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

REBUTTAL TESTIMONY OF

R. Thomas Beach
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

January 30, 2024

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I. INTRODUCTION

Q: Please state your name, business address and position.

A: My name is R. Thomas Beach. I am principal consultant of the consulting firm Crossborder Energy. My business address is 2560 Ninth Street, Suite 213A, Berkeley, California 94710.

Q: Have you previously submitted direct testimony in this docket?

A: Yes. On December 6, 2023, I submitted direct testimony on behalf of Clean Energy New Hampshire. My experience and qualifications are described in the *curriculum vitae*, which is **Attachment RTB-1** to that direct testimony.

Q: What is the purpose of your rebuttal testimony?

A: This rebuttal testimony first responds to the analysis of the rate and bill impacts of New Hampshire's net energy metering (NEM) policies, as set forth in the direct testimony of David Borden and Tim Woolf of Synapse Energy Economics (Synapse) on behalf of the New Hampshire Office of the Consumer Advocate (OCA). The second section of this rebuttal responds to OCA's direct testimony recommending a further review of NEM

policies in two years, including an analysis of a change from today's monthly netting of NEM imports and exports to hourly netting.

II. REVIEW OF THE SYNAPSE RATE AND BILL IMPACT ANALYSIS ON BEHALF OF THE OFFICE OF THE CONSUMER ADVOCATE

Q: Your opening testimony discussed at length the rate and bill impact (RBI) analysis of current NEM policies in New Hampshire that Dunsky Energy + Climate Advisors (Dunsky) prepared for the New Hampshire Department of Energy.[1] Your direct testimony recommended certain changes to that analysis, and presented a revised RBI analysis with those changes. Have you performed a comparable analysis of the RBI analysis that Synapse performed for OCA?

A: Yes, I have.

Q: What are the similarities and differences in the scopes of the Dunsky and Synapse RBI analyses?

A: Both RBI analyses are limited just to solar PV systems. Dunsky shows the rate and bill impacts over a longer period (2021-2035) than Synapse (2024-2028). Dunsky provides the rate and bill impacts of forecasted solar deployment on all ratepayers, on non-participating customers, and on DG customers who adopt solar. Synapse focuses on the rate and bill impacts on non-participating residential customers and on the impacts to the payback periods for residential customers who install solar.

Importantly, the Dunsky RBI analysis includes all three IOUs and three customer classes (residential, small commercial, and large commercial) for each IOU, while Synapse's RBI analysis looked only at Eversource's residential class.[2] Both the Dunsky results, and my modifications to that analysis, show that commercial solar customers

[1] See the *New Hampshire Value of Distributed Energy Resources: Final Report* prepared for the New Hampshire Department of Energy (the Dunsky Report). The Dunsky Report is Appendix 1 to the direct testimony of CENH witness Mr. David Littell. Appendix 2 to Mr. Littell's testimony provides the appendices to the Dunsky Report.

[2] OCA Testimony, at p. 6.

have significantly smaller rate and bill impacts than residential solar.[3] In evaluating the big picture of the whole NEM program – residential and commercial – the consistently lower rate and bill impacts from commercial solar customers should not be ignored.

Further, Synapse analyzed the rate and bill impacts from both existing and incremental solar customers, while Dunsky and my analysis only looked at incremental, future solar customers. In its RBI analysis, Synapse's inclusion of both existing and incremental solar customers magnifies the rate and bill impacts. Including existing solar customers provides a view of the impacts of the entire NEM program. However, assuming continued legacy treatment of existing solar customers – a policy that OCA has stated that it supports[4] -- any changes to NEM pricing or policies will only impact incremental customers. Thus, any RBI analysis of changes to NEM should consider only incremental, future solar customers.

Q: What is your evaluation of the details of the Synapse RBI analysis?

A: Based on my review, I have identified the following issues with the Synapse RBI analysis:

1. **Avoided distribution capacity and avoided line loss costs.** Synapse used the same avoided distribution capacity costs calculated by Dunsky, and, like Dunsky, used average lines losses. For the reasons set forth in my direct testimony,[5] these should be revised to use modestly higher avoided distribution costs and marginal (not average) line losses.

2. **Customer and system size.** Synapse analyzed a customer with both (1) a solar system equal in size to Eversource's average residential solar system size and (2)

[3] See CENH (Beach) Testimony, at Tables 3 and 4; Dunsky Report, at p. 53 and 55 (Figures 33 and 36).

[4] See OCA Testimony, at p. 38: "customers subject to our proposed compensation rate after 2025 should be "grandfathered" with respect to future solar compensation changes for a period of thirty years, the expected lifetime of solar distributed generation."

[5] See CENH (Beach) Testimony, at pp. 4-11.

usage equal to the average Eversource residential customer.[6] However, the average Eversource solar customer has greater-than-average usage, so Synapse's assumptions result in modeling a solar customer whose system produces 108% of their annual usage. Dunsky assumed a residential system serves 100% of the customer's load.[7]

3. **Avoided transmission costs.** Synapse and Dunsky use a similar calculation of avoided transmission costs, and appear to assume the same transmission costs. Both assume that DG solar will avoid regional and local network transmission costs based on solar output in the 12 monthly peak load hours. However, Synapse and Dunsky identify different hours in which monthly peak hourly loads are expected to occur. The OCA testimony states that Synapse used data from a single year, 2022, to determine the monthly peak load hours,[8] but in a subsequent communication to CENH clarified that it used 5 years of data (2017-2021). The Dunsky Report states that it identified monthly peak load hours "based on historic RNL data (over the past 5 years)."[9] This appears to be the same approach used by Synapse, but I have not been able to establish why the two sets of peak hours are so different. Synapse's set of peak hours results in significantly lower avoided transmission costs.

4. **Avoided generation capacity costs.** Synapse phases-in avoided generation capacity costs over the first nine years of a solar system's life.[10] In contrast, Dunsky assumed that a project should be credited with avoided generation capacity costs immediately when it comes online. Section 5.2 of the 2021 AESC, on which the Synapse testimony relies, argues that a DG kW that does not participate in the ISO-NE FCM is not reflected in the load forecast until a year

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6 See Synapse model, at the PV System and Usage tabs.

7 Based on our review of the Dunsky RBI spreadsheets.

8 OCA Testimony, at p. 29, footnote 30: "Peak hours based on 2022 data from ISO-NE, *Energy, Load, and Demand Reports*." Also, see Synapse model, Avoided Transmission tab.

9 See Dunsky Report, at Appendix C.5.3.

10 See Synapse model, at the Avoided Capacity tab.

after it comes on-line, and then does not begin to impact the FCM until the first year of the next FCM auction, which is another three years into the future. In addition, the 2021 AESC asserts that an incremental kW of DG solar in a particular year will only gradually impact the regression used to forecast demand on the ISO-NE system, with fully recognition of the resource's capacity only in year 9. The basic problem that I have with this approach is that the historical data on DG solar shows a clear trend of steadily increasing amounts each year – for example, see the historical data in Figure 2 of OCA's testimony. Thus, an ISO-NE forecast that is based on trending historical load data will include the impact of increasing amounts of DG solar, in every future year. In other words, the historical rate of growth of DG solar already should be built into the ISO-NE forecast, which thus should already include the impact of new, incremental solar in future years.[11] As a result, the impact on the load forecast of an incremental kW of DG solar installed next year is already included in the ISO-NE forecast that was used to set next year's capacity needs, and this added kW should be credited immediately for the supply-side generation capacity that it avoids.[12]

The Dunsky Report takes a different approach on this issue. It recognizes that a kW of incremental DG solar will have an immediate impact to reduce the capacity costs of load-serving entities. Dunsky does not use the full prices from the ISO-NE Forward Capacity Market, however, but reduces those prices to use the Effective Charge-Rate short-term capacity prices. As Dunsky explains, this

[11] As a simple example of this, consider a system in which the growth of DERs (energy efficiency and distributed generation) have been exactly offsetting load growth in every year, with the result that historical peak loads have been constant over time. A regression of this historical data, used to forecast future peak demand, obviously will produce a forecast of peak loads that will continue to be flat over time. However, this forecast depends on, and has built into it, the assumption that the installation of DERs will continue to grow at the same rate as load growth. Future DERs, up to the level built into the forecast, must be assumed to be immediately effective at reducing peak demand.

[12] The Synapse approach might have some validity if there was clear evidence that DG adoption was accelerating significantly, such that next year's growth in DG installations was going to be significantly greater than the historical trend. Even then, only a portion of the new DG capacity would not be built into the forecast. However, the historical data – again, see the historical data in OCA's Figure 2 – shows a steady rate of growth of DG solar in New Hampshire since 2015, not an acceleration.

reflects "the actual cost of capacity procured on the market at the time that it is needed."[13] This short-term price for capacity should reflect the immediate impact of load-modifying resources such as solar DG. I believe that the Dunsky approach to this issue is more reasonable than the questionable and prolonged phase-in of avoided generation capacity used by Synapse.

Q: Are there aspects of the Synapse model that differ from Dunsky that are you think are reasonable alternatives?

A: Yes. Synapse's analysis removes, on the lost revenue side, the energy portion of the generation supply rate, and, on the avoided cost side, the avoided cost components for energy, ancillary services, RPS, and the risk premium.[14] This assumes that, over time, the energy portion of generation supply rates will equal marginal/avoided energy costs. This is a reasonable assumption so long as energy supply costs for load-serving entities are closely linked to energy market prices in ISO-NE. Dunsky did not use this approach, and kept these energy market-related components on both the cost and benefit sides of its RBI analysis. The Synapse approach has the positive feature of avoiding the issue of whether the forecast of future generation supply costs is consistent with the assumed trajectory of future avoided energy costs.

Q: If you make the adjustments to the Synapse model that you have discussed above, what is the impact on the results of the Synapse RBI analysis?

A: I have modified the Synapse RBI model to use: (1) Dunsky's avoided generation capacity costs, which assume no 9-year phase-in, (2) use of a customer whose consumption is equal to 100% of the average solar system size, (3) the revised avoided distribution capacity costs and marginal line losses presented in my direct testimony, and (4) either the Synapse or Dunsky avoided transmission costs. **Table 1** shows the cumulative impacts of each of these changes, in terms of the average bill impacts on non-participating Eversource residential ratepayers over the years 2024-2028, when these

[13] See Dunsky Report, at Appendix C.2.3, footnote 7.

[14] See OCA Testimony, at pp. 29-30 and the Cost Benefits tab of the Synapse model.

changes are made, step by step, to the Synapse RBI analysis. The starting point for Table 1 is the rate and bill impacts in Table 3 of the Synapse testimony.

Table 1 shows that, when these changes are made, the revised Synapse RBI analysis also shows that future DER deployment in New Hampshire from 2024-2028 will result in either (1) very small increases (+0.13% to 0.19%) in the rates and bills for Eversource's non-participating residential ratepayers, when the Synapse avoided transmission costs are used (see Section 4a of Table 1), or (2) small decreases (-0.17% to -0.64%), using the Dunsky avoided transmission costs (see Section 4b of Table 1). In either case, the conclusion is that current NEM policies will have negligible rate and bill impacts on non-participating ratepayers over the next five years.

Table 1: *Changes to OCA Rate and Bill Impacts*

	2024	2025	2026	2027	2028
(1) OCA Table 3:					
Rate Impact (c/kWh)	0.16	0.20	0.24	0.28	0.31
Bill Impact ($/Month)	1.02	1.22	1.47	1.74	1.91
Percent Bill Impact (%)	0.64%	0.76%	0.91%	1.06%	1.16%
(2) No Phase-in of Avoided Generation Capacity Costs (per Dunsky)					
Rate Impact (c/kWh)	0.10	0.11	0.14	0.14	0.16
Bill Impact ($/Month)	0.64	0.71	0.87	0.87	0.96
Percent Bill Impact (%)	0.41%	0.44%	0.54%	0.54%	0.59%
(3) PV Sized to 100% of Customer Load					
Rate Impact (c/kWh)	0.11	0.12	0.14	0.15	0.16
Bill Impact ($/Month)	0.66	0.73	0.90	0.91	1.01
Percent Bill Impact (%)	0.42%	0.46%	0.56%	0.56%	0.61%
(4a) CENH Recommended Avoided Costs (with Synapse Avoided Transmission)					
Rate Impact (c/kWh)	0.04	0.04	0.05	0.04	0.04
Bill Impact ($/Month)	0.27	0.23	0.31	0.23	0.22
Percent Bill Impact (%)	0.17%	0.15%	0.19%	0.14%	0.13%
(4b) CENH Recommended Avoided Costs (with Dunsky Avoided Transmission)					
Rate Impact (c/kWh)	-0.04	-0.08	-0.10	-0.13	-0.17
Bill Impact ($/Month)	-0.28	-0.48	-0.61	-0.81	-1.05
Percent Bill Impact (%)	-0.17%	-0.30%	-0.38%	-0.49%	-0.64%

IV. PERSPECTIVE ON FUTURE CHANGES TO NET METERING

Q: The OCA testimony acknowledges that the rate impacts of the current NEM program on non-solar customers are "relatively modest."[15] Yet OCA recommends that the Commission require the joint utilities, by December 1, 2025, to submit an analysis and proposal for a net billing tariff with hourly netting and a fixed compensation rate for solar DG exports based on expected avoided costs.[16] Please respond to this recommendation.

A: All of the rate and bill impacts submitted in this proceeding show that New Hampshire's current NEM program has just a small impact – either positively or negatively – on non-participating ratepayers. The bill impacts generally fall in the range of -1% to + 1%, based on the expected pace of DG deployment over the next decade. The variations in bill impacts within this narrow range are based mostly on different calculations of the magnitude of certain avoided costs. These minor bill impacts are not evidence of a pressing need to begin to make significant changes to the NEM program within the next two years. As set forth in Clean Energy New Hampshire's direct testimony, modest adjustments should be made to the program to encourage the steady growth of DG opportunities for all types of customers. This can be done without adverse rate impacts on any customer class.

Q: Would OCA's proposal for hourly netting and a fixed export rate at avoided costs result in a significant reduction in the rate and bill impacts of NEM on non-participating ratepayers?

A: No. Comparing Tables 2 and 5 of the OCA testimony shows OCA's calculation of the additional rate and bill reductions for Eversource's residential customers that would result from its proposal. These additional reductions in bill impacts are -0.35% in 2024, increasing to -0.71% in 2028. However, even these modest reductions are overstated, because Synapse calculated them for both existing and incremental solar customers.

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15 OCA Testimony, at p. 31.

16 *Id.*, at p. 37.

Assuming legacy treatment of existing customers, which OCA supports, the OCA proposal would only apply to new, incremental customers, resulting in far smaller bill impacts: -0.08% in 2024, increasing to -0.41% in 2028. Further, any bill reductions from a fixed export rate at avoided costs are highly uncertain, given that avoided costs can be volatile, primarily due to fluctuations in natural gas prices. The only likely bill reductions from the OCA proposal are from hourly netting, which the OCA testimony correctly notes would raise significantly the percentage of DG solar output that is exported to the grid. And the bill reductions from hourly netting alone are small – when applied just to incremental customers, they produce additional bill reductions of -0.06% in 2024, increasing to -0.31% in 2028. This represents added bill reductions for the average customer of just $0.10 to $0.50 per month.

Q: Do you believe that it would be reasonable to move as soon as the end of 2025 to the hourly netting of NEM imports and exports?

A: No. A move to hourly netting in such a short time frame is unlikely to be reasonable or necessary given (1) the state of the New Hampshire electric market and (2) the small rate impacts from the existing NEM program. I agree completely with OCA's witnesses that hourly netting would produce a more accurate picture of when a solar customer imports and exports power.[17] But there are many other elements of electric service that also would be more accurate if measured and determined on a time-dependent, hourly basis; and this includes all of the other elements of NEM service – customer usage, solar output, utility retail rates, and system avoided costs. Moving to hourly netting alone makes little sense unless it is part of a broader transition to hourly interval metering for all customers and to time-dependent pricing for both imports and exports and for retail rates. For example, prospective solar customers will not be able to understand the impact of hourly netting unless they have had hourly interval meters installed for several years. This is necessary to provide customers with access to a reasonable and significant amount of data on the hourly profile of their usage, so that they can project accurately the economics of a solar installation under hourly netting. In discovery, several of the utilities have

[17] OCA Testimony, at p. 6.

indicated that they would need to incur significant costs to provide hourly interval metering and to enhance their billing systems if the OCA proposal were adopted.[18]

Q: Do you agree that, at some point in the foreseeable future, it will be important for the Commission to consider changes to NEM – including hourly netting – that reframe all of the elements of the program on a more granular, accurate, and time-sensitive basis?

A: Yes. This is principally due to technological change – specifically, the declining costs and rapidly expanding access to battery storage, both stationary home batteries and mobile batteries in electric vehicles (EVs). As both a load and a resource, battery storage requires time-sensitive rates and the broad deployment of time-of-use (TOU) metering. For example, EVs will be a major new electric load, with the potential to reduce rates significantly by spreading costs over greater volumes, but only if EVs are charged under TOU rates that tell customers when there is low-cost power and excess grid capacity available to fill their vehicles. Similarly, home batteries, when paired with solar, will increase the value of the solar output to both the customer and the system, by allowing the solar generation to be stored and then discharged in the hours when power is most valuable.[19] Again, TOU rates that accurately reflect time-varying system costs are essential to unlock these new benefits. Finally, rapidly emerging vehicle-to-home and vehicle-to-grid systems will merge the roles and blur the distinctions between mobile and stationary batteries – for example, allowing EV batteries to be a source of power for the home and the grid.

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[18] See Eversource and Liberty responses to CENH Data Request No. 3, Q1, provided in **Attachment RTB-3**: "If, however, Messrs. Woolf and Borden are suggesting using hourly data to conduct hourly netting, hourly data would require interval meters, such as AMI technology. For Eversource, hourly net metering is currently not feasible with existing meter or billing systems, or existing AMR meters, which is what approximately 98% of Eversource customers have. Implementing hourly netting in this fashion cannot be done at a nominal or negligible cost, assuming the definition of nominal or negligible to be $100,000 or less. Given the number of systems implicated, and the need for interval meter installation, the company can state with relative confidence that implementing hourly netting using interval data would be a nine-figure investment."

[19] Solar-plus-storage systems also provide customers with an assured backup supply of electricity when the grid is down. This added benefit will help to reduce the cost of storage used for the separate task of shifting when demand is placed on the grid.

My perspective is that it will make sense to discuss moving to hourly netting in the context of increasing the time-sensitivity of all elements of the NEM transaction – metering, billing, retail rates, and avoided costs – and of retail rates for all customers. This broad conversation is likely to be necessary in the next five to ten years, due to the rapid deployment of both stationary and mobile batteries. However, what does not make sense is OCA's proposal to discuss just one element of this important transition – hourly netting for NEM customers – in isolation from all the other changes that will be needed to incorporate battery storage, with time-sensitive pricing and measurement, into New Hampshire's retail rates and its NEM program.

Q: Does this complete your rebuttal testimony?

A: Yes, it does.