

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

REBUTTAL TESTIMONY OF

**David P. Littell on behalf of
Clean Energy New Hampshire**

**in response to
the Office of the Consumer Advocate's Testimony**

**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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DPL Reply-A **OCA Responses to Clean Energy NH Data Request Set 1, Response to CENH 04.**

1 **I. INTRODUCTION.**

2 **Q. What is your name, business, address, position, and work?**

3 A. My name is David Littell. My business address is 100 Middle Street, West Tower,
4 6th Floor, Portland, Maine 04101. I am a shareholder in Bernstein, Shur, Sawyer, & Nelson where
5 I work on utility, energy, and regulatory matters for utilities, energy companies, buyers and sellers
6 of energy projects, municipalities, competitive electricity providers, state commissions, consumer
7 advocates, and non-governmental entities.

8 **Q. Have you previously submitted testimony in this Docket?**

9 A. Yes, On December 6, 2023, I submitted direct testimony on behalf of Clean Energy New
10 Hampshire. My qualifications, experience, and qualifications are described in the *curriculum*
11 *vitae*, **Attachment DPL-1** to my direct testimony.

12 **Q. What is the purpose of your rebuttal testimony?**

13 A. The purpose of this rebuttal testimony is to respond as a policy expert to the direct
14 testimony of David Borden and Tim Woolf of Synapse Energy Economics (“Synapse”) on behalf
15 of the New Hampshire Office of the Consumer Advocate (the “OCA”). In this rebuttal, I reply to
16 the OCA testimony on issues relating to data collection, hourly netting, and payback periods. I
17 also address the assumption of lost utility sales and corresponding equity impacts which is an issue
18 raised by the Synapse testimony. I find the “lost revenue” and equity assertions unsatisfactory in
19 this formulation due to incomplete data. I raise these last points should the New Hampshire Public
20 Utilities Commission (the “Commission”) embark on additional data collection examination as
21 OCA suggests.

22 **II. SUMMARY OF THE OCA’S TESTIMONY.**

23 **Q. Can you summarize the OCA’s Testimony?**

24 A. I am reluctant to summarize or characterize the OCA’s testimony. I will just touch on issues

1 to which we reply in this rebuttal testimony.

2 **Q. What are those issues?**

3 A. The OCA's experts, Tim Woolf and Eric Borden of Synapse, testify that Net Energy
4 Metering ("NEM") is not a "set it and forget it" endeavor. They also suggest periodic evaluations
5 that should be informed by quantitative analyses.

6 **Q. Are there other issues?**

7 A. Yes, the OCA presents purposes for data evaluation: to evaluate whether customers are
8 adopting distributed generation and whether NEM results in "cost-shifting"?

9 **Q. Does the OCA speak to rate impacts?**

10 A. Yes, the OCA, on page 9, lines 1-4 of its testimony, states that rate impacts under NEM 2.0
11 are "currently low and will remain low for the next several years."

12 **Q. Does the OCA present alternative designs?**

13 A. Yes, the OCA suggests on page 9, lines 8 to 14 of its testimony, that hourly netting be
14 considered and be a fixed export rate.

15 **Q. What are other OCA recommendations?**

16 A. The OCA recommends that NEM 2.0 should stay in place for two to three years
17 followed by a reevaluation. OCA Testimony, p, 9, lines 17-19.

18 **Q. What would the reevaluation involve?**

19 A. The OCA, on page 10, suggests that the Commission should reevaluate the customer
20 payback period, its hourly netting idea and its fixed compensation proposal. The OCA also
21 suggests periodic reviews.

22 **III. RESPONSE TO THE OCA TESTIMONY.**

23 **Q. Do you agree with the OCA's testimony?**

24 A. In part yes and in part no.

1 **Q. Do you agree with the OCA’s testimony that NEM is not a “set it and forget it”**
2 **endeavor?**

3 A. Yes, I think that commissions and utility regulators in multiple jurisdictions reevaluate
4 NEM as they do other rate designs. I agree the NEM and all rate designs should be periodically
5 reevaluated.

6 **Q. Do you agree with the OCA testimony that NEM should have periodic evaluations**
7 **that should be informed by quantitative analyses?**

8 A. Yes, I agree that analyses of multiple goals and considerations, quantitative and qualitative
9 should occur. There is a dearth of data on some issues. Discussing data collection is not an issue
10 we briefed. We are happy to have that discussion with the parties here.

11 The data that is important is to specify together, with reporting or evaluation formats, on
12 all of the avoided costs, benefits, and related issues.

13 **Q. Do you agree with the OCA testimony that data evaluation should be to evaluate**
14 **whether customers are adopting distributed generation and whether NEM results in**
15 **“cost-shifting”**

16 A. I do not see the relevance of the customer-payback analysis. Having consultants, state
17 departments, and the Commission consider payback periods is not clear to me why and how that’s
18 useful. The OCA expert calculation is far beyond any commercially acceptable payback period
19 for a commercial business for new rooftop solar. So the issue becomes what else, what other
20 motivations does a residential or commercial entity have to install an NEM facility. I’m not sure
21 why we want to debate that and it seems very hard to resolve in the Commission regulatory context.
22 A payback period seems much more of business analysis.

23 On cost-shifting, there are different ways to calculate and portray a “cost-shift.” So there
24 needs to be a discussion of data to be collected, evaluated, and reported. I do not oppose, I just

1 note that the issue was not set up by the Commission’s notice, so this issue is not fully briefed.

2 **Q. Do you agree with the OCA testimony on page 9, lines 1-4, that states that rate impacts**
3 **under NEM 2.0 are “currently low and will remain low for the next several years.”?**

4 A. Yes, I agree. I think all the analyses and models in this docket reach that general conclusion
5 using different methodologies. The Crossborder analysis by Tom Beach shows positive ratepayer
6 benefits, not a cost at all.

7 **Q. Do you agree with the OCA testimony on page 9, lines 8 to 14, that hourly netting be**
8 **considered and a fixed export rate?**

9 A. I am not sure that hourly netting is worth the cost, expense and effort. For customers with
10 internal meters, there’s a discussion on the ability, difficulty and expense of the utilities collecting
11 that information. For customers without interval meters, I am not sure if the proposal is to install
12 interval meters to gather this information or how to gather that information?

13 On the fixed export rate suggestion, that is an entirely different solar customer tariff
14 arrangement. The OCA testimony does not develop that idea or concept with any specificity. So I
15 assume it’s a future consideration. I am sure that limiting future Commission’s decisions on what
16 future tariffs might be considered is something this Commission would entertain. I observe that
17 the record is not well developed for entirely different models at this point.

18 **Q. Do you agree with the OCA testimony that NEM 2.0 should stay in place for two to**
19 **three years, followed by a reevaluation? See OCA Testimony, p, 9, lines 17-19?**

20 A. Clean Energy NH (“CENH”) has recommended revisions to NEM 2.0 as new NEM 3.0.
21 CENH is happy to see those recommendations stay in place for two to three years pending
22 additional data development.

1 **Q. Do you agree with the OCA testimony that the Commission should reevaluate the**
2 **customer payback period, its hourly netting idea and its fixed compensation proposal in**
3 **periodic reviews?**

4 A. I think the Commission should focus on avoided costs and benefits data reporting in
5 periodic reviews and not limit a future Commission to specific revisions.

6 **IV. ENERGY SALES IMPACT.**

7 **Q. Does the OCA take a position on whether NEM participation increases costs?**

8 A. Yes, the OCA testifies that NEM reduces energy sales. On page 17, lines 4 to 6, the OCA
9 testifies that “[e]nergy sales decline with NEM participation, resulting in fewer sales over which
10 to recover costs. To recover its revenue requirement, the utility has to increase rates for all
11 customers.”

12 **Q. Do you agree with this testimony?**

13 A. Yes and no. Yes on a narrow basis of just looking at NEM without considering more
14 broadly consumer-generator adoptions, I understand the OCA’s math. That said, there is a strong
15 correlation between NEM adoption and electric vehicle (“EV”) and electric space-heating
16 adoption.¹ Both of those customer behaviors likely increase sales greater than the sale losses
17 through NEM alone.

18 **Q. Why is customer behavior important here?**

19 A. It’s important because it undercuts the assumption there is a revenue loss here. And it
20 undercuts the assumption there may be a cost shift.

21 **Q. Can you explain?**

¹ See, e.g., S. Sharda, V.M. Garikapati, K.G. Goulias, J.L. Reyna, B. Sun, C.A. Spurlock, Z. Needell, “The electric vehicles-solar photovoltaics Nexus: Driving cross-sectoral adoption of sustainable technologies,” *Renewable and Sustainable Energy Reviews*, Vol. 191, 114172, March 2024, on the web at: <https://www.sciencedirect.com/science/article/abs/pii/S1364032123010304?dgcid=author>; National Renewable Energy Laboratory (NREL), News Release: Green Wheels, Bright Skies: NREL Analysis Unveils the Connection Between Electric Vehicles and Photovoltaics, Jan. 24, 2024.

1 A. Yes, if the customer-generator, say a residential customer, also installs multiple heat pumps
2 and drives an EV that they charge at home, even with a full rooftop of solar panels, that consumer
3 would likely still buy more electricity net from the utility. That would increase sales, not decrease
4 sales.

5 **Q. Would there be additional utility costs to those increased sales?**

6 A. Immediately, the marginal increases in sales would increase kWh acquisition of default
7 service. At a small level, the increase in the default service cost would be the kWh charge for
8 default service. If the increases in sales occur during off-peak periods – for example, with managed
9 charging of EVs – then all ratepayers will benefit by spreading the utility’s costs over greater
10 volumes of electric use.

11 **Q. Can you summarize?**

12 A. Yes, in summary, the assumption there is a revenue loss is likely incorrect as customers
13 interested in NEM often are interested in other prosumer adaptations of energy usage, which include
14 beneficial electrification. Air- or ground-source heat pumps in the New England climate increase
15 electricity sales on a monthly basis and increase electricity usage. EVs can double a household’s
16 electricity sales on a monthly basis, while charging is easily managed to ensure charging occurs
17 off-peak.

18 It is not unusual to see an NEM customer also adopt EV and efficient home heating uses
19 such as heat-pump technologies. For that reason, I think focusing on NEM narrowly does not give
20 due consideration to the role that NEM customers are playing in reducing rate impacts by
21 increasing sales rather than decreasing sales.

22 **Q. Are you proposing that the Commission or parties do quantitative analysis of the**
23 **energy prosumer issue here to assess impact on rates?**

24 A. No. This issue arose in the 2017 NEM proceeding as well. Then, as now, there was a

1 recognition that data sets on this issue of how much there is parallel adoption of NEM, EVs, and
2 electric heating are not well developed. I do not think the data is robust enough to do a quantitative
3 analysis. I do think that, if there is data gathering for NEM customers, including virtual NEM
4 customers for municipal host NEM, analyzing that data for future evaluation would be advisable
5 to assess whether and to what extent NEM customers also adopt beneficial electrification measures
6 and the corresponding changes over multiple years in overall customer sales. Data may well show
7 that NEM customers are overall increasing sales and therefore reducing rate impacts.

8 **V. EQUITY IMPACT.**

9 **Q. Do you agree with the OCA that lower-income customers disproportionately pay**
10 **NEM costs?**

11 A. No, CENH does not agree.

12 **Q. Can you explain why?**

13 A. For the reasons explained in the prior section, CENH members generally observe much
14 adoption of beneficial electrification. This increases sales for many NEM customers greater than
15 any NEM sale decreases.

16 **Q. What equity impacts does that have?**

17 A. When an NEM customer also installs electric heat pumps and/or adopts an EV, then sales
18 increase for that customer. That sales increase increases the overall sales for the utility, which are
19 the denominator in a rate case by which the revenue requirement is divided. That has the impact
20 of reducing rates. That impact also reduces what lower-income households, who are not NEM
21 participants, would pay.

22 **VI. CONCLUSION.**

23 **Q. Can you summarize your reply testimony?**

24 A. Yes.

1 **Q. Does this conclude your testimony?**

2 A. Yes. Thank you.

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**R. Thomas Beach
on behalf of
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**CONSIDERATION OF CHANGES TO THE
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Attachments

RTB-3: Selected Discovery Responses

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1

2 I. INTRODUCTION

3

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

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

8

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

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

13

14 **Q: What is the purpose of your rebuttal testimony?**

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

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

3
4 II. REVIEW OF THE SYNAPSE RATE AND BILL IMPACT ANALYSIS ON BEHALF
5 OF THE OFFICE OF THE CONSUMER ADVOCATE

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

12 A: Yes, I have.

13
14 **Q: What are the similarities and differences in the scopes of the Dunskey and Synapse**
15 **RBI analyses?**

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

22
23 Importantly, the Dunskey RBI analysis includes all three IOUs and three customer
24 classes (residential, small commercial, and large commercial) for each IOU, while
25 Synapse's RBI analysis looked only at Eversource's residential class.² Both the Dunskey
26 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 Dunskey Report). The Dunskey 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 Dunskey Report.

² OCA Testimony, at p. 6.

1 have significantly smaller rate and bill impacts than residential solar.³ In evaluating the
2 big picture of the whole NEM program – residential and commercial – the consistently
3 lower rate and bill impacts from commercial solar customers should not be ignored.
4

5 Further, Synapse analyzed the rate and bill impacts from both existing and
6 incremental solar customers, while Dunsky and my analysis only looked at incremental,
7 future solar customers. In its RBI analysis, Synapse’s inclusion of both existing and
8 incremental solar customers magnifies the rate and bill impacts. Including existing solar
9 customers provides a view of the impacts of the entire NEM program. However,
10 assuming continued legacy treatment of existing solar customers – a policy that OCA has
11 stated that it supports⁴ -- any changes to NEM pricing or policies will only impact
12 incremental customers. Thus, any RBI analysis of changes to NEM should consider only
13 incremental, future solar customers.
14

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

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

- 18 1. **Avoided distribution capacity and avoided line loss costs.** Synapse used the
19 same avoided distribution capacity costs calculated by Dunsky, and, like Dunsky,
20 used average lines losses. For the reasons set forth in my direct testimony,⁵ these
21 should be revised to use modestly higher avoided distribution costs and marginal
22 (not average) line losses.
- 23 2. **Customer and system size.** Synapse analyzed a customer with both (1) a solar
24 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.

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

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

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

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.

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

17
18 The Dunskey Report takes a different approach on this issue. It recognizes
19 that a kW of incremental DG solar will have an immediate impact to reduce the
20 capacity costs of load-serving entities. Dunskey does not use the full prices from
21 the ISO-NE Forward Capacity Market, however, but reduces those prices to use
22 the Effective Charge-Rate short-term capacity prices. As Dunskey 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.

1 reflects “the actual cost of capacity procured on the market at the time that it is
2 needed.”¹³ This short-term price for capacity should reflect the immediate impact
3 of load-modifying resources such as solar DG. I believe that the Dunsky
4 approach to this issue is more reasonable than the questionable and prolonged
5 phase-in of avoided generation capacity used by Synapse.
6

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

9 A: Yes. Synapse’s analysis removes, on the lost revenue side, the energy portion of the
10 generation supply rate, and, on the avoided cost side, the avoided cost components for
11 energy, ancillary services, RPS, and the risk premium.¹⁴ This assumes that, over time, the
12 energy portion of generation supply rates will equal marginal/avoided energy costs. This
13 is a reasonable assumption so long as energy supply costs for load-serving entities are
14 closely linked to energy market prices in ISO-NE. Dunsky did not use this approach, and
15 kept these energy market-related components on both the cost and benefit sides of its RBI
16 analysis. The Synapse approach has the positive feature of avoiding the issue of whether
17 the forecast of future generation supply costs is consistent with the assumed trajectory of
18 future avoided energy costs.
19

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

22 A: I have modified the Synapse RBI model to use: (1) Dunsky’s avoided generation capacity
23 costs, which assume no 9-year phase-in, (2) use of a customer whose consumption is
24 equal to 100% of the average solar system size, (3) the revised avoided distribution
25 capacity costs and marginal line losses presented in my direct testimony, and (4) either
26 the Synapse or Dunsky avoided transmission costs. **Table 1** shows the cumulative
27 impacts of each of these changes, in terms of the average bill impacts on non-
28 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%

1 IV. PERSPECTIVE ON FUTURE CHANGES TO NET METERING

2

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

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

20

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

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

¹⁵ OCA Testimony, at p. 31.

¹⁶ *Id.*, at p. 37.

1 Assuming legacy treatment of existing customers, which OCA supports, the OCA
2 proposal would only apply to new, incremental customers, resulting in far smaller bill
3 impacts: -0.08% in 2024, increasing to -0.41% in 2028. Further, any bill reductions from
4 a fixed export rate at avoided costs are highly uncertain, given that avoided costs can be
5 volatile, primarily due to fluctuations in natural gas prices. The only likely bill
6 reductions from the OCA proposal are from hourly netting, which the OCA testimony
7 correctly notes would raise significantly the percentage of DG solar output that is
8 exported to the grid. And the bill reductions from hourly netting alone are small – when
9 applied just to incremental customers, they produce additional bill reductions of -0.06%
10 in 2024, increasing to -0.31% in 2028. This represents added bill reductions for the
11 average customer of just \$0.10 to \$0.50 per month.
12

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

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

¹⁷ OCA Testimony, at p. 6.

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

3
4 **Q: Do you agree that, at some point in the foreseeable future, it will be important for**
5 **the Commission to consider changes to NEM – including hourly netting – that**
6 **reframe all of the elements of the program on a more granular, accurate, and time-**
7 **sensitive basis?**

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

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.

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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.

Attachment RTB-3

Selected Discovery Responses

Date Request Received: December 19, 2023

Data Request No. CENH 3-001

Request from: Clean Energy NH

Witness: Davis, Edward A.; Coskren, Dawn

Request:

In the direct testimony of Tim Woolf and Eric Borden of Synapse on behalf of the New Hampshire Office of Consumer Advocate (OCA), Mr. Woolf and Mr. Borden advocate for an hourly netting regime for NEM in New Hampshire and a proceeding to figure that regime out. Cf. Woolf and Borden testimony at p. 32.

- a. Is hourly netting feasible for each of the Joint Utilities given current utility systems? Can hourly netting be implemented at a nominal or negligible cost? Please suggest a rough cutoff for how the utility might define nominal or negligible cost.
- b. If hourly netting is not immediately feasible at nominal or negligible cost(s), please explain the utility hardware, software, firmware systems and processes that would require update or replacement to accomplish hourly netting for the Joint Utilities or each utility including but not limited to:
 - i. Customer meters
 - ii. Meter communications systems and relays
 - iii. Customer information storage database(s)
 - iv. Customer information data management and access system(s)
 - v. Customer data information sharing system(s) through either
 1. Customer service representatives, or
 2. Directly through customer data portals,
 3. Or otherwise (please explain)
 - vi. Load settlement system(s)
 - vii. Billing system(s)
 - viii. Other systems or hardware that would require updates or upgrades?
 - ix. If any of these systems or functions would require manual calculation and

dedication of personnel beyond current assignments and functions to accomplish hourly netting, please explain.

- c. Does each utility have any estimated costs for performing the upgrades and updates address in question 1b?
 - i. If no specific estimated costs, do the Joint Utilities or each utility have any order of magnitude cost estimates for individual items explained in the answer to 1b (e.g., is each a six figure or seven figure upgrade or update)?
 - 1. Are there any estimate for accomplished those functions in 1b manually for NEM ratepayers in NH annual or over a multi-year period?
 - ii. Would the utility in its judgement plan any of these update(s) for purposes of the NEM tariff compliance?
- d. Does the utility have any information or data on the customer or system benefits of implementing the hourly netting proposal?

Response:

- a. The answer depends on what Mr. Woolf and Mr. Borden are seeking with hourly netting. If they are only seeking to apply what Eversource does with Large Commercial customers, which is instantaneous netting and involves using net consumed energy from one billing meter channel and net excess generation from another billing meter channel and apply that process to small commercial and residential customer generators, Eversource would not require interval meters. This scenario would be possible to implement with existing meters and supporting systems, and so Eversource could implement this version of hourly netting comparable to what Eversource does for Large Commercial customers through modifications to its C2 billing system.

These changes would incur more than nominal costs, as changes to the C2 system are typically complex undertakings. Without having done an actual cost estimate, Eversource can provide an initial assumption that these costs, at an order of magnitude level, would be about six figures, likely mid to high six figures. However, regardless the approach to hourly netting, it is almost certain that some degree of manual intervention would have to be involved and would create ongoing, incremental costs additional to the implementation costs, which have not been estimated at this time. The degree of manual intervention would vary depending on the specifics of the approach to hourly netting (i.e. the need for interval meters, or not), but examples of the types of manual intervention that could be required are: manually tracking account data, creating custom reports to pull the relevant data and then regularly running those reports every billing cycle, and creating and using calculation sheets to manually calculate the net metering credits, if the crediting calculation function cannot be automated. These are examples of manual intervention efforts that are currently applied to the “instantaneous netting” that is done for the small group of Large Power Billing customer generators.

This scenario also assumes that the current compensation structure stays the same, because changes to the compensation structure would necessitate additional modifications to the Eversource billing systems. Any of these changes could not happen overnight and could take a minimum of several months and could take a year or more.

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.

b.

The systems that would likely need to be modified or replaced wholesale would be the following listed below, in italics. This is the company's best assumption at this time, without a granular proposal to assess.

- i. Customer meters – *yes, customers would need AMI/interval meters installed*
 - ii. Meter communications systems and relays – *for interval time of use cellular meters, existing systems could be used, the meters themselves are just very expensive (approx. \$650 per meter, plus installation and setup – these also have a one-year lead time to obtain). However, to implement AMI, new meter systems able to interface with the new meters would need to be installed, as well as all accompanying software and reading equipment necessary for communication between meters and the corresponding systems. This would also likely entail wholesale replacement of all billing systems.*
 - iii. Customer information storage database(s) – *without a more granular proposal it is unclear what would be needed to satisfy the data storage needs, but it would likely require either considerable changes to existing billing and meter systems to hold exponentially greater interval meter data, or new systems altogether. One factor that would influence this would be how many meters this would apply to for instance.*
 - iv. Customer information data management and access system(s) – *the answer to this would likely parallel or depend upon the answer to iii. Above.*
 - v. Customer data information sharing system(s) through either – *this element would depend on the proposal as well – it is not sufficiently clear what kind of customer contact, education, and service would be expected with hourly netting.*
 1. Customer service representatives, or
 2. Directly through customer data portals,
 3. Or otherwise (please explain)
- c.
- i. If the above were the scope of the changes required to implement hourly metering, which is Eversource's best assumption at this time, this would like be a nine-figure initial investment for Eversource, with additional incremental ongoing operation and maintenance costs. However, if the testimony is suggesting the first example discussed in this response

(mimicking instantaneous netting like is done for Large Commercial Eversource customers), then the costs would likely be more in the range of mid to high six figures.

1. As previously discussed, the first option (instantaneous netting) could be implemented with a degree of manual intervention, using existing systems. If hourly netting would require interval data, the new systems described above would be a necessary condition precedent.

ii. If the question is asking if Eversource would recommend moving to hourly netting as a means of updating the current net metering tariff, in either scenario of hourly netting discussed above, this functionality needs further examination and analysis of a more granular and detailed proposal before the full scope of the needed investments can be determined. Eversource does not believe that compliance with the current NEM tariff requires hourly netting, and believes it is premature to attempt this update without knowing exactly what is being proposed to be implemented and a plan for execution of that implementation is fleshed out.

d.

Eversource is uncertain of any net customer or system benefits resulting from switching to hourly netting once accounting for the upfront investments and ongoing, incremental costs required to implement such an update. It is possible that moving to hourly netting would not result in commensurate system or customer benefits, as it is unknown if the costs to implement hourly netting would outweigh any possible benefits created by more accurate net meter crediting compensation as a result of hourly netting, as is posited in testimony by Messrs. Woolf and Borden.