy. As long as that NEM tariff still results in net benefits to all ratepayers, such a decision would be consistent with the NEM enabling statute, which directs the PUC to support the ability for New Hampshire customers to invest in their own generation. So the Commission can capture marginally more benefits (again in excess of costs) with a modest increase from 25 percent to 50 percent distribution credit.

B. Large Customer-Generators

Q. Are NEM customers up to 1 MW a large NEM tariff system?

A. As a general category of NEM customers, other than municipal NEM which can be installed up to 5 MWac BTM or offshore which systems we do not address here, 1 MW is New

Hampshire's largest system size that qualifies for NEM. As a point of reference, other states allow larger NEM tariff systems.

Q. Are other states' net metering schemes more lucrative for NEM customers in these larger capacity projects?

A. Yes, generally other New England states' NEM programs provide more credit for NEM commercial customers.

Q. Are you recommending that New Hampshire adopt other New England states' approaches?

A. No. New Hampshire has its own approach to NEM that has worked in New Hampshire. I am recommending incremental changes to create more opportunity for DER deployment, which will generate more value for all ratepayers. Our analysis has shown that New Hampshire's structure is foregoing some value—even for non-NEM participants—by undercompensating large customer generators in particular.

Q. How does the value illustrated by the Dunsky and Daymark stack up to costs paid?

A. NEM 2.0 does not support larger commercial scale systems well.

Q. Can you identify the shortcomings?

A. NEM 2.0 does not support projects above 100 kW and below 1 MW well. I call these commercial sized DER projects. These commercial sized DER projects only receive the value of New Hampshire's default electricity supply. This is an obvious and easily accounted for avoided cost value and should be maintained.

Commercial sized DER projects up to 1 MW deliver transmission value and distribution value too. Tom Beach's analysis is quite clear on this value as just over or under cost for all ratepayers.

Q. How could an NEM 3.0 provide better support for commercial sized DER projects up to 1 MW?

A. The Commission can provide some transmission value for commercial sized DERs comparable to that for projects below 100 kWh. Notably, Unitil's analysis recognized there is transmission charge reduction value, though in the range of 12 percent. The Dunsky VDER Study calculated the transmission value at 50 percent so we propose that amount of transmission credit.

Q. Is there another way the Commission can provide a NEM 3.0 with better support for commercial sized DER projects?

A. The Commission can provide some amount of distribution credit. There undoubtedly is a distribution value for projects from 100 kW to 1 MW.

Q. What are you recommending for New Hampshire's large customer generator NEM program?

A. I am recommending recognizing that NEM customers over 100 kW provide transmission and distribution value as well as other values such as reliability and resilience and line loss reductions as the DER resource is located much closer to load.

Q. Specifically, what is CENH's recommendation for NEM customers over 100 kW?

A. Since Tom Beach's analysis shows benefits to all ratepayers for large commercial projects, we request the Commission provide enhanced credit to NEM customers with projects 100 kW to 1 MW. Specifically, we request the following export credits for projects over 100 kW: full default energy service credit, a distribution credit at 50 percent of the volumetric distribution rate, and a volumetric ($ per kWh) adder of 50% of the avoided transmission costs for a solar profile in the years 2021-2035 as determined by the avoided cost model, this adder averages $0.024 per kWh over 2021-2035. The transmission adder is needed so that large customers who install solar and who pay transmission costs in demand charges receive some benefit for avoiding transmission

costs as recognized by the Dunsky NH VDER Study.

Q. Have you looked at the bill impact for this change to NEM for facilities 100 kW to 1 MW?

A. Tom Beach did so in his analysis and concluded the bill impact is very small, with the program continuing to provide net benefits for non-participating customers.[35]

Q. Are you recommending the same NEM 20-year period for new NEM customers for facilities over 100 kW?

A. Yes, I am. It's important that a NEM tariff provides sufficient stability for distributed projects to be financed.

Q. If commercial sized projects are granted some distribution and transmission credit, will they be compensated with similar NEM schemes to other New England states?

A. No, even with some additional distribution and transmission credit, New Hampshire's NEM program would remain the most frugal and thrifty in New England

C. Consider Value for Solar + Storage.

Q. Are there some DERs that are more valuable than others?

A. Yes, the Dunsky NH VDER Study does a good job of illustrating that some DERs are more valuable for customers and/or for grid purposes than others. DERs, like all resources, have different capabilities—not to be confused with Forward Capacity Market capacity. Different types of DERs have different capabilities as well. Those different capabilities translate into different customer and grid value propositions.

Q. What is an example illustrated in the Dunsky NH VDER Study?

A. The Dunsky NH VDER Study illustrates the superior value of solar + storage to solar alone. While solar alone can hit early and mid-afternoon system peaks to provide substantial value,

[35] Tom Beach Testimony at p. 19.

solar alone cannot hit the later evening peaks. If storage is added to solar, that extends the ability to hit supply peak pricing, capacity and transmission peaks. That adds substantial value.

Q. Does the Dunsky NH VDER Study quantify that solar + storage value?

A. Yes, the Dunsky NH VDER Study uses its model to produce a quantified value. I take that value as illustrative rather than literally of course. Nonetheless, the Dunsky model is a substantial and expertly modeled illustration of the value of solar + storage.

Q. What is your recommendation for solar + storage.

A. Since the Dunsky NH VDER Study modeling shows that solar + storage systems will increase the value up to 5¢/kWh more over the time period, I would recommend that solar + storage systems receive 2¢ more per kWh than ordinary solar systems for exports.

Q. Why 2¢ more for solar + storage NEM systems?

A. There are several reasons. On the positive side, solar + storage is more valuable as discussed and will become more so over time. That additional value goes beyond the DER value illustrated in the Dunsky NH VDER Study analysis to provide more grid flexibility, resilience, and future capabilities. On the negative side, I am not recommending a higher amount to frugally obtain more valuable capacity at a lower price and because I recommend forty percent of the future value. That seems like a reasonable approach here for higher value systems that will produce superior customer value over the long run.

Q. Should a NEM customer be obligated to use the battery for peak times?

A. That obligation would be hard to enforce or even track without advanced metering infrastructure as well as complementary data and utility management systems. For that reason, I am not recommending at this point in time that the program impose such an obligation. However, if such a rate were to result in deploying more customer-owned battery storage, that resource would be readily available to be enrolled in demand response programs and advanced rate structures as

the utilities' billing and data management systems are upgraded.

D. Consider Value of West-Facing Systems.

Q. Does the Dunsky NH VDER Study show that other DERs are more valuable than others?

A. Yes, the Dunsky NH VDER Study illustrates that west facing systems are more valuable than south facing systems.

Q. What is illustrated in the Dunsky NH VDER Study for west-facing systems?

A. The Dunsky NH VDER Study illustrates the superior value of west-facing solar to south facing solar alone. While south-facing solar can hit early and mid-afternoon system peaks to provide substantial value, west-facing solar can hit later afternoon peaks. That adds more avoided cost value than south-facing solar.

Q. Does the Dunsky NH VDER Study quantify West facing solar value?

A. Yes, the Dunsky NH VDER Study uses its model to produce a quantified value. I take that value as illustrative rather than literally of course. Nonetheless, the Dunsky model is a substantial and expertly modeled illustration of the value of west-facing solar.

Q. What is your recommendation for west-facing solar?

A. The modeled values in the Dunsky NH VDER Study are roughly 1¢ or more for west-facing solar compared to south-facing solar so I propose an additional 1¢ value for exports from systems facing westward at 225 to 315 degrees azimuth.[36]

Q. Does this mean that non-NEM customers will pay a cent more each kWh than a southward facing system would generate?

A. No. When you face a system west, it produces less actual kWh. So the total number of kWh will go down appreciably due to a west-facing orientation. While you are getting greater value out

[36] Dunsky NH VDER Study, pp. 26-28.

of each kWh under the NEM system, you are paying for a lower quantity. So you get higher value and lower costs.

VIII. OTHER ISSUES RELATED TO NEM 2.0.

A. Grandfathering.

1. NEM 1.0 and NEM 2.0.

Q. How were customers who opted into NEM 1.0 treated during the transition to NEM 2.0?

A. NEM 1.0 customers were grandfathered, for a certain time period, into the earlier program. But only those customers in NEM 1.0 were allowed to continue. New customers had to move forward under NEM 2.0.

Q. Is grandfathering current customers important?

A. Yes, CENH supports the arrangements put in place for NEM 1.0 customers. Those customers made investments based on understandings of the program in place at the time, e.g. prior to 2017. CENH agrees that continuing to honor those arrangements is important.

Q. Do you have recommendations for how to treat NEM 2.0 customers in the future?

A. Yes, two recommendations. The first is to provide a 20-year time frame for any NEM customer from the date they energize. For customers turning systems on in 2020, that would mean 20 years to at least 2040. For customers turning systems on in 2022, that would mean 20 years to 2042.

Q. What is the second recommendation?

A. The second recommendation is that, assuming NEM 3.0 is any different than NEM 2.0, to ask for the same effective grandfathering for NEM customers taking NEM 3.0 after the Commission's new program becomes effective, so 20 years of NEM for new customers.

Q. Are there other considerations for grandfathering and rate revisions?

A. Yes, rate design principles, often called the Bonbright principles and their progeny, generally endorse simplicity, customer understanding, stability, and of course economic efficiency among other principles. These principles support grandfathering and incremental NEM improvements here.

2. Projects Built Under NEM 2.0 through 2050.

Q. How would you treat projects built under NEM 2.0 later than 2020?

A. Again, we are suggesting a 20-year NEM tariff agreement stability. So for projects starting on NEM 2.0 later than 2020, we are suggesting those agreements be allowed to stay in place for 20 years.

C. Value as Load Reducer.

Q. Should the NEM program be re-oriented around realizing only market values?

A. No, as noted above, the ISO-NE programs only recognize a couple to several thin slivers of value. That is a function of how the restructured markets work.

Q. What is the alternative to using the wholesale market value?

A. The alternative, at least one alternative, is to continue the NEM program to recognize multiple value elements including as a load reducer. Reducing retail load has direct benefits for all ratepayers. The Dunsky NH VDER Study does a nice job of illustrating how value as a load reducer is superior to value as an ISO-NE market resource for the DERs evaluated.

D. Highest Value for Lowest Cost.

Q. What are your thoughts on NH's approach to NEM value and costs?

A. The New Hampshire approach to NEM has been to pursue DER value at low cost. New Hampshire has been less generous for NEM customers than other states, but has been successful in securing DER growth for very modest cost impacts on non-NEM customers.

Q. Are your recommendations in this testimony consistent with that New Hampshire approach to NEM?

A. Yes, we are not recommending NEM programs like other New England states. The CENH recommendations here are incremental suggestions to secure DER value at a continued very modest cost.

Q. Would maintaining NEM at the NEM 2.0 levels secure the same DER value?

A. No, the level of support for commercial sized solar, above 100 kW is leaving value underdeveloped. Our recommendations are to provide incremental support there in line with the NEM 2.0 program for smaller DER projects up to 100 kW.

IX. CONCLUSION

Q. Can you summarize your testimony?

A. Yes. New Hampshire can both ensure NEM-customers and all customers receive the benefits of distributed generation with modest revisions to the NEM 2.0 tariff. The revisions CENH recommends in this testimony are to: 1) conservatively modify the residential and small commercial NEM tariff (up to 100 kW) to allow distribution credit of 50 percent, 2) continue to have commercial customers imports and exports netted hourly and modify the large commercial NEM tariff (100 kW to 1 MW) to allow credits at the sum of: a) full credit for default energy service, b) 50 percent distribution credit, and c) a volumetric transmission adder set at 50% of the solar-weighted avoided transmission cost from 2021-2035 from the Dunsky model, and 3) allow a stable 20 years of benefit from the energization of the customer facility for a 20-year NEM contract.

Q. Does this conclude your testimony?

A. Yes. I incorporate the appendices listed in the Table of Contents into this testimony and attached hereto. Thank you.