Consultant Comments on the 2024 Massachusetts Electric Sector Modernization Plans

Submitted to the Massachusetts Grid Modernization Advisory Council

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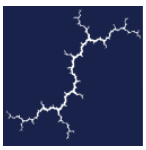

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Disclaimer

These comments reflect the analyses and observations of the authors.

They do not represent the views of the Grid Modernization Advisory Council or any of its members.

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1. INTRODUCTION

Established by *An Act Driving Clean Energy and Offshore Wind* (the Climate Act),[1] the Grid Modernization Advisory Council (GMAC) is charged with reviewing and providing recommendations to the state investor-owned electric distribution companies (EDC) regarding their electric-sector modernization plans (ESMP). These draft plans were submitted to the GMAC on September 1, 2023 (2023 ESMPs).

After receiving the draft ESMPs on September 1, 2023, the GMAC met on a biweekly basis to review the draft plans. The Climate Act requires that the EDCs provide the GMAC at least 80 days to conduct its review of the draft ESMPs, and that the GMAC provide written feedback to the EDCs not later than 70 days before the EDCs file with the Department of Public Utilities (Department) in January 2024. Each GMAC meeting was structured to allow for consultant summary presentations and GMAC discussion on ESMP sections. The statutory deadline for the GMAC providing its recommendations to the EDCs was November 20, 2023.

On November 30, 2023, the GMAC issued a set of observations and recommendations regarding the EDCs' 2023 ESMPs.[2] These recommendations included 33 observations on a range of issues, 88 recommendations for the EDCs to address in the final draft of the ESMPs, and 12 recommendations from the Equity Working Group.

On January 29, 2024, the EDCs submitted modified ESMPs (2024 ESMPs) to (a) account for the recommendations provided by the GMAC, and (b) provide additional analysis that was not included in the 2023 ESMPs.

The Climate Act requires that the ESMPs demonstrate how the EDCs will proactively improve grid reliability, communications, and resilience; enable increased, timely adoption of renewable energy and distributed energy resources (DER);[3] promote energy storage and electrification technologies necessary to decarbonize the environment and economy; prepare for future climate-driven impacts on the transmission and distribution systems; accommodate increased transportation electrification, increased

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1 St. 2022, c. 179, § 53, codified at G.L. c. 164, §§ 92B-92C.

2 Grid Mod Advisory Council, *Observations and Recommendations of the Grid Mod Advisory Council*, Regarding the Electric Distribution Companies' Electric-Sector Modernization Plans, November 20, 2023.

3 For the purpose of this report, "distributed energy resource" is defined as small-scale power generation or storage technology, not greater than 20 megawatts, including, but not limited to, resources that are in front of or behind the customer meter, electric storage resources, intermittent generation, distributed generation, demand response, energy efficiency, thermal storage and electric vehicles and their supply equipment that may provide an alternative to, or an enhancement of, the traditional electric power system and are located on an electric utility's distribution system or on a subsystem of the utility's distribution system. This definition is consistent with An Act Driving Clean Energy and Offshore Wind (Climate Act), St. 2022, c. 179, § 52, codified at G.L. c. 164, § 1.

building electrification and other potential future demands on distribution and, where applicable, transmission systems; and minimize or mitigate impacts on the ratepayers of the Commonwealth, thereby helping the Commonwealth realize its statewide greenhouse gas (GHG) emissions limits and sublimits under Chapter 21N.[4]

The 2023 ESMPs did not include some of the key information necessary for the GMAC to meet these statutory requirements. They did not include benefit-cost analyses (BCA) that are necessary to assess net benefits to customers; nor did they include bill impact analyses that are necessary to determine whether the ESMPs minimize or mitigate impacts on ratepayers. The 2024 ESMPs did include BCAs and bill impact analyses, along with testimony describing the analyses. These new analyses play an important role in informing the comments below.

The purpose of these comments is to provide the GMAC consultants' findings on the 2024 ESMPs in order to support the GMAC members in their review and understanding of the 2024 ESMPs. The EDCs have requested that the Department approve a set of proposed investments, referred to here as ESMP investments (see Chapter 3 for more discussion of the ESMP investments relative to the non-ESMP investments). Many of our comments below are focused on these ESMP investments that the EDCS are seeking pre-authorization for, but we also address the other aspects of the ESMPs that are relevant to these investments.

In the chapters below we include information that summarizes and synthesizes the materials provided in the three EDC filings. In most of those chapters we provide our comments separately from the summary of the filings to allow for easier reference to our comments.

It is important to note that this is the first time the Commonwealth of Massachusetts has gone through this process to create and review large electric-sector modernization plans and all-encompassing integrated distribution system planning. The Massachusetts EDCs' and GMAC's substantial effort on this undertaking is commendable and greatly contributed to these comments.

[4] G.L. c. 164, § 92B(a).

2. SUMMARY OF THE GMAC CONSULTANT COMMENTS

Overview

The Climate Act requires that the GMAC review and provide recommendations on the ESMPs that should, among other things, "maximize net customer benefits and demonstrate cost-effective investments in the distribution grid... and minimize or mitigate impacts on ratepayers throughout the Commonwealth."[5] In addition, the Department already requires the EDCs to demonstrate that proposed grid modernization investments benefits exceed their costs.[6]

In sum, it is our opinion that the ESMPs do not provide sufficient evidence to demonstrate that the ESMPs will provide net benefits to customers and minimize or mitigate rate and bill impacts. This is due to many overlapping reasons that we summarize below.

Bifurcation of ESMP and Non-ESMP investments

All three ESMPs separate the ESMP investments from the non-ESMP investments and focus their BCA and bill impact analyses on the ESMP investments alone. Consequently, the ESMPs do not allow for an assessment of all the EDCs' proposed investments from 2025–2029. This approach is not consistent with the Climate Act, which clearly states that "in order to be approved, a plan shall provide net benefits for customers and meet the criteria enumerated in clauses (i) to (vi), inclusive of subsection (a)" [emphasis added].[7]

Further, and just as importantly, this approach does not allow for an assessment of whether the total ESMP and non-ESMP investments are being optimized to maximize net benefits and minimize rate impacts, because the investments made in one category can affect the investments, benefits, and costs of the other category. This approach is also problematic because the EDCs use different methods for categorizing which types of investments fall into the two different categories, without justifying the differences. (See Chapters 6 and 7 for more discussion of proposed investments.)

Benefit-Cost Analysis

The BCAs provided in the ESMPs suffer from several flaws that in combination make it difficult to have confidence in the results. As noted above, there is no BCA for non-ESMP investments. Even for the ESMP-investments for which the EDCs are seeking pre-authorization, the BCAs do not indicate whether the proposed investments have been optimized. The BCAs consider only two scenarios: one without the proposed ESMP investments, and one with them. A robust analysis of the cost-effectiveness of the ESMP

[5] G.L. c. 164, § 92C(b)

[6] D.P.U. 12-76-B, Appendix 1, p. 11.

[7] G.L. c. 164, § 92B(c)

investments should include analyses of alternative investments that might have lower costs, provide greater benefits, or both.

The BCAs input the ESMP investments in the form of actual expenditures incurred in each year, as opposed to the revenue requirements that will be recovered from customers in each year. This is inconsistent with standard practice and does not include the recovery of equity, debt, and taxes that are factored into revenue requirements. It also exaggerates the costs in the early years and reduces the costs in later years by not accounting for the timing effects of amortization.

The primary benefit identified in the BCAs is the reduction in GHGs that occur from the new technologies (electric vehicles, heat pumps, solar, and storage) that are enabled by the infrastructure investments. However, these new technologies will also have utility system costs and benefits that will be passed on to customers through electricity rates. The EDCs did not account for these additional utility system costs in the BCAs.

The EDCs recommend that the BCA results be aggregated for all the ESMP investments combined, as opposed to using BCA results for each of the separate categories of ESMP investments. While there is value in reviewing the BCA results in aggregate, there is also value in reviewing them separately for each investment type.

The analysis of macroeconomic impacts accounts for only the effects created by investing in ESMP infrastructure and does not account for the effects of increases or reductions in electricity rates, which can have a large impact on macroeconomic effects. (See Chapter 9 for more discussion of BCAs.)

Bill Impact Analysis

The bill impact analyses provided in the ESMPs present many of the same flaws in the BCA that, in combination, make it difficult to have confidence in the results. As with the BCAs, there is no bill impact analysis for non-ESMP investments. This is especially problematic because the total of ESMP and non-ESMP costs is dramatically higher than the costs incurred by the EDCs in 2022. Eversource and National Grid are proposing to increase their capital costs by roughly three to four times from now through 2029, respectively (see Chapter 6). This increase in spending will clearly require a large increase in rates, but the bill impact analyses provided in the ESMPs account for only a small portion of these costs because they do not account for the non-ESMP costs.

As with the BCAs, the bill impact analyses do not provide any information to determine whether rate or bill impacts have been minimized or mitigated because they do not indicate whether the proposed investments have been optimized. First, the EDCs have separated the ESMP and non-ESMP investments and ignored the non-ESMP investments. Second, the bill impact analyses, as with the BCA, do not demonstrate that the ESMP investments have been optimized because they do not consider alternatives to the proposed investments.

The bill impact analyses do not account for changes in electricity sales. The large amount of EVs, heat pumps, and distributed storage that will be added to the system from 2025 to 2029 will clearly result in

both increases and reductions in electricity sales. These changes to electricity sales will affect the electricity rates.

The bill impact analyses do not start from today's electricity rates. The analyses include only the incremental impacts of the revenue requirements of the ESMP investments from 2025 to 2029. As a result, it is not possible to determine what the actual bill impact is going to be relative to today's bills. (See Chapter 10 for more discussion on the bill impact analyses.)

Other Concerns

These comments also address several other elements of the ESMPs, including:

- The load forecasts used to justify the ESMP investments do not document some of the key methods and assumptions, use some inconsistent assumptions across the three EDCs, and are not clear whether their assumptions are consistent with some of the key assumptions in the Massachusetts Clean Energy and Climate Plans (CECPs). The combined 2050 net peak demand forecast in the ESMPs is significantly higher than the *Phased* scenario in the 2050 CECP, yet lower than the *Full Electrification* scenario in the 2050 CECP. It is unclear if the EDCs are overestimating or underestimating the future impact of electrification. Thus, it is unclear if the investments proposed in the ESMPs are more than necessary to meet the peak demands required under Massachusetts decarbonization policies. (See Chapter 4.)

- The ESMPs' proposals to make large investments to support reliability needs are inconsistent with the fact that their recent reliability performance has been generally better than industry averages. The ESMPs do not optimize investments to improve resilience, and apparently favor high-cost resilience measures over lower-cost ones. The ESMPs might be proposing investments to replace aging infrastructure earlier than needed. (See Chapter 5.)

- The EDCs propose to include different investment categories in their ESMP investments compared with their non-ESMP investments. This can have significant implications for review of the ESMPs because (a) the amount of costs involved is very large as a portion of the total ESMP costs, and (b) the bifurcation of ESMP and non-ESMP costs is very problematic for the BCA and bill impact analyses and these differences exacerbate these problems. (See Chapter 6.)

- Eversource and Unitil provide some information about the headroom on their systems (the difference between capacity available and peak demand) that suggests that they might be installing more substations than are needed to meet demand. National Grid does not provide information to conduct this sort of analysis. (See Chapter 8.)

- The cost recovery mechanisms proposed by the EDCs to recover their ESMP investments will be based on pre-authorization from the Department in the ESMP dockets, which creates risk that the EDCs will propose larger investments than necessary and therefore requires especially thorough justification of the investments and their magnitudes. (See Chapter 11.)

- The ESMPs provide little information or details about how the EDCs will integrate their ESMPs with long-term gas planning. Further, some of the key assumptions regarding long-term residential heat-pump adoption in the ESMPs are inconsistent with the Department's recent order on long-term gas planning. (See Chapter 12.)

- The metrics proposed in the ESMP are limited and are not outcome-based. In cases where utilities are requesting pre-authorization of investments, it is especially important to have robust metrics that can be used over time to demonstrate that the investments are providing the benefits that they are purported to deliver. (See Chapter 13.)

- The EDCs reject several of the GMAC recommendations, including five recommendations on integrated gas-electric planning, two recommendations from the Equity Work Group, and recommendations on stakeholder engagement, the 5-year plan, and economic benefits. Many GMAC recommendations were "accepted but modified," but some of those did not adopt the substance of the GMC recommendations. These include, for example, the recommendation that the ESMPs be the central distribution planning document, and the recommendation that the EDCs should be more transparent about the short-term and long-term load forecasts. (See Chapter 14.)

3. DISTRIBUTION SYSTEM PLANNING CHALLENGES

Key objectives of distribution system planning include determining how to provide reliable electricity service while enabling new technologies to meet Massachusetts decarbonization goals at the lowest cost. Achieving these objectives is without question a daunting challenge. We address several issues below regarding how the EDCs need to balance the goals of meeting evolving needs and keeping costs low.

Expanding capacity for electrification in advance of load growth

Increasing grid capacity in advance of load growth involves a balance of two opposing risks. The farther in advance of need (load growth) an investment occurs, the greater the rate impact (because massive investments proposed 2025–2029 will not be offset by meaningful sales volume increases for several years). On the other hand, the shorter the duration between investment and load growth, the greater the risk an electric vehicle (EV) charger or heat pump installation might be delayed. Some of the biggest challenges facing the EDCs are how best to optimize the balance between "readiness" and rate impacts, and how to develop mechanisms to help make such choices.

Expanding capacity for distributed energy resources

While capacity expansion for DERs involves the same balancing act, additional variables need consideration. For example, PV generation is ill-suited for heat-pump-related system peaks, which typically occur early on winter mornings when the sun is not shining. Thus, PV generation does not help address this peak without energy storage technologies to support it. Yet energy storage costs do not appear to have been considered in EDC decisions to expand utility-scale solar capacity. Almost one-third of Eversource's proposed capacity expansion projects are prompted by utility-scale solar,[8] which will provide it with utility-scale solar DER capacity of 1,357 MW by 2035. This is more than three times greater than the total of all DER capacity in group studies for these projects today.[9] It might not be advisable to over-prepare for utility-scale solar DERs by such an amount from 2025 to 2034 without taking energy storage costs into account.

Avoiding investments that might eventually be uneconomical

Some distribution grid equipment is very long-lived. A device installed today might still be in service in 2100. As a result, choices made today are highly consequential. For example, most electric utilities stopped building 4kV substations and circuits and started building 13kV substations and circuits around the time of World War II, largely because 13kV circuits can carry three times the load of 4kV circuits. Though 24kV or 26kV substations and circuits are much more costly to build, they can handle twice the

[8] D.P.U. 24-10 Exhibit ES-ESMP-1. (Hereinafter, "Eversource ESMP"). Table 6-1, p. 290.

[9] Id, p. 394-396 (1,012 MW EMA-South Sub-Region) and p. 415-425 (345 MW WMA Sub-Region).

load of 13kV. Given that so many new substations are proposed in the ESMP, should EDCs consider building them (and the circuits they serve) at 24 or 26kV rather than at 13kV? Comprehensive economic analysis should be completed to examine this question. Replacement of "aging" infrastructure can also constitute regrettable spending (see Section 5.2).

Prioritizing the improvement of blue sky reliability

All three EDCs deliver reasonable blue sky reliability performance relative to their investor-owned utility peers. All U.S. EDCs measure average service interruption frequency and duration, both with storms and with storm performance removed from the metrics (i.e. assuming "blue sky" conditions). Eversource and Unitil routinely perform in the top quartile on blue sky service interruption duration (see Section 5). National Grid has lately performed below average on this metric, but not egregiously so. Given acceptable blue sky reliability performance, the law of diminishing returns, and the sheer number of capital spending priorities facing the EDCs, we are concerned that EDC capital spending on reliability 2025–2029 is too high.

Prioritizing the improvement of resilience and long-duration interruptions

While a strong case can be made that increasing blue sky reliability performance should not be high on the priority list, the elimination of long-duration interruptions (i.e., improving resilience) should be a priority; in recent years both Eversource and National Grid have performed worse than investor-owned utility averages for service interruption durations including storms (see Section 5). Reducing long-duration interruptions becomes increasingly important as customers increasingly rely on heat pumps for space heating. However, when it comes to eliminating long-duration interruptions, it appears that the ESMPs favor the costliest and more capital-intensive solutions over lower-cost options (see Section 5).

Accounting for transmission planning

The transmission issues identified by the Clean Energy Transmission Working Group (CETWG) in its report to the Legislature are very similar to those issues addressed in the ESMPs. The top five transmission challenges in the CETWG report include strategies to manage peak load; prioritization of spending; timing of spending; geographic diversity of generation; and system capacity constraints.[10] The CETWG report cites demand response, energy efficiency, and use of fossil-fueled heating to reduce demand on the coldest days as strategies to reduce transmission costs. These same issues need to be addressed to reduce distribution costs. Rate increases are also identified as a concern, with the CETWG citing a doubling of transmission rates from 2012–2023 and an additional 38 percent increase expected by 2027.[11]

[10] *Report to the Legislature*. Clean Energy Transmission Working Group. P. "x". December, 2023. Available at https://www.mass.gov/info-details/clean-energy-transmission-working-group-cetwg#cetwg-final-report-

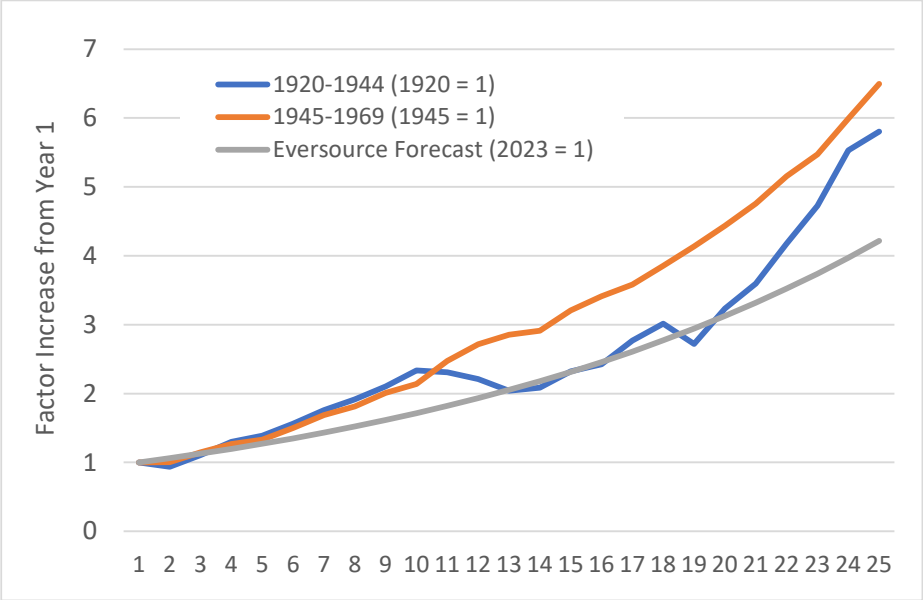
[11] Id, p. xi.

The Climate Act, which established the CETWG, does not specify activities for the CETWG beyond the filing of its report to the legislature. The Climate Act does specify that the ESMPs should address transmission "where applicable."[12] Given the interdependence of the transmission and distribution systems, the ESMPs should ideally address the implications of transmission needs on the distribution system infrastructure. However, the ESMPs say very little about how transmission needs affect EDCs' short- or long-term distribution investments.

Historical perspective

A common theme promoted by the EDCs is that the grid might not be ready for an electrified future. Both Eversource and National Grid state in their ESMPs, "To simultaneously meet the Company's core obligation to provide safe and reliable service to its customers, as well as drive toward the Commonwealth's electrification and clean energy goals through proactive upgrades pursuant to the ESMP, the Company is compelled to undertake a level of investment through 2050 that has never been experienced in the Commonwealth."[13] While this may be true relative to recent electricity growth trends, it is not true for the industry's history.

Figure 1. Electricity Sales: U.S. Historical Compared with Eversource Forecast (2026–2050)



Historical energy data from Cleveland CJ et al., United States Electric History in Four Charts, Institute for Global Sustainability, Boston University. Available at http://visualizingenergy.org
Eversource sales converted from Eversource's peak demand forecast (GW) into energy (GWh) at an assumed capacity factor that doubles from 43% today to 87% by 2050. Eversource 2050 peak demand forecast (15.3 GW) from ESMP p. 474.

[12] G.L. c. 164, § 92B(a) and § 92B(e).

[13] Eversource ESMP at 18:1; National Grid ESMP at 13:4.

Figure 1 compares U.S. electricity sales during two historical periods of growth to Eversource's forecasted electricity sales from 2026 to 2050. Electric sales volumes have grown six-fold within a 25-year period *twice* in the past. From 1920 to 1944, electric sales volumes grew six-fold from refrigeration, rural electrification, and World War II arms manufacturing. From 1945 to 1969, electric sales volumes grew six-fold from air-conditioning. In sum, electric utilities have previously experienced and invested in an electric distribution grid to accommodate rapid load growth of the type Massachusetts might observe from 2026–2050.

Some of the issues that need to be addressed today are different and potentially more challenging than in the past, such as the need to support DERs and achieve decarbonization goals. But this does not mean that the EDCs should rush to build new capacity ahead of the demand for it. Instead, these additional complexities require more comprehensive and thoughtful planning practices than those of the past.

4. LOAD FORECASTS AND LOAD DRIVERS

The EDCs provided short-term load forecasts (through 2033 or 2034) and long-term load forecasts (2035–2050). While the short-term forecasts are the primary drivers of the proposed ESMP investments, the long-term forecasts are meant to ensure the investments address long-term needs or are easily modifiable to meet the future long-term needs. The EDCs provide separate forecasts for each major load component, including: a base demand forecast (or trend load), energy efficiency (EE), demand response (DR), heating electrification, transportation electrification, PV adoption, and energy storage systems (ESS).

The EDCs provide base, low, and high demand scenarios for the long-term forecasts, but only provide base forecasts for the short-term forecasts, since the EDCs state these forecasts are what drive investment decisions. The EDCs generally state they align their base forecasts with the 2050 Decarbonization Roadmap's *All Options* or 2050 CECP *Phased* or *High Electrification* scenarios, although the extent to which the EDCs provide sufficient explanation and demonstration of alignment varies. Section 4.4 discusses the extent to which the EDCs forecasts align with the CECP.

4.1. Summary of Forecast Assumptions by Load Component and EDC

The table below describes the key assumptions the EDC's made in their forecasting of the major load components.

Table 1. Summary of EDC Load Forecast Assumptions

	Eversource	National Grid	Unitil
Base	Disaggregates historical baseload and DERs and forecasts separately. Based on econometric forecast which takes into account factors such as projected customer growth and expected demographic changes (Exhibit ES-Forecast-1, p. 13).	Disaggregates historical baseload and DERs and forecasts separately. Based on econometric forecast which considers factors such as projected customer growth and expected demographic changes (Exhibit NG-ESMP, p. 208).	Projects recent historical growth forward for baseload. Does not disaggregate DERs. (Exhibit UN-Forecast 1, p. 7).
Energy Efficiency	Assumes continuation of programs at historical levels and consistent impacts (Exhibit ES-Forecast-1 p. 22). 2024 MassSave approved budget ($525M) is constant over 10 years.	Base case through 2024 reflect Company's annual energy efficiency plan. Post 2024, cumulative persistent energy efficiency savings growth rate of residential slows by 15% to account for saturation of claimable savings until 2035 and stays flat after 2050. Commercial savings growth rate slows by 5% annually until	The Company expects historical energy efficiency investments and savings to continue but does not separate them or forecast separately, as it is difficult to separate historical energy efficiency savings from the historical load data (Exhibit UN-Forecast 1, p. 13).

	Eversource	National Grid	Unitil
		2050. (Exhibit NG-ESMP, p. 211).	
Demand Response	Does not consider. Demand response and BTM storage that consistently deliver peak demand reductions are captured in the trend forecast as they impact the recorded peaks (Exhibit ES-Forecast-1, page 14 line 21).	Based on continued growth of existing program, leading to growth of about 60% by 2034 compared to 2022. (Exhibit NG-Forecast-1 p. 14) Does not model winter DR.	Does not consider.
Heating electrification / Heat pump adoption	Following a trajectory that meets the *All Options* electrification scenario, and assumes all heat pumps are air-source heat pumps (no hybrid) (Exhibit ES-Forecast-1 p. 49).	Through 2024, based on approved energy efficiency plan. Post 2024, Base forecast based on a forecast that meets 2050 CECP "Phased" target by 2050, and roughly aligns with interim goals for 2030 onwards (Exhibit NG-Forecast-1 p. 12). Base, High, and low scenarios based on CECP scenarios: *Phased, Full Electrification, Hybrid*, respectively (Exhibit NG-Forecast-1 p. 23)	For 2025–2029, the Company assumed 1% of total forecasted load incorporated by year and for 2030–2034 2% of total forecasted load incorporated by year. Assume 80% of residential customers will convert to electric heat by 2050. (Exh. UN-Forecast-1 p. 29). Aligns with *All Options* scenario (Exh. UN-Forecast-1 p. 18).
Transportation Electrification	Following a trajectory that meets the 2050 CECP benchmarks for percentage of vehicle stock (Exhibit ES Forecast 1, p. 20). Light-duty vehicle data aggregated to bulk stations to provide station-specific charging profiles. Medium- and heavy-duty EVs tracked through step load process. (Exhibit ES-Forecast 1, p. 13).	Light-duty adoption rate based on Massachusetts adopting the California Advanced Clean Car (ACC II) Rule and Advanced Clean Truck Rule, which requires all light-duty cars sold in MA be zero emission starting in 2035. Mid- and heavy-duty and electric bus scenarios based on adoption of California's Advanced Clean Truck Rule (NG-ESMP, p. 211).	Near term: Assumes percent of the ISO-NE EV Adoption Forecasts. Long-term: Align with *All Options* scenario (Exhibit ES-Forecast-1 p.16).

	Eversource	National Grid	Unitil
PV	Based on interconnection queue and following a trajectory that meets the *All Options* scenario (Exhibit ES-Forecast-1 p.16). Split between rooftop and ground-mounted solar from All Options pathway of 2050 Roadmap, since CECP did not explicitly separate them. (Exhibit ES-Forecast-1 p.40)	Near term (through 2027) based on interconnection queue and internal expertise, and on meeting share of the statewide existing solar target of 3.2 GW by mid 2020s. Solar is projected to continue to grow to meet National Grid's share (45%) of the statewide 2050 target[14] under the *All Options* scenario (Exhibit NG-ESMP, p. 211).	Near term: based on interconnection queue. Long term: Following a trajectory that meets the *All Options* scenario (Exhibit UN-Forecast-1 p.9).
Energy Storage	Near term: based on interconnection queue (Exhibit ES-Forecast-1 p.16). Long term: following a trajectory that meets the *High Electrification* scenario (Exhibit ES-Forecast-1 p.16).	Near term based on interconnection queue and meeting State policy target of 1,000 MW by 2025, with continued growth after (Page 8 of Exhibit NG-Forecast-1). Assumes it achieves its share (45%) of statewide target in All Options pathway in 2050 Roadmap, and accounts for share of capacity that would be connected to the distribution system. Incorporates 2050 Roadmap goal of 1,000 MW of statewide ESS by 2025 (Page 31 of Exhibit NG-Forecast-1).	Based on interconnection queue in near term, and on *All Options* pathway in 2050 Roadmap (Exhibit UN-Forecast-1 p.9).

4.2. Short-Term Forecasts

Eversource

Figure 2 presents Eversource's short-term peak demand forecast, as well as the underlying assumptions regarding the growth of base loads, step loads, heat pumps, EVs, demand response, energy efficiency, PV, and energy storage. Figure 3 presents Eversource's cumulative incremental load additions from 2025 through 2033. Eversource projects a 1.0 percent Compound Annual Growth Rate (CAGR) between 2025 and 2033. Eversource switches from a summer-peaking system to a winter-peaking system in 2035. Thus, all years of the short-term forecast have a summer peak.

[14] The *All Options* scenario targets 6.99 GW of behind-the-meter (BTM) PV connection and 16.2 GW of ground-mounted PV connection by 2050 statewide. For its base scenario, National grid modeled approximately 3.1 GW of BTM PV and 3.6 GW of ground-mounted PV, and modeled two alternative scenarios that reach the *All Options* scenario a few years earlier or later.

Figure 2. Eversource Short-Term Peak Load by Load Component

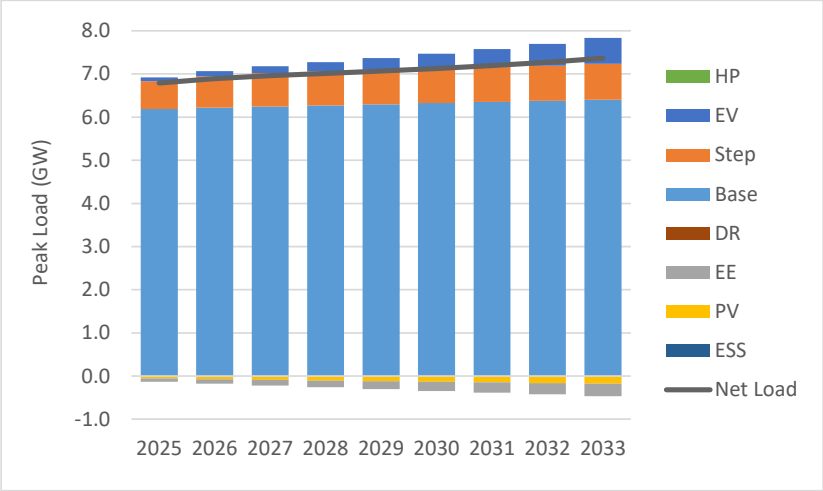


Exhibit ES-ESMP-1 p. 244.

Figure 3. Eversource Short-Term Cumulative Incremental Load by Load Component

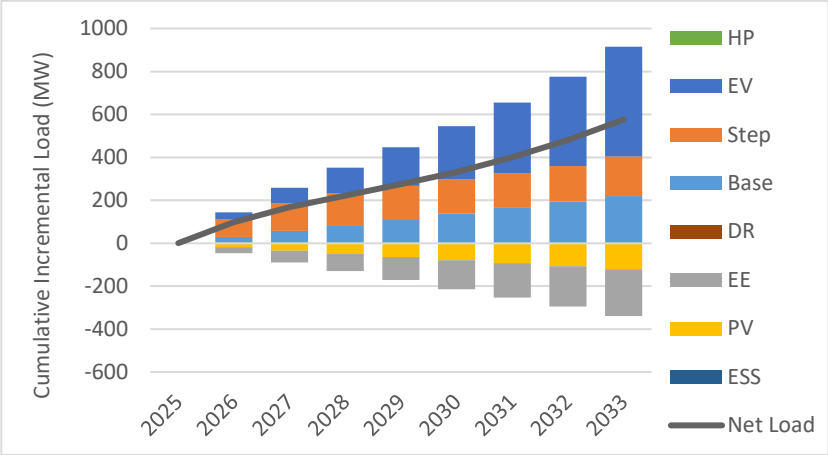


Exhibit ES-ESMP-1 p. 244.

Eversource projects 2033 peak load will be 8 percent higher than 2025 loads. While EVs make up more than half of short-term peak demand increases, Eversource states that the key driver of proposed investments in the short term is the addition of new step loads driven by growth in the biotech industry in its urban and suburban sub-regions.[15] Eversource includes only light-duty vehicle adoption in its short-term forecast, while medium- and heavy-duty EV charging peaks are assigned to step loads.[16] Eversource explains that EVs are less impactful, since the load is more evenly spread across Eversource's

[15] (Exhibit ES-Forecast-1 p. 37). Medium- and heavy-duty vehicle charging and HVDC charging stations are included in these step loads (Exhibit ES Forecast 1, p. 17). Eversource's step load forecast includes 28.3 MW of known regional or public transportation electrification initiatives (Exhibit ES-ESMP-1 p. 247).

[16] Exhibit ES-ESMP-1, p. 247.

territory.[17] In addition, while Eversource includes heating electrification adoption in its short-term forecast, because the system is summer-peaking until after the 10-year forecast, heating electrification does not contribute to peak load.[18]

Eversource does not include the impacts of pending capital investment projects (CIP) in its ground-mount PV forecast, and it notes that solar impacts could be significantly different than forecasted if the CIPs are approved. Specifically, the Southern region has limited remaining capacity for additional solar development, so if the requested CIPs for that region are approved, Eversource states forecasted capacity would shift to that region.[19]

Eversource forecasts continuation of energy efficiency programs at similar funding and impact levels and does not forecast demand response. Rather, Eversource states that both "demand response and behind the meter storage systems that consistently deliver peak demand reductions are captured in the trend forecast as they impact the recorded peaks and therefore are not separately modeled."[20]

National Grid

Figure 4 presents National Grid's short-term peak demand forecast, as well as the underlying assumptions regarding the growth of base loads, step loads, heat pumps, EVs, demand response, energy efficiency, PV, and energy storage. Figure 5 presents National Grid's cumulative incremental load additions from 2025 through 2033. National Grid projects a 2.4 percent CAGR between 2025 and 2033. National Grid switches from a summer-peaking system to a winter-peaking system in 2034. Thus, all years of the short-term forecast have a summer peak.

[17] Exhibit ES Forecast 1, p. 37.

[18] Exhibit ES-Forecast-1, p. 11.

[19] Exhibit ES-Forecast 1, p. 31.

[20] Exhibit ES-Forecast 1, p. 13

Figure 4. National Grid Short-Term Peak Load by Load Component

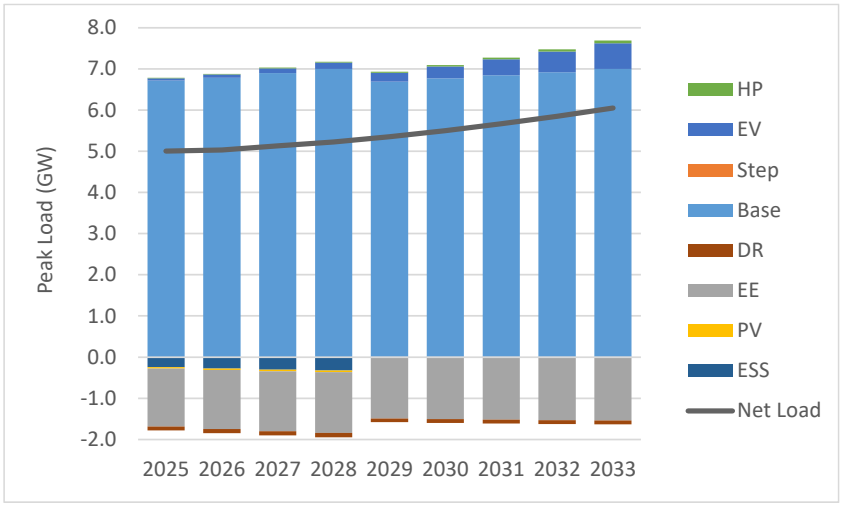


Exhibit NG-ESMP, p. 215.

Figure 5. National Grid Short-Term Cumulative Incremental Load by Load Component

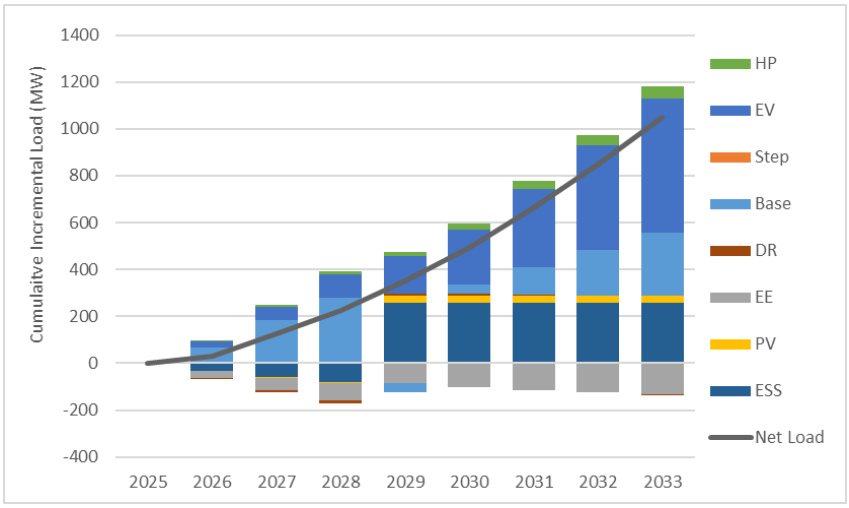


Exhibit NG-ESMP, p. 215. Note that while PV, ESS, and demand response have positive cumulative impacts beyond 2029, these load factors are not increasing peak demand. Rather, they are providing a smaller negative impact on peak than before, and so their incremental impact is positive relative to 2025.

National Grid explains the primary driver of increased demand growth through 2034 is increased adoption of EVs, combined with a decreasing rate of growth of cumulative energy efficiency savings.[21] While National Grid projects PV adoption to continue to increase, the contribution of PV to reducing

[21] Exhibit NG-Forecast-1, p. 215.

system peak decreases from 2025 through 2028, after which PV has no impact on system peak. This is because the peak hour shift to later in the day, which reduced the impact of PV on peak demand.[22]

Unlike Eversource, National Grid does not model step loads independently from other end uses. National Grid uses a three-year heat pump adoption plan between 2022 and 2024 based on its approved energy efficiency plan.[23] National Grid's PV forecast through 2027 is based on current projects in the interconnection queue, internal expertise, and the assumption that National Grid will contribute 45 percent of the existing statewide target of 3.2 GW by the mid 2020's.[24] National Grid estimates that its demand response program helped reduce system peak by 1.3 percent, and that it will continue to grow through 2025. Through 2034 National Grid assumes a similar incremental growth, which results in a growth of 60 percent compared to 2022.[25]

Unitil

Figure 6 presents Unitil's short-term peak demand forecast, as well as the underlying assumptions regarding the growth of base loads, step loads, heat pumps, EVs, demand response, energy efficiency, PV, and storage. Figure 7 presents Unitil's cumulative incremental load additions from 2025 through 2033. Unitil projects a 1.3 percent CAGR between 2025 and 2033. Unitil switches from a summer-peaking system to a winter-peaking system in 2033. Thus from 2025 through 2032, the system peak includes summer impacts, but in 2033, the system becomes winter-peaking. Notably, in 2033, the impact of heat pumps on peak demand increases whereas the load reduction impact of PV decreases to zero.

[22] Exhibit NG-Forecast-1, p. 215.

[23] Exhibit NG-ESMP, p. 221.

[24] Exhibit NG-ESMP, p. 210.

[25] Exhibit NG-Forecast-1, p. 14.

Figure 6: Unitil Short-Term Peak Load by Load Component

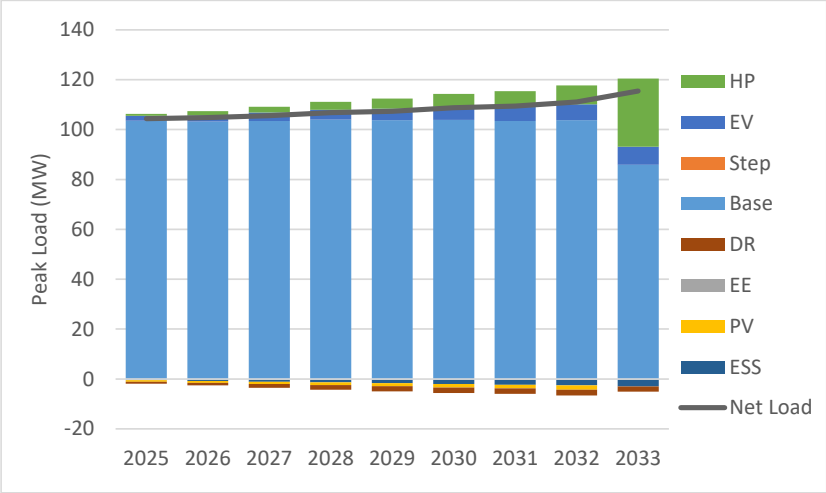


Exhibit UN-ESMP, p. 118.

Figure 7: Unitil Short-Term Cumulative Incremental Load by Load Component

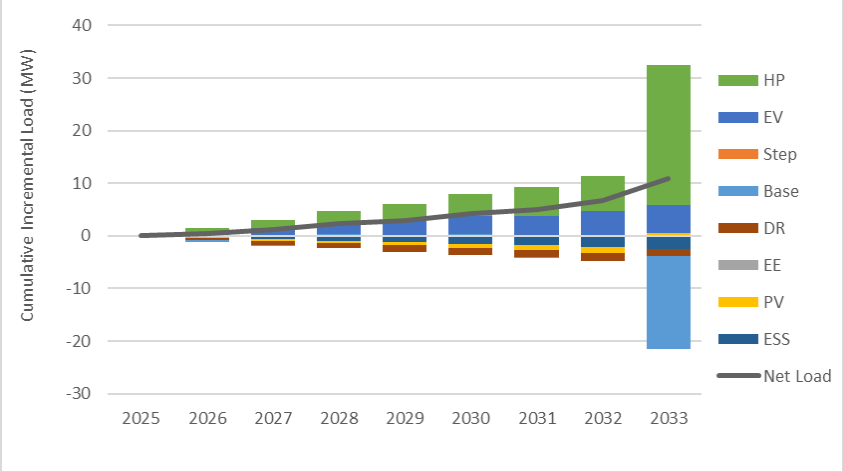


Exhibit UN-ESMP, p. 118.

Unlike National Grid and Eversource, Unitil does not separately account for energy efficiency impacts in its historical or future load assessments; however, Unitil does expect demand reductions from energy efficiency to continue.[26] Unitil does not use the trajectory of the MA CECP forecasts and instead uses the trend of ISO-NE EV adoption forecasts.[27] The short-term forecast does not include managed charging.[28]

[26] Exhibit UN-Forecast-1, p. 13.

[27] Exhibit UN-ESMP, p. 89.

[28] Exhibit UN-ESMP, p. 93.

4.3. Long-Term Forecasts

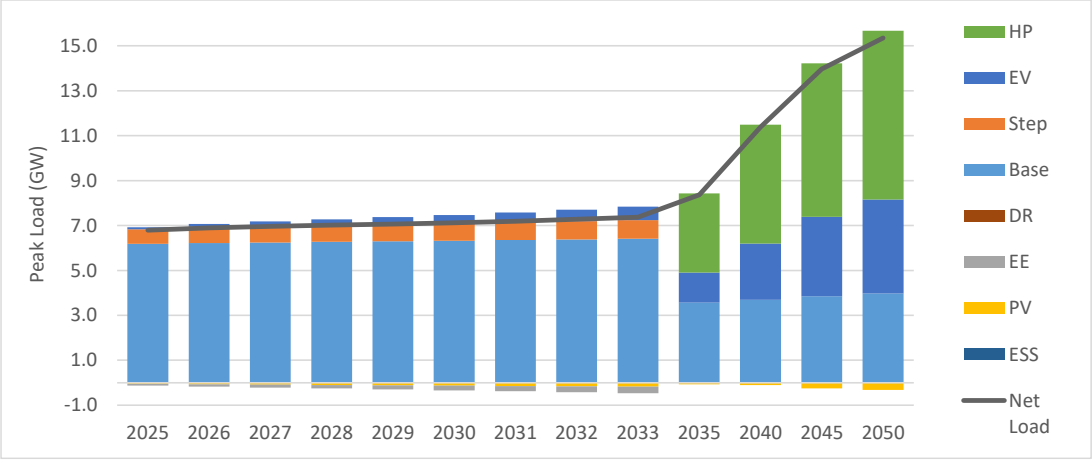
Each EDC provided base, high and low scenarios for each aspect of the long-term forecast to generate a range of possible outcomes for future demand and reflect future uncertainties. The following discussion focuses on the base forecast of each utility, which generally align with the Decarbonization Roadmap *All Options* Pathway and CECP *Phased* scenario.

A key component of the long-term forecasts is the switch from summer- to winter-peaking for each of the EDCs. Eversource becomes winter-peaking by 2035.[29] National Grid becomes winter-peaking in 2036.[30] Unitil becomes winter-peaking in 2033.[31]

Eversource

Figure 8 presents Eversource' short-term and long-term base case peak demand forecast, as well as the underlying assumptions regarding the growth of base loads, step loads, heat pumps, EVs, demand response, energy efficiency, PV, and energy storage. Figure 9 presents Eversource' cumulative incremental load additions from 2025 through 2050. Eversource projects a 3.3 percent CAGR between 2025 and 2050 and a 4.4 percent CAGR between 2033 and 2050. Eversource projects that the system will change from summer-peaking between 2033 and 2035 if statewide goals are achieved.[32] Thus, the long-term forecast is winter-peaking and all of the short-term forecast is summer-peaking.

Figure 8. Eversource Short-Term and Long-Term Peak Load by Load Component



Eversource ESMP, pp. 244, 480.

[29] Exhibit ES-ESMP-1, p. 252.

[30] Exhibit NG-ESMP, pp. 568, 570.

[31] Exhibit UN-ESMP, p. 101.

[32] Exhibit ES-ESMP-1, p. 564.

Figure 9. Eversource Short-Term and Long-Term Cumulative Incremental Load by Load Component

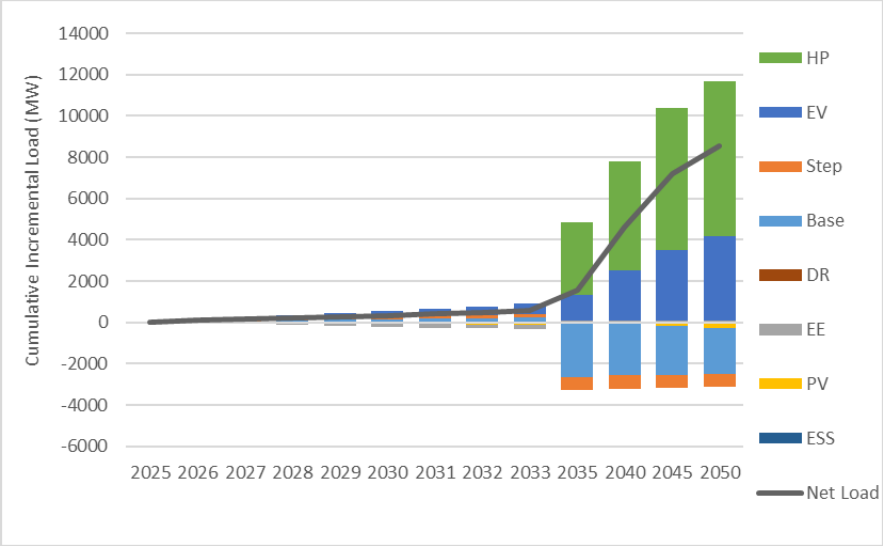


Figure data source: Eversource ESMP, pp. 244, 480.

Once the system becomes winter-peaking, Eversource expects EVs are unlikely to significantly contribute to overall system peak, as they will have finished charging by the time of the early morning peak.[33]

Eversource's baseline analysis assumes EV adoption rates consistent with the *All Options* scenario in the 2050 Roadmap, and it results in approximately 5.4 million EVs statewide by 2050. This forecast is slightly different than MA CECP forecasts due to differences in light-duty versus heavy-duty conversion.[34]

The baseline assumption of managed charging for Eversource is 0 percent for all customers. That is, it assumes that 0 percent of the EV peak demand is shifted off-peak. Eversource also presents scenarios with 20 percent, 50 percent, and 75 percent shifting of EV load to off-peak. Its peak EV load impact does not reflect the sum of all potential EV loads at one time.[35] Eversource's peak EV demand reflects the contribution to peak demand from EVs given that EVs have differing charging times, locations, and energy needs.[36] Eversource presents a series of scenarios for seven different heating scenarios and six different EV scenarios, resulting in 42 total scenarios forecasted.

Eversource uses an adoption propensity model in which consumers who have comparable propensities to adopt heating electrification are assigned to a cluster. These clusters then adopt electrification at variable timescales. Eversource uses available customer demographic information, such as income and

[33] Exhibit ES-ESMP-1, p. 554.

[34] Exhibit ES-ESMP-1, p. 532.

[35] Eversource calculates this value to be 59 GW. Exhibit ES-ESMP-1, p. 532.

[36] Exhibit ES-ESMP-1, p. 532.

home type, to determine the propensity values for each set of customers and for each of its sub-regions.[37]

Eversource does not expect there to be many options for demand response on winter peak heating demand. The difference between desired indoor air temperature and outdoor temperature may last for several hours. Thus, demand response for heat pumps may instead result in load shifting rather than load mitigation.[38]

Eversource assessed the impacts of several scenarios of heating electrification and EV charging in 2050 coincident peak impacts compared to the baseline scenario. Notably, without baseline heating assumptions (no hybrid), the moderate EV and ideal charging scenarios would only lower the total system peak by 3 and 18 percent, respectively.[39]

Eversource considers the effects of the efficiency of heating in buildings along with the impact of building code changes.[40]

Unlike in the short-term load forecast, in the long-term forecast, Eversource assumes all the approved CIPs and CIPs pending approval will be built.[41] Eversource's modeled buildout of PV is that once all substation upgrades are made at lowest cost, buildout will occur where land is cheapest.[42] Eversource assumes solar capacity and storage capacity matches that from the *All Options* scenario.[43]

National Grid

Figure 10 presents National Grid's base case peak demand forecast from 2025 through 2050, as well as the underlying assumptions regarding the growth of base loads, step loads, heat pumps, EVs, demand response, energy efficiency, PV, and energy storage. Figure 11 presents National Grid's cumulative incremental load additions from 2025 through 2050. National Grid projects a 3.0 percent CAGR between 2025 and 2050, and a 3.2 percent CAGR between 2033 and 2050. National Grid switches from a summer-peaking system to a winter-peaking system in 2036. Thus, the first year of the long-term forecast is summer-peaking while all other years in the long-term forecast are winter-peaking.

[37] Exhibit ES-ESMP-1, p. 497.

[38] Exhibit ES-ESMP-1, pp. 504-505.

[39] Exhibit ES-ESMP-1, p. 483.

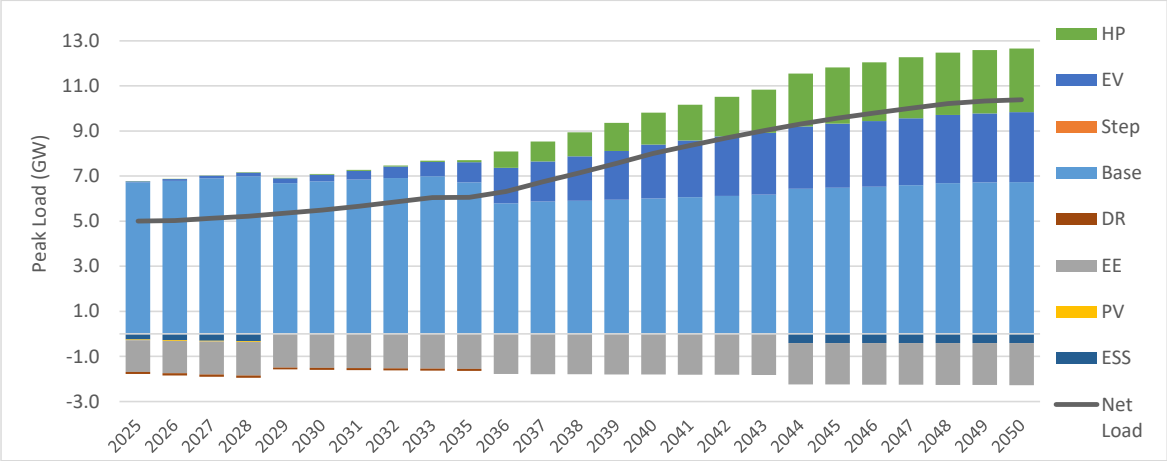
[40] Exhibit ES-ESMP-1, pp. 503-504.

[41] Exhibit ES-ESMP-1, p. 534.

[42] Exhibit ES-ESMP-1, p. 534.

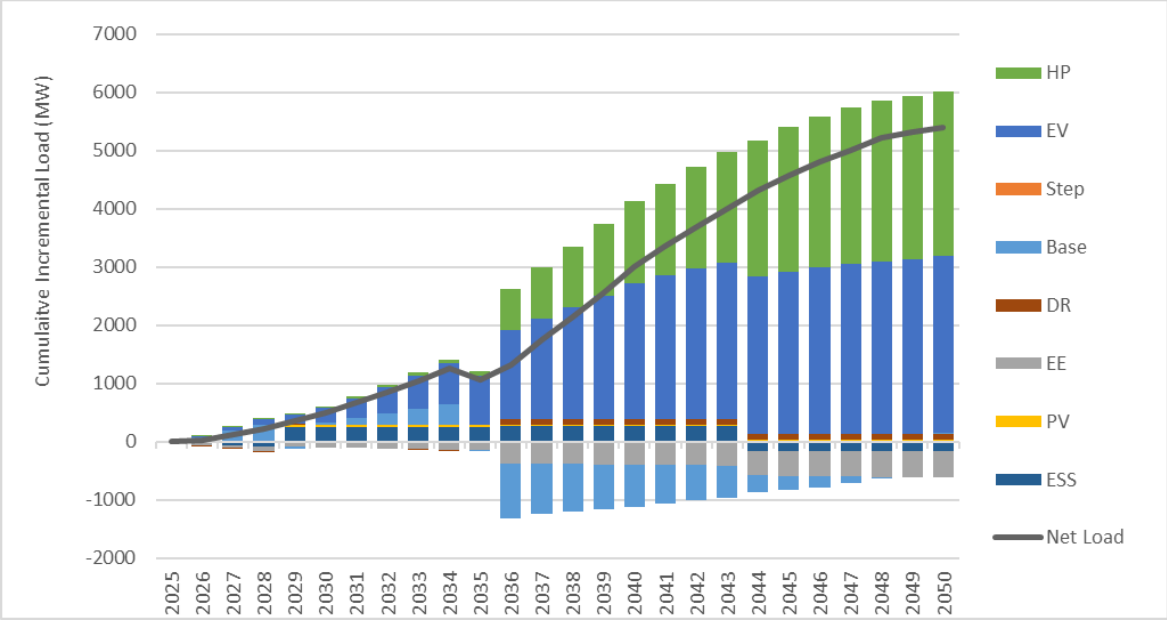
[43] Exhibit ES-ESMP-1, p. 542.

Figure 10. National Grid Short-Term and Long-Term Peak Demand by Load Component



National Grid ESMP, pp. 215, 568, 570.

Figure 11. National Grid Short-Term and Long-Term Cumulative Incremental Load by Load Component



National Grid ESMP, pp. 215, 568, 570.

National Grid forecasts peak load reductions from demand response will continue to grow through 2035. After 2035, the system switches to winter-peaking, and National Grid assumes no demand response impacts on peak load. Thus, because demand response impacts are lower than 2025 impacts, post 2035, the cumulative incremental impacts of demand response on peak demand are positive.

Unlike Eversource, which assumes no managed EV charging, National Grid assumes that 75 percent of at-home charging occurs outside of peak periods, while away-from-home charging is unmanaged. The

result is a 3.5 percent reduction in load by 2050 because of managed charging.[44] National Grid presents a low, base, and high forecast of EV adoption along with all other DERs in its load forecasting appendix.

National Grid bases its heat pump adoption on the CECP *Phased* scenario.[45] National Grid does not include building code changes in its assessment of heating demand and does not include demand response related specifically to heating, even for hybrid systems.[46,47] National Grid assumes all regions adopt heat pumps at the same rate.

National Grid assumes that wholesale demand response is not dispatched.[48] It adds wholesale demand response back into its load forecast due to not being in control of when the events occur. National Grid expects its retail demand response to double in size from 101 MW in 2022 to 222 MW in 2050, though none of this is assumed to occur during the winter peak.[49]

Unitil

Figure 12 presents Unitil's base case peak demand forecast from 2025 through 2050, as well as the underlying assumptions regarding the growth of base loads, step loads, heat pumps, EVs, demand response, energy efficiency, PV, and energy storage. Figure 13 presents Unitil's cumulative incremental load additions from 2025 through 2050. Unitil projects a 5.3 percent CAGR between 2025 and 2050, and a 7.3 percent CAGR between 2033 and 2050. Unitil switches from a summer-peaking system to a winter-peaking system in 2033. Thus, all years of the long-term forecast are winter-peaking.

[44] Exhibit NG-ESMP, p. 400. and Exhibit NG-Forecast-1, p. 28.

[45] Exhibit NG-ESMP, p. 221.

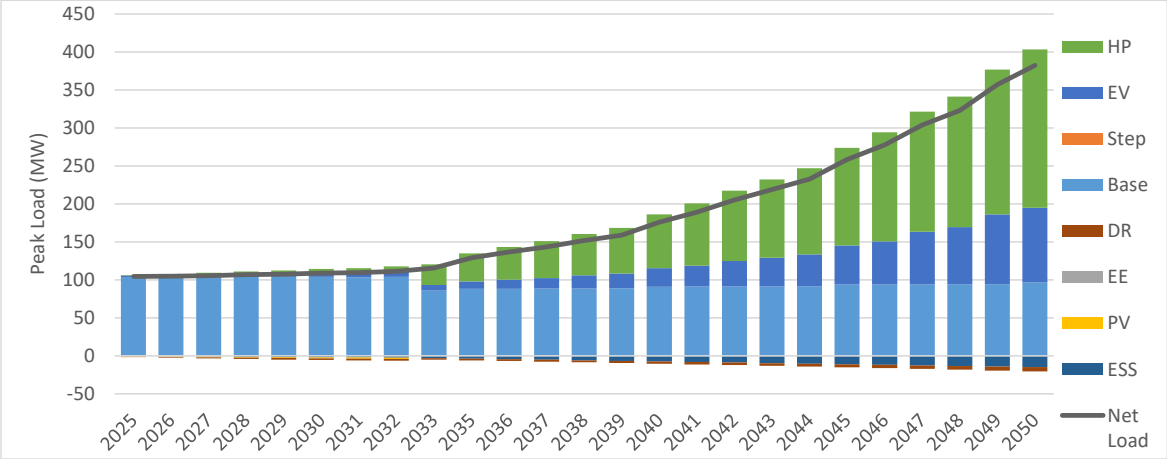
[46] Exhibit NG-ESMP, p. 396.

[47] Exhibit NG-ESMP, p. 397.

[48] Exhibit NG-ESMP, p. 546.

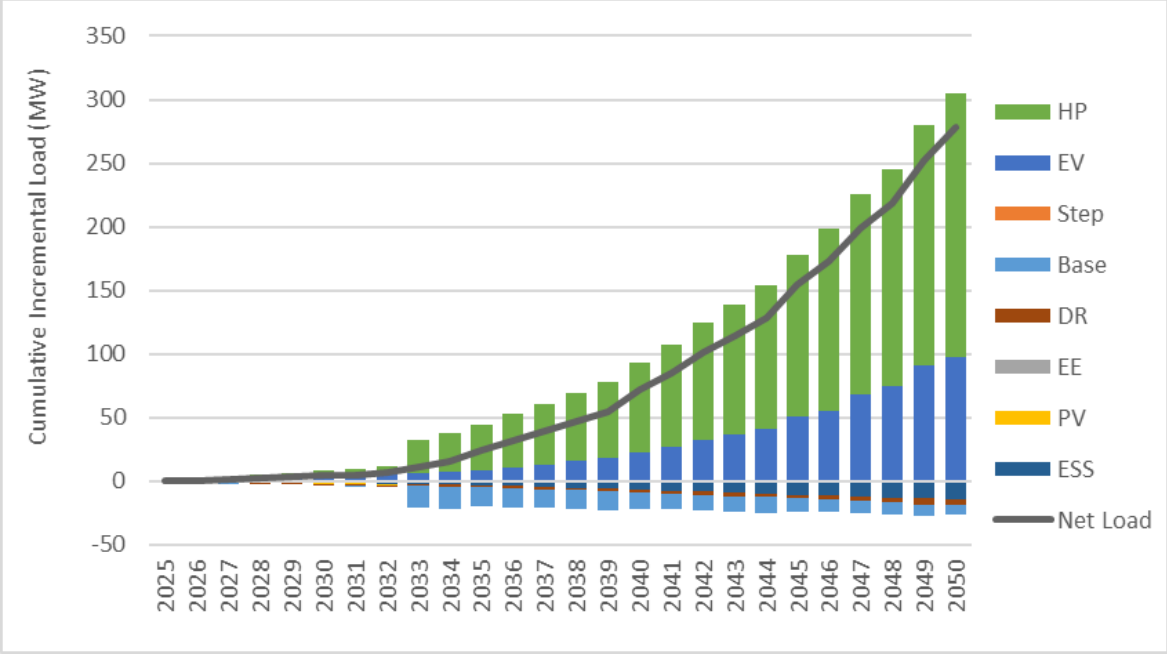
[49] Exhibit NG-ESMP, p. 547.

Figure 12. Unitil Short-Term and Long-Term Peak Demand by Load Component



Unitil ESMP, pp. 118, 210.

Figure 13. Unitil Short-Term and Long-Term Cumulative Incremental Load by Load Component



Unitil ESMP, pp. 118, 210.

4.4. Consistency With Clean Energy Climate Plans

Background

The *Global Warming Solutions Act* (GWSA) requires Massachusetts to achieve net zero GHG emissions by 2050, and to achieve gross reductions of 85 percent below 1990 levels. Pursuant to the authority granted by the GWSA, the Executive Office of Energy and Environmental Affairs (EEA) adopted the statewide 2050 limit of net zero and established an interim 2025 statewide GHG emission limit of 33

percent below 1990 levels and an interim 2030 limit of 50 percent below 1990 levels. Furthermore, the EEA also established sector-specific sub-limits for 2025, 2030, and 2050, as shown in Table 2. [50,51]

Table 2. Sector-specific greenhouse gas emissions sub-limits shown as percentage reductions compared to 1990 levels

Sector	2025	2030	2050
Residential Heating and Cooling *	29%	49%	95%
Commercial and Industrial Heating and Cooling *	35%	49%	92%
Transportation	18%	34%	86%
Electric Power	53%	70%	93%
Natural Gas Distribution and Service	82%	82%	72%
Industrial Processes	-449%	-281%	-27%

** Due to how emissions are tracked in the statewide GHG inventory, emissions associated with the use of electricity for cooling in residential, commercial, and industrial buildings are covered under the Electric Power sublimit.*

The emissions sub-limits are based on the CECP for 2025 and 2030 and the CECP for 2050. Both plans establish clear pathways for achieving the emissions sub-limits and build upon modeling done for the Massachusetts 2050 Decarbonization Roadmap study, which was commissioned by the EEA to understand tradeoffs across different decarbonization pathways to achieve net zero GHG emissions by 2050.

The CECPs represent Massachusetts state policy and strategies to achieve net zero GHG emissions by 2050. Many of these strategies (including electrification of buildings and transportation and increased deployment of clean energy resources such as wind, solar, and storage) will require improvements and modifications to the electric system. Therefore, alignment between the ESMPs and the Massachusetts decarbonization strategies and policies detailed in the CECPs is critical.

Peak Demand

Figure 14 compares the base peak demand forecasts from the ESMPs and the 2050 CECP *Phased* scenario. Note that the ESMP peak demand forecasts may differ from the CECP *Phased* scenario forecast for a variety of reasons, including differing assumptions about key aspects of the load forecast. As summarized in Table 1, while the EDCs align some aspects of their base forecasts with the CECP *Phased* scenario, they also rely on other scenarios (including CECP *Hybrid*, CECP *High Electrification*, CECP *Full Electrification*, and 2050 Roadmap *All Options* forecasts).

[50] Massachusetts Executive Office of Energy and Environmental Affairs. 2022. 2025 and 2030 GHG Emissions Limit Letter of Determination. https://www.mass.gov/doc/2025-and-2030-ghg-emissions-limit-letter-of-determination/download.

[51] Massachusetts Executive Office of Energy and Environmental Affairs. 2022. 2050 GHG Emissions Limit Letter of Determination. https://www.mass.gov/doc/determination-letter-for-the-2050-cecp/download.

In order to compare the combined EDC peak demand forecast and the CECP forecast, we multiplied the CECP forecast by the percentage of 2022 statewide electricity sales attributable to the EDCs.[52] Similarly, the CECP utility-specific forecasts were estimated based on each EDC's percentage of statewide electricity sales in 2022.[53]

While the ESMPs and CECP peak load magnitudes are similar in 2025 and 2030, they diverge significantly afterward. In 2040, the combined EDCs total is 22 percent greater than the CECP forecast, and in 2050, this difference increases to 31 percent.

Figure 14. Comparison of CECP Phased Scenario and ESMP Peak Demand Modeling Results by Utility

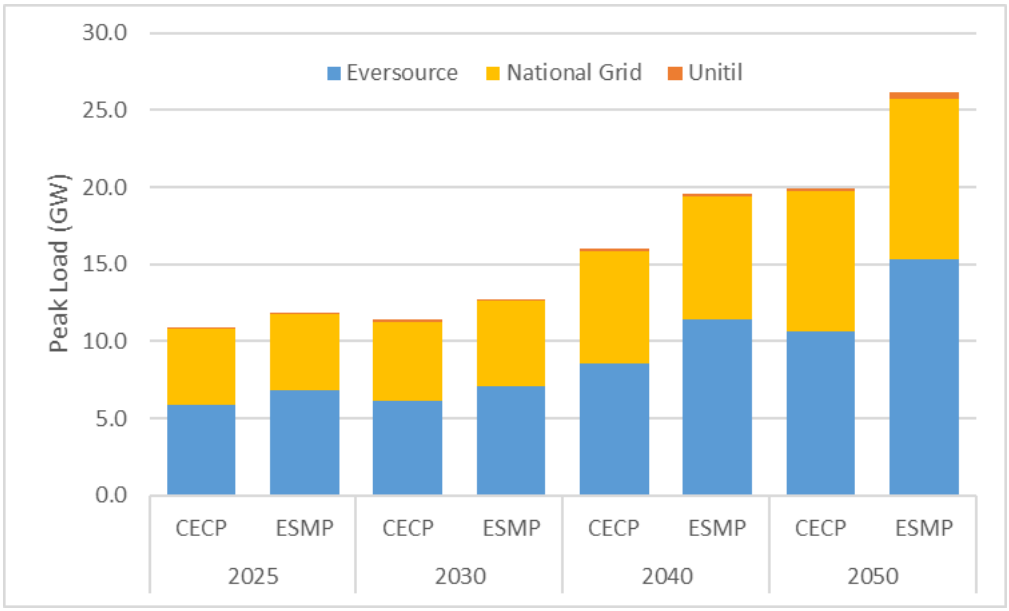


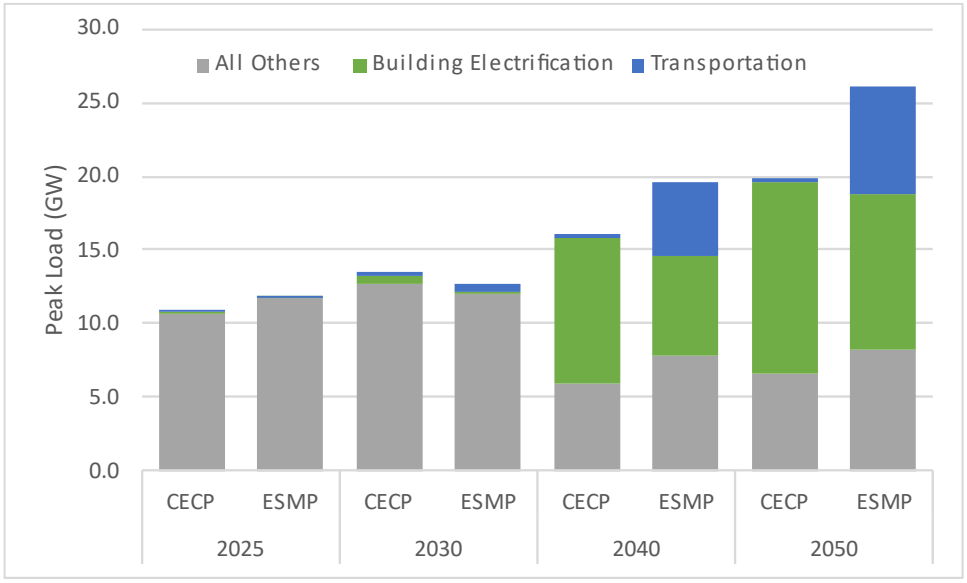
Figure data source: Eversource ESMP, pp. 244, 480; National Grid ESMP, pp. 215, 568, 570; Unitil ESMP, pp. 118, 210.

Figure 15 compares the assumptions for short-term load drivers (building electrification, EVs, and all others) used in the CECPs and the ESMPs. As indicated, electrification and EVs do not play a large role in peak impacts in 2025 or 2030. In contrast, in both the ESMPs and CECP, electrification loads are the primary drivers of peak demand in 2040 and 2050. However, the ESMPs project a much larger impact of electrification compared to the CECP.

[52] The EDCs made up 85 percent of 2022 statewide electricity sales. Source: U.S. Energy Information Administration, Form EIA-861, Annual Electric Power Industry Report.

[53] The percentage of 2022 statewide electricity sales by EDC are: Eversource: 45 percent; National Grid: 38 percent; Unitil: 1 percent. Source: U.S. Energy Information Administration, Form EIA-861, Annual Electric Power Industry Report.

Figure 15. Comparison of CECP Phased Scenario and ESMP Assumptions of Load Drivers



Note: Demand from both space and water heating is included in building electrification for the CECP targets, whereas the ESMP estimates only include demand from space heating.

Residential Heat Pumps

Figure 16 presents each EDC's projected number of residential heat pumps installed in each five-year period between 2025 and 2050. It also displays the total residential heat pumps installed for all EDCs combined as compared to the CECP *High Electrification* and *Full Electrification* pathways.

Figure 16. Residential Heat Pump Projection

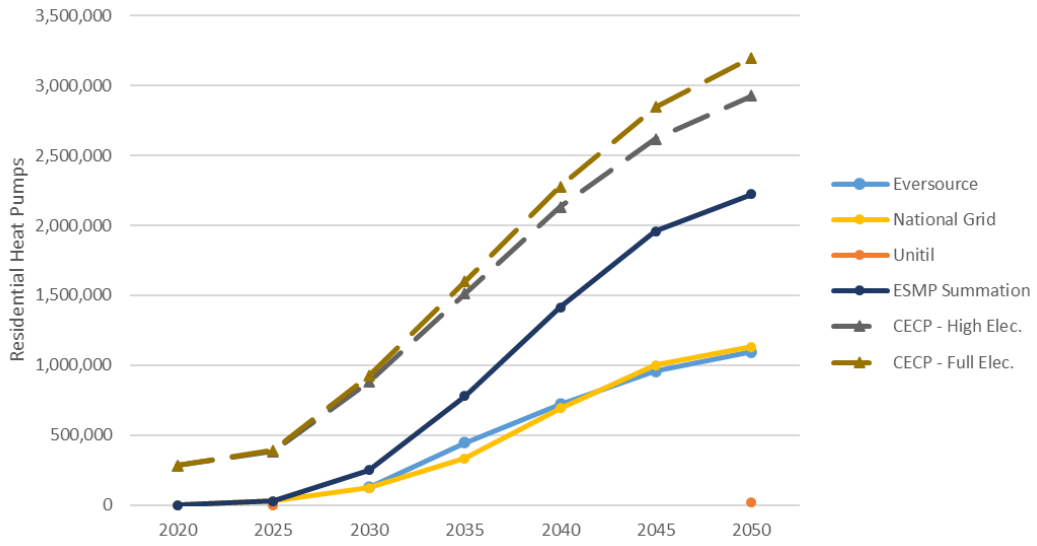


Figure data source: Eversource ESMP, pp. 482, 500, 503. Eversource's projection is based off of its assumed statewide projection from p. 482.; National Grid ESMP, p. 624; Unitil ESMP p. 34, 118; MA CECP Workbook of Energy Modeling Results Tab 3. Residential Space Heating Stocks including fuel/electric hybrid, air-source heat pump, and ground-source heat pumps.

Eversource states that its base case forecast follows the Decarbonization Roadmap's *All Options* forecast which is most like the *High Electrification* forecast from the CECP.[54] The 2050 Decarbonization Roadmap targets 2.0 million whole-home air-source heat pumps (ASHP) and 0.20 million ground-source heat pumps (GSHP).[55] Eversource uses the *All Options* ASHP target as its all-heat pump target which includes hybrid systems, ASHPs, and GSHPs, even though the ASHP target is meant to be fulfilled only by whole-home ASHPs.[56] Additionally, the CECP *High Electrification* 2050 target for whole-home ASHPs is 2.18 million but also includes 0.54 million hybrid systems and 0.21 million GSHPs.[57] The CECP *High Electrification* forecast projects a total stock of 2.9 million fuel/electric hybrid, ASHP, and GSHP systems installed in 2050.

Unitil uses the same target at a share of 1 percent of the statewide target.[58]

National Grid states that its base case forecast follows the *Phased* CECP pathway.[59] The CECP *Phased* pathway projects a total stock of 2.8 million fuel/electric hybrid, ASHP, and GSHP systems installed in 2050. However, National Grid's pro-rata stock of heat pumps of 1.34 million at an assumed pro-rata share of 45 percent equates to a statewide target of 2.98 million residential heat pumps, rather than the calculated 2.8 million from the CECP *Phased* pathway.[60]

While the emissions sector sub-limits are based on the CECP *Phased* scenario,[61] D.P.U. Order 20-80 indicated that there should be minimal hybrid heat pump systems by 2050. Although the Department did not adopt any specific scenario, it did largely reject a hybrid electrification approach by determining that ratepayer dollars used for hybrid heating systems should be separately tracked and that funds should be directed to targeted electrification and networked geothermal.[62] The Order also highlights ways that alternative fuels such as renewable natural gas and hydrogen are not appropriate to rely on to

[54] Exhibit ES-ESMP-1, p. 507.

[55] Clean Energy and Climate Plan for 2050, p. 23.

[56] Exhibit ES-ESMP-1, p. 482.

[57] Massachusetts Workbook of Energy Modeling Results, Tab 3. Residential Space Heating.

[58] Exhibit UN-ESMP, p. 191.

[59] National Grid, p. 638.

[60] Exhibit NG-ESMP, pp. 543, 545. National Grid did not provide a pro-rata share specifically to heat pumps. 45% is the load share used to compare to the Solar-Photovoltaic target.

[61] Massachusetts Clean Energy and Climate Plan for 2025 and 2030, p. 26. and Massachusetts Clean Energy and Climate Plan for 2050, p. 19.

[62] D.P.U. Order 20-80, p. 81.

meet the Commonwealth's goals.[63] The *Full Electrification* scenario is the only scenario with a minimal stock of gas, liquid fuels, fuel/electric hybrid, and wood stove systems in 2050.[64]

Therefore, the CECP *Full Electrification* scenario, which assumes almost all households convert to full heat pumps, may better represent the target for the future number of heat pumps statewide. If there are minimal hybrid systems and gas and liquid fuel heating systems in 2050, the EDC's forecasts would be underestimating the total number of heat pumps.

Figure 17 presents the incremental impact on peak load of an additional heat pump, and how that changes over time in each of the EDC forecasts. The change in 2035 is driven by when the EDCs switch from a summer- to winter-peaking system; Eversource has a contribution of 0 kW per heat pump in 2025 and 2030 due to the utility being summer-peaking at that time. Notably, Eversource projects a much larger peak load contribution per heat pump compared to National Grid once both utilities are winter-peaking, and Unitil projects an even larger contribution.

Figure 17. Ratio between Residential Heat Pump Adoption and Contribution of Residential Heat Pumps to Peak Load

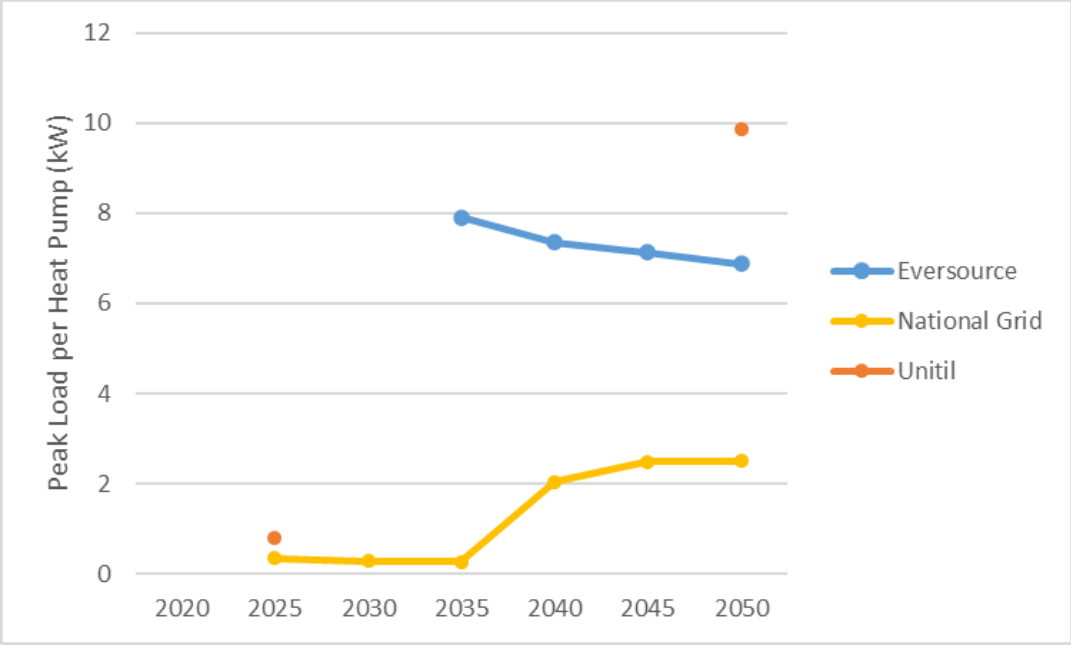


Figure data source: Eversource ESMP, pp. 280, 480, 482, 500, 503; National Grid ESMP, pp. 218, 568, 570, 624; Unitil ESMP p. 34, 118, 210.

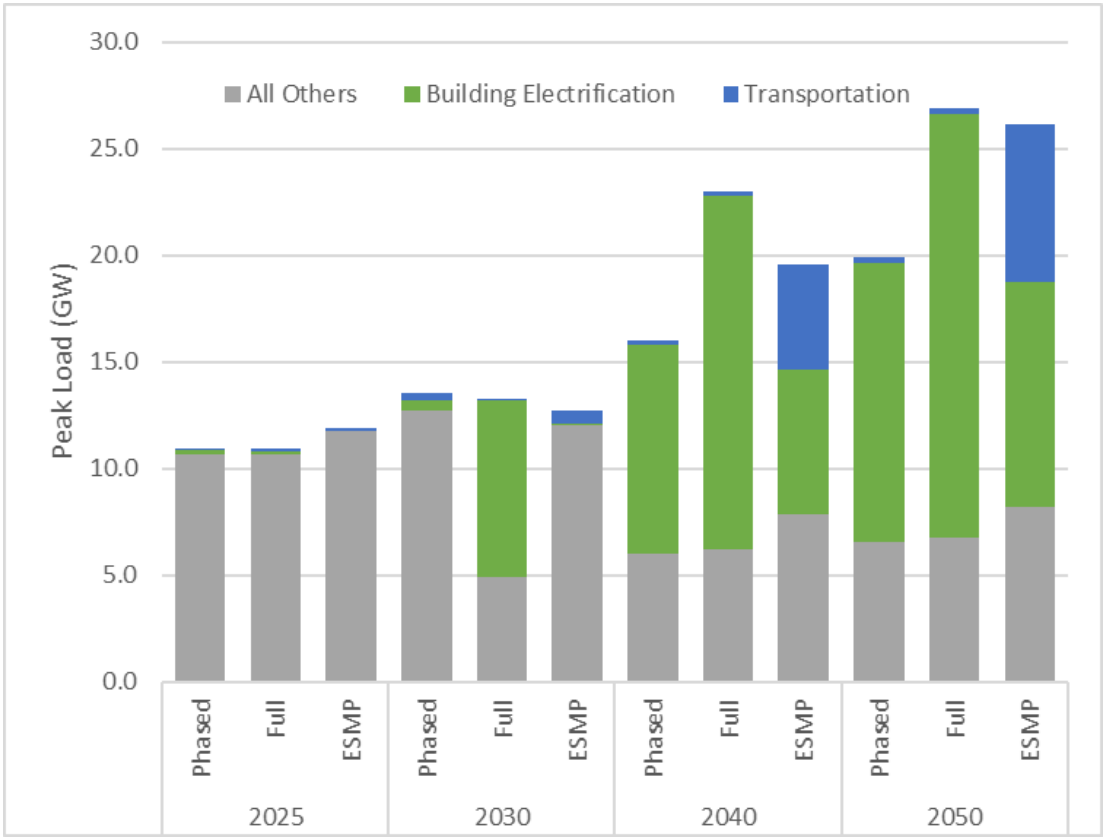
[63] D.P.U. Order 20-80, p. 84.

[64] The *Full Electrification* scenario has 10.1 percent of space heaters that are not air-source or ground-source heat pumps, compared to 32.6 percent for *High Electrification* and 35.6 percent for *Phased*, respectively.

Eversource's base case commercial heating follows the *All Options* scenario.[65] Eversource does not include commercial GSHPs while there is an *All Options* Commercial GSHP target.[66] Unitil's commercial heating assumptions follow the *All Options* scenario.[67] Eversource and Unitil simply compute their respective pro-rata share from the *All Options* Commercial Heating targets. National Grid's commercial heating follows the CECP *Phased* scenario, with the 58 percent penetration stated by National Grid matching the penetration rate from the MA CECP *Phased* scenario.[68]

The choice of space heating scenario has a profound effect on forecasting targets. Figure 18 is an updated version of Figure 15 with the addition of the *Full Electrification* scenario. Notably, the CECP *Full Electrification* scenario models a winter peak in 2030, driving a high peak demand contribution from building electrification. The joint ESMP forecasts shift from being too high to too low based on the updated choice of CECP scenario target.

Figure 18. Comparison of CECP Phased and Full Electrification Scenarios and ESMP Peak Demand by Load Type



Note: Demand from both space and water heating is included in building electrification for the CECP targets, whereas the ESMP estimates only include demand from space heating.

[65] Exhibit ES-ESMP-1, p. 507.

[66] Exhibit ES-ESMP-1, p. 507, MA CECP for 2050, p. 23.

[67] Exhibit UN-ESMP, p. 191.

[68] Exhibit NG-ESMP, p. 545. MA Workbook of Energy Modeling Results, Tab 4. Commercial Space Heating – Stock.

Electric Vehicles

Rates of electric vehicle adoption are consistent across all CECP scenarios. The CECP assumes zero emission vehicles make up 100 percent of light-duty vehicles sales from 2035 onwards. As shown in Figure 19, the EDC combined EV forecast aligns with the CECP forecast.

Figure 19. Light-Duty Electric Vehicle Adoption

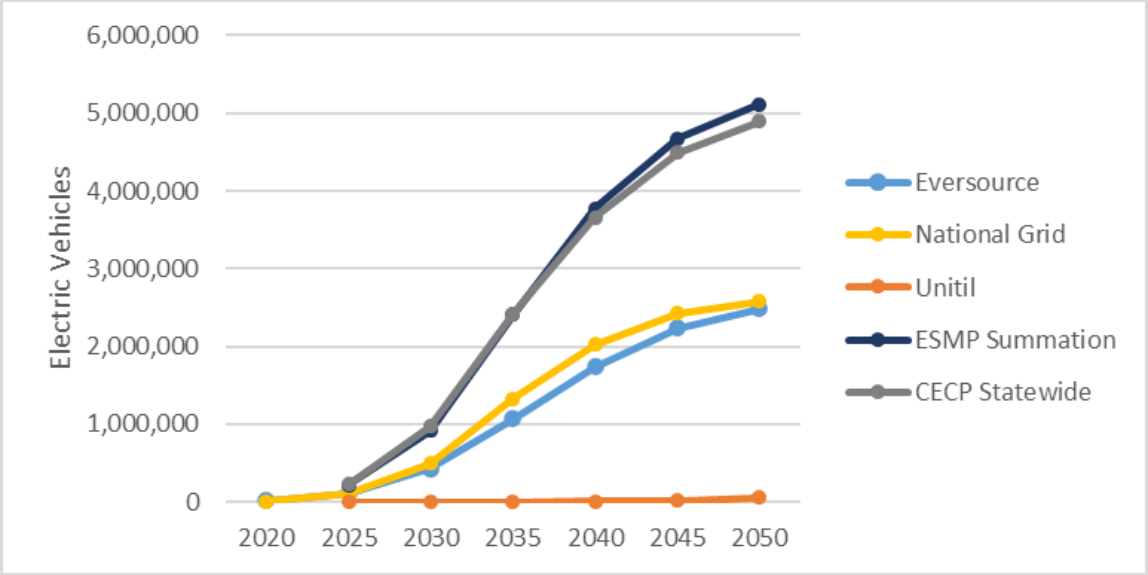


Figure data source: Eversource ESMP, p. 245, 482; National Grid ESMP, p. 622; Unitil ESMP, p. 205; MA CECP Workbook of Energy Modeling Results, Tab 5. Vehicles – Stocks.

As shown in Figure 20, the increase in peak demand due to an additional EV being added to an EDC's service territory changes over time in each of the EDC forecasts. While the per-vehicle impact on peak load in Eversource's and National Grid's forecast increases over time, the per-vehicle impact on peak load decreases over time in Unitil's forecast.

Figure 20. Ratio of Peak Load Contribution from EVs to Forecast Count of EVs

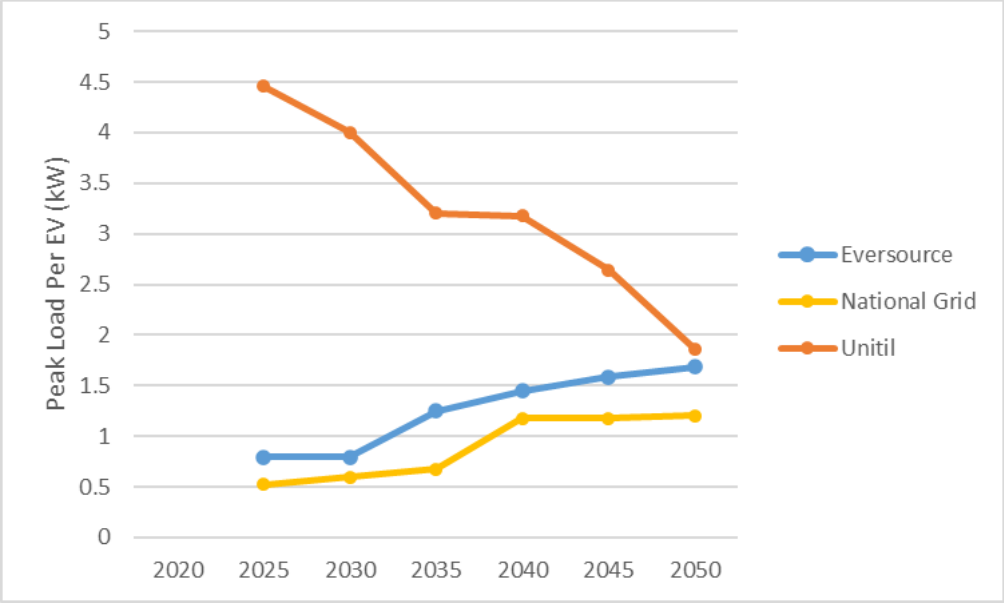


Figure data source: Eversource ESMP, p. 244, 245, 480, 482; National Grid ESMP, pp. 215, 568, 570, 622; Unitil ESMP, pp. 118, 205, 210.

The ESMP's estimate of EV contribution to system peak is more than 20 times larger than the CECP 2040 and 2050 estimate. This difference is driven by differing assumptions in the charging profiles of EVs and unmanaged versus managed charging. The EDCs forecast a 2050 EV coincident peak contribution of 7.4 GW which, based on Eversource's assumptions, is equivalent to 12.5 percent of all the EVs in the state charging at the same time.[69] It is important to note the EDCs base case assumes little managed charging while the CECP forecast assumes 75 percent of charging is managed. Thus, if 0 percent of charging were managed in the CECP forecast, this would result in 1.4 GW of Transportation Peak Load, which is still much lower than the 7.4 GW of the EDCs.

Eversource models its base case scenario for medium- and heavy-duty EV adoption through the *All Options* pathway, with a 55 percent penetration in 2050. This is notably lower than the MA CECP adoption pathways which have a 73 percent penetration.[70] Unitil follows the same *All Options* forecast as Eversource, with about 1 percent attributable to Unitil.[71] National Grid models continuous growth of medium-duty EVs, heavy-duty EVs, and E-buses sales through 2050. All the medium-duty vehicles and buses sold in 2050 are electric in National Grid's forecast.[72] National Grid's projection is a more

[69] If all the EVs forecasted to be on the road in 2050 charged simultaneously, peak EV demand would be approximately 59 GW, assuming light-duty vehicles charge at a standard level 2 charger at 7.6 kW each, and medium-/heavy-duty vehicles charge at 50 kW. Exhibit ES-ESMP-1, p. 532.

[70] Exhibit ES-ESMP-1, p. 532.

[71] Exhibit UN-ESMP, p. 191.

[72] Exhibit NG-ESMP, pp. 636 – 637.

aggressive electrification plan than the MA CECP scenarios since the MA CECP scenario includes sales of Hydrogen Fuel Cell Medium-Duty Vehicles and Hydrogen Transit Buses in 2050.[73]

Solar Photovoltaic

Eversource and National Grid based their PV forecasts off the Decarbonization Roadmap *All Options* scenario, which results in a lower estimate for PV capacity compared to the 2050 CECP *Phased* scenario 2030 benchmark.[74,75]

Table 3. Comparison of CECP benchmarks and forecasted PV capacity by EDC

EDC	2030 MW	2050 MW
Eversource	2,500	9,700
National Grid	3,155	10,400
Unitil	13	250
All EDCs	5,668	23,050
Decarbonization Roadmap (*All Options*)	5,600	23,200
MA 2050 CECP (*Phased* scenario)	8,360	26,930

Exhibit ES-ESMP-1 p. 209, p. 482; Exhibit NG ESMP, p. 90; Exhibit UN-ESMP-1, p. 102.

Storage

Eversource assumes its proportional component of storage capacity for the *All Options* scenario.[76] National Grid's energy storage forecast is between the *All Options* and *100% Renewable* scenario from the 2050 roadmap. It claims 45 percent of the share of the state target and *All Options* energy storage forecasts.[77] National Grid states that energy storage is expected to move towards a supply-side resource.[78] The *All Options* pathway assumes 1.8 GW of pumped hydro storage that is maintained until 2050 plus any additional battery storage.[79]

[73] MA CECP Workbook of Energy Modeling Results, Tab 5. Vehicles.

[74] Exhibit ES-ESMP-1, p. 209.

[75] Exhibit NG-ESMP, p. 543. National Grid assumes its share of the statewide target is 45 percent, which is based on National Grid's share when the SMART program opened.

[76] Exhibit ES-ESMP-1, p. 544.

[77] Exhibit NG-ESMP, p. 401.

[78] Exhibit NG-ESMP, p. 403, 547.

[79] Energy Pathways for Deep Decarbonization Technical Report, p. 55.

Table 4. Comparison of CECP benchmarks and forecasted energy storage capacity by EDC

EDC	2030 MW	2050 MW
Eversource	480	2,600
National Grid	N/A	2,500
Unitil	N/A	60
All EDCs	N/A	5,160
Decarbonization Roadmap (*All Options*)	1,800	3,000
MA 2050 CECP (*Phased* Scenario)	2,900	5,790

Exhibit ES-ESMP-1 p. 209, p. 482; Exhibit NG ESMP, p. 90; Exhibit UN-ESMP-1, p. 102, MA Energy Pathways to Deep Decarbonization Pathway Technical Report p. 55.

Energy Efficiency

The 2050 Decarbonization Roadmap does not include energy efficiency as a unique resource but rather incorporates efficiency savings over time that are netted from energy usage.[80] The CECP does not separately model energy efficiency as a resource. However, the report includes 1.3 million energy efficiency residential envelope retrofits, and a 1 percent increase year over year in energy efficiency in Industrial Energy.[81]

Demand Response

The 2050 Roadmap does not model demand response and it is not included as a resource in the MA CECP Workbook of Modeling Results.

4.5. Consultant Comments

The EDC forecasts might be generally aligned with assumptions in the Decarbonization Roadmap and the CECPs. However, while the EDCs in some cases provide detail about their assumptions, generally, they do not provide sufficient explanation about why and how they used various forecasts from the Roadmap and CECPs to inform their own forecasting.

In the short term (through 2033), peak demand is primarily driven by base load, and the ESMP forecasts generally align with the CECP Phased scenario. After 2033, peak demand increases rapidly, driven largely by increased electrification. While the EDC's forecasts for residential heat pump adoption and electric vehicle adoption generally align with their respective CECP scenario forecasts, their per-heat-pump contribution to peak demand varies significantly from the CECP.

The peak demand forecast for each of the ESMPs in 2040 and 2050 is significantly higher than the comparable peak demand forecast in the CECP Phased scenario. This misalignment may be driven in part

[80] MA CECP for 2050, p. 131.

[81] MA CECP for 2050, pp. 23, 25.

by different assumptions about the contribution of EVs to peak demand. Whereas the CECP results suggest EVs will contribute to 2 percent of peak demand in 2050, in the ESMPs, EVs contribute to 28 percent of peak demand.

While part of this difference may be explained by different assumptions about managed charging, it does not explain all the difference. For example, Eversource found that ideal EV charging in which 75 percent of EV load is shifted off-peak (consistent with CECP managed charging assumptions) results in an 18 percent reduction in total system peak load, not just EV-related peak-load.[82] For comparison, the 2050 combined EDC peak demand estimate is 31 percent higher than the EDC share of the CECP forecasted peak.

The lack of uniform forecasting assumptions across ESMPs makes it difficult to compare the reasonableness of EDC forecasts to statewide targets. Each EDC chooses the forecasting scenario that they deem most appropriate for each technology. Consequently, it is difficult to compare aggregate ESMP forecasts to CECP reference forecasts where every technology follows a single scenario and cannot be separated into separate scenarios for each technology. In particular, the Massachusetts Workbook of Energy Modeling Results does not contain the *All Options* pathway which the EDCs chose for many forecasting decisions.

The EDCs under-forecast the number of heat pumps likely to be installed over the long term. No EDC follows the *Full Electrification* forecast which most closely follows the directive of D.P.U. Order 20-80. This results in an under-forecast of adopted heat pumps as well as a slower adoption of heat pumps.

In conclusion, the EDC baseline long-term electrification forecasts include assumptions about EV charging and heat pumps which result in large system peak impacts. By basing their baseline scenario off non-managed EV charging (resulting in increased peak demand) but insufficient numbers of heat pumps (resulting in reduced peak demand), it is unclear if the EDCs are overestimating or underestimating the future impact of electrification.

[82] Exhibit ES-ESMP p. 483.

5. RELIABILITY AND RESILIENCE

Summarizing EDC reliability and resilience spending for 2025–2029 and beyond is complicated. Though reliability and resilience spending is projected to be one of the largest types of capital spending for 2025–2029 for Eversource and National Grid, these EDCs do not generally present this spending for Department approval in their ESMPs. Instead, in large part, the EDCs explain they will present this spending in general rate cases (see Chapter 11).

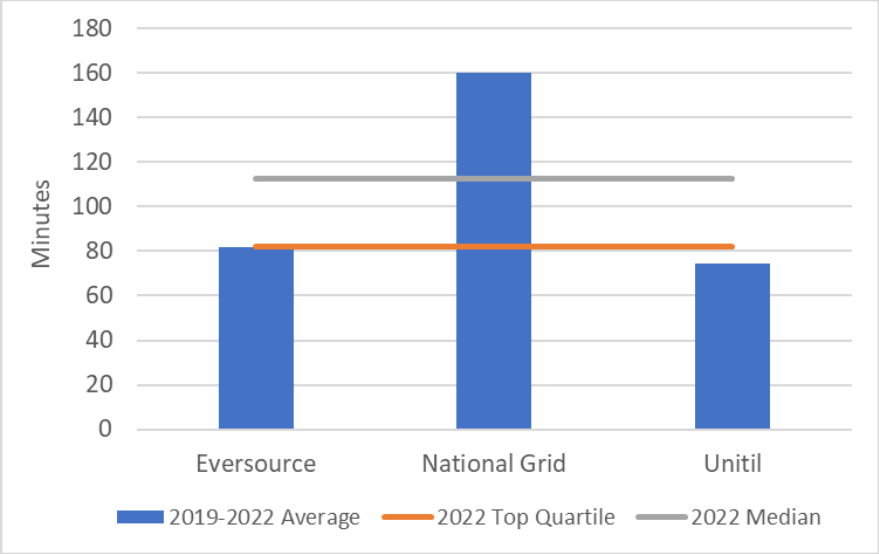
Eversource splits out resilience spending separately from reliability spending and includes only the resilience component in its ESMP investments. National Grid places all reliability and resilience capital spending for 2025–2029 into its Core investments to be recovered through its current rate case. However, it combines those investments with other Core investments, making it impossible to assess the viability of each type of investment. Nonetheless, we use the limited information provided in the ESMPs to provide comments on the role of reliability and resilience in the proposed ESMP and non-ESMP investments.

5.1. Reliability vs. Resilience

In some places, the ESMPs identify reliability and resilience as two very different issues, but there is often overlap or unclear distinctions between the two. We associate reliability performance with average service interruption frequency and duration during relatively fair weather (blue sky), and grid resilience with average service interruption frequency and duration under all weather conditions—including severe storms and other major events. The frequency and duration metrics used to measure reliability remove the outages associated with severe storms and major events, while the metrics used to measure resilience do not remove those outages.

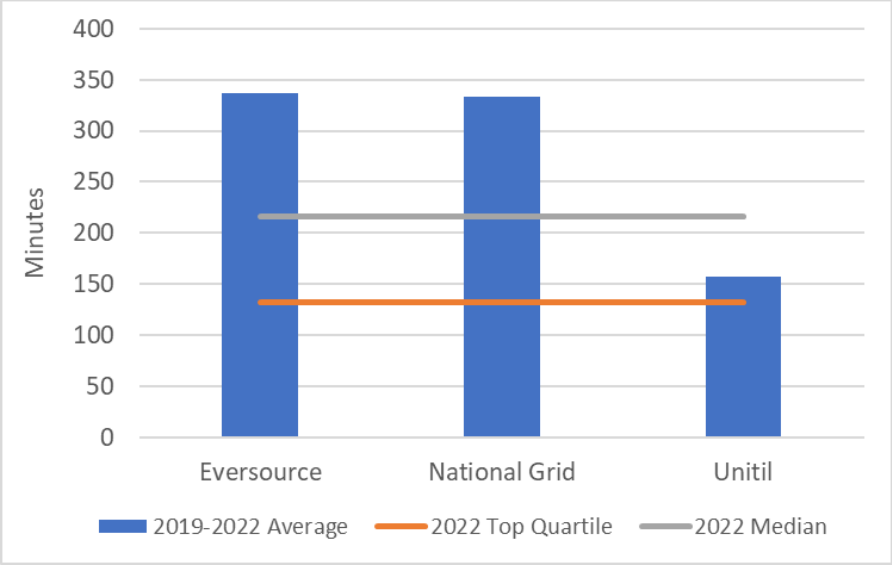
Figure 21 presents the average service interruption duration for the three Massachusetts EDCs and for other U.S. utilities on average, with outages due to storms and major events removed (blue sky). Figure 22 presents the same information with the outages due to storms and major events included. (Note that shortage duration of outages is preferable.)

Figure 21. Average Service Interruption Duration – Blue Sky: EDCs versus U.S. IOUs



Reliability performance data reported by U.S. utilities, from U.S. Energy Information Administration (EIA) Form 861, Schedule 3, part B, 2019-2022.

Figure 22. Average Service Interruption Duration – Including Storms: EDCS versus U.S. IOUs



Reliability performance data reported by U.S. utilities, from U.S. Energy Information Administration (EIA) Form 861, Schedule 3, part B, 2019-2022.

This information suggests that the EDCs should focus on the elimination of long-duration service interruptions caused by storms over other reliability or resilience goals. While EDC blue sky service interruption duration is generally better than that of U.S. investor-owned peers for Eversource and Unitil, average service interruption duration including storms is generally worse than other U.S. investor-

owned utilities.[83] (National Grid's relatively poorer blue sky reliability performance should not be perceived as carte blanche to justify large amounts of reliability-related capital spending. An understanding of the factors that contribute to National Grid's relatively poorer blue sky reliability performance is required before determining that capital-intensive solutions are appropriate.)

The information presented above is admittedly general, and important other factors are often at play with regard to reliability and resilience needs. Nonetheless, this information is useful to provide general guidance about whether the EDCs are properly prioritizing their reliability and resilience investments. The ESMP filings do not include similar comparisons to other utilities, or information regarding the outage goals that they are seeking with new investments. This makes it difficult to assess whether the EDCs are properly balancing costs relative to resilience or reliability.

5.2. Replacement of Aging Equipment

It appears that replacement of aging infrastructure will constitute a large part of the EDC's capital spending in 2025–2029. We identify three primary categories of aging infrastructure replacement: substation equipment replacement (largely to improve blue sky reliability); underground cable replacement (also intended to improve blue sky reliability); and overhead distribution line equipment replacements/hardening (resilience-oriented, but costly). We identify multiple reasons why replacing aging equipment should not comprise significant EDC capital spending in 2025–2029.

Substation equipment replacement. Major substation equipment is routinely and periodically subjected to objective diagnostic and functional testing. As a result, there is already a means in place to identify and address equipment likely to fail in service before it does. There is therefore no reason to replace substation equipment that has passed its tests due to age or subjective assessments of condition. Further, substation equipment is backed up as part of EDC's capacity planning guidelines. This means that a failure in service of a piece of major substation equipment—already made rare through testing—almost never results in a service interruption. This explains why our detailed examinations of multiple substation equipment programs proposed by EDCs across the United States has yet to identify one in which the value of reliability improvements comes remotely close to justifying the incremental cost of more frequent equipment replacement.[84]

Still further, substation equipment is almost never damaged by storms. Thus, substation equipment replacement programs are targeted mainly to improving blue sky reliability, which we argued earlier should not be a top priority for EDC capital spending. Last but certainly not least, substation equipment

[83] Reliability performance data reported by U.S. EDCs, including the three Massachusetts EDCs, on U.S. Energy Information Administration (EIA) Form 861, Schedule 3, part B. 2019-2022.

[84] See, for example*, Panel Direct Testimony of Paul J. Alvarez and Dennis Stephens on behalf of the Maryland Office of People's Counsel* in Maryland PSC Case No. 9702. Dec. 15, 2023. Pp. 43-52. At https://webpsc.psc.state.md.us/DMS/case/9702.

replacement potentially results in large amounts of duplicative capital spending—once to replace the equipment due to age, and again in a few years due to capacity expansion requirements.

When large capacity expansion investments loom, it makes sense to extend the life of existing equipment whenever possible to serve as a bridge to eventual replacement for capacity expansion, or what we call "triage and transition." Triage refers to replacing equipment which fails tests, and poles which fail formal inspections, because there is no option not to do so. But optional replacements, such as replacements of equipment based on age or subjective assessments of condition despite having passed tests or inspections, should be avoided. Equipment that has passed objective tests, or poles that have passed formal inspection, should remain in service while awaiting the transition to greater capacity in due course.

Underground cable replacement. As underground infrastructure is almost never impacted by extreme weather, underground cable replacement is likewise a blue sky reliability improvement effort. As noted above, blue sky reliability improvements should not be a top spending priority. Further, prospective replacement of underground cable (i.e., replacements not due to a history of cable faults) provides very little reliability improvement and is extremely expensive, thus offering low benefits per dollar.

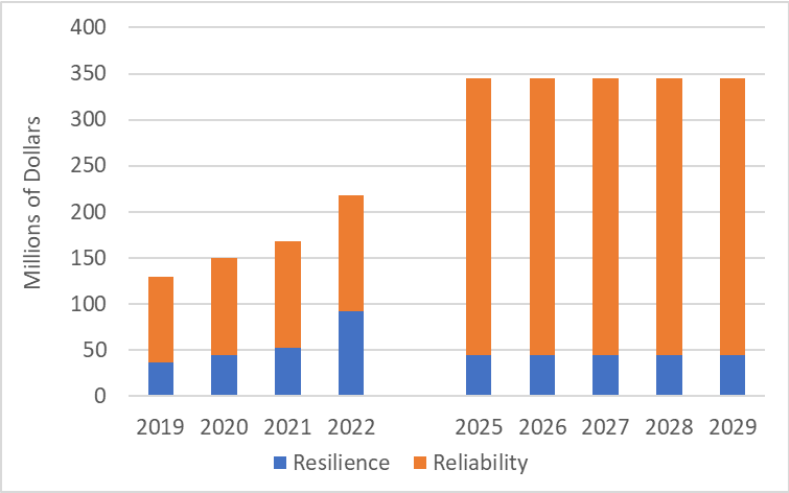
Overhead distribution line equipment. Poles and other overhead infrastructure are routinely and periodically subjected to objective, formal inspections. As with substation equipment, means are already in place to identify poles and other overhead infrastructure that should be addressed before a storm adds stress to compromised equipment. Furthermore, even a new pole can fail with enough weight from ice or falling trees. While circuit equipment replacement—including accelerated pole replacements, equipment "hardening", and undergrounding—can play a role in reducing long-duration outages, these are relatively costly strategies. They are likely cost-effective only in limited circumstances and situations, and they should serve more as last resorts than primary approaches.

5.3. Eversource's Reliability and Resilience Capital Spending

Figure 23 presents Eversource's capital spending on resilience and reliability in four recent years relative to proposed spending in 2025–2029. As indicated, Eversource proposes to significantly increase its reliability and resilience spending relative to recent levels. At approximately $345 million annually for 2025–2029, planned reliability and resilience capital spending approaches Eversource's total distribution business capital spending in 2022 ($404 million).[85] Between its ESMP resilience capital investments and its non-ESMP reliability capital investments, Eversource devotes more capital spending in 2025–2029, and greater growth over historical capital spending, than the other EDCs.

[85] Eversource 2022 FERC Form 1. P. 204.

Figure 23. Capital Spending on Resilience and Reliability: Eversource



Historical spending is from Exhibit ES-ESMP-1, p. 615, where resilience is based on "distribution line reliability." Proposed spending is from Exhibit ES-ESMP-1, p. 433.

Aging Equipment Replacement. We are also concerned about the prevalence of "aging" equipment replacement in Eversource's reliability improvement capital spending plans. Eversource's equipment replacement programs totaling $72.9 million in 2019 increased to $169.5 million by 2022.[86] Though Eversource's ESMP does not provide details by reliability spending type, this historical growth in equipment replacement raises the question of whether such growth is also built into the ESMP.

Further, Eversource's aging equipment replacement program description alludes to replacing 25 substation power transformers annually due to age, which is defined as their depreciation period.[87] As described above, these equipment replacements exhibit all the same drawbacks as other substation equipment replacements described above, but at an exorbitant cost we conservatively estimate at $100 million annually (assuming an average of $4 million per transformer). Given that these substation power transformers are all passing their diagnostic and functional tests (if they had not, they would have already been removed from service) this spending proposal deserves scrutiny. Yet, the ESMPs do not provide sufficient information for a proper review of the proposed reliability investments.

ESMP resilience capital spending proposal. We also have concerns regarding Eversource's resilience capital spending proposal. A different approach to resilience solutions development and selection would likely deliver greater resilience benefits for less capital spend. This is because the resilience spending solutions proposed in its ESMP appear to be prioritized from most costly to least costly, and from most capital-intensive to least capital-intensive, rather than the other way around.

[86] Eversource ESMP, p. 615.

[87] Eversource p. 616.

There are many ways to reduce the incidence of long-duration service interruptions due to storms. In our experience, one of the least-costly approaches is better storm response preparedness, both generally and when severe weather is specifically forecast. Eversource's resilience plan does not even mention its storm preparedness strategies and tactics. The next-least-costly approach is more aggressive tree trimming, which Eversource intimates is its least-preferred resilience solution alternative.[88]

Eversource's "First tier" solution—undergrounding—is the most costly and capital-intensive. Second and third tier solutions—Aerial Cable and Tree Wire (covered conductor)—are progressively less costly and less capital-intensive[89] but should still be subject to a BCA for each potential location. In summary, we believe basic BCA would indicate that Eversource's resilience solution priority should be inverted.

We also take issue with the process Eversource employed to identify the ESMP resilience capital spending budget that it claims is optimal ($450 million from 2025–2034). To determine the ESMP resilience budget, Eversource appears to have ranked projects based on outage duration reductions per dollar, and picked a point on the law of diminishing returns curve where the improvement to spending ratio begins to flatten out.[90] This is not the same as quantifying the value of outage duration reductions in dollars and comparing them to project costs.

A better approach would be to identify multiple potential solutions available for a particular grid location identified as a resilience risk, and to compare each potential solution on monetized valuation of duration reductions available to each solution's cost (i.e., a BCA). In this manner, the most cost-effective approach to resilience improvement could be identified on a case-by-case basis. (We note that Eversource's net benefit analysis provides no information as to how the dollar-denominated benefits of the EDC's resilience capital spending were estimated; see Section 8.)

5.4. National Grid's Reliability and Resilience Capital Spending

National Grid seeks Department approval for reliability and resilience capital spending in 2025–2029 in its current rate case before the Department, not in its ESMP. We address the EDC's rate case proposals here due to the large size of its reliability and resilience capital spending proposals.

Figure 24 presents National Grid's capital spending on resilience and reliability in four recent years relative to proposed spending in 2025–2029. As indicated, National Grid proposes to significantly expand its investments in reliability. As reported in National Grid's current rate case, "System Capacity" and "System Performance" are combined into a single line item, making it impossible to identify the split between the two.[91] However, as System Capacity spending proposed in the rate case is for routine load

[88] Eversource ESMP, p. 622.

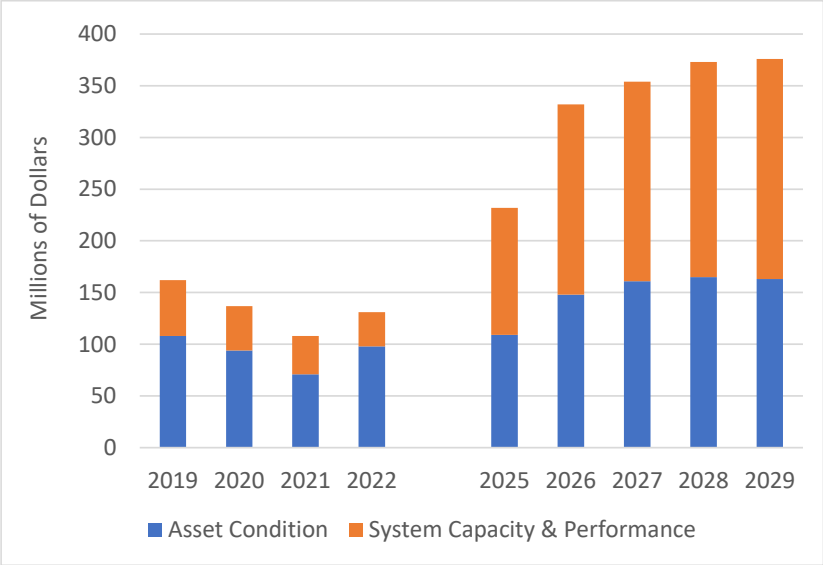
[89] Ibid.

[90] Eversource ESMP, p. 626.

[91] D.P.U. 23-150. Exhibit NG-CPIP-1, p. 61 (2019) and p. 58 (2025-2029).

growth, which is not expected to be at all significant, we assume that most of the increase can be attributed to reliability spending.

Figure 24. Capital Spending on Reliability: National Grid



Historical spending is from D.P.U. Docket 23-150, Exhibit NG-CPIP-1, p. 61.
Proposed spending is from D.P.U. Docket 23-150, Exhibit NG-CPIP-1, p. 58.

Aging equipment replacement. Note that "Asset Condition" capital spending, which involves replacement of "aging" equipment, is a significant part of National Grid's reliability capital spending for 2025–2029. As noted above, we are concerned that investments to replace equipment absent test failure or formal inspection failure could result in unnecessary costs.

Resilience capital spending. To National Grid's credit, reliability and resilience activities include descriptions of storm preparedness and enhanced tree trimming. However, National Grid provides no details regarding the relative mix of spending between various reliability spending types. This lack of transparency makes it difficult to evaluate National Grid's reliability and resilience spending.

5.5. Unitil's Reliability and Resilience Capital Spending

Unitil's ESMP also proposes an increase in reliability and resilience capital spending, from about $1 million per year historically to $2 million annually.[92] Unitil's ESMP describes several types of potential uses for the increased budget, including targeted reconductoring and undergrounding projects as well as construction of new and or automated circuit ties to improve grid configuration flexibility.

[92] Unitil ESMP. Table 51, p. 153 (existing spending levels) and Table 52, p. 154 (proposed spending levels).

Unitil's net benefit analysis projects just $2.5 million in reliability improvement value for the $5 million increase in reliability and resilience capital spending.[93] This could reflect the difficulty associated with improving upon Unitil's reliability performance, which is already top quartile among U.S. investor-owned utilities for both blue sky and storm metrics. It could also reflect the fact that the law of diminishing returns applies to reliability and resilience improvement spending. Or it could reflect the selection of cost-ineffective solutions, or implementation of solutions in less-than-ideal locations. As with the other EDC's ESMPs, the information Unitil provides on its reliability and resilience spending is insufficient to draw any firm conclusions.

[93] Exhibit UN-Net Benefits-3. P. 31 (costs); p. 29 (benefits).

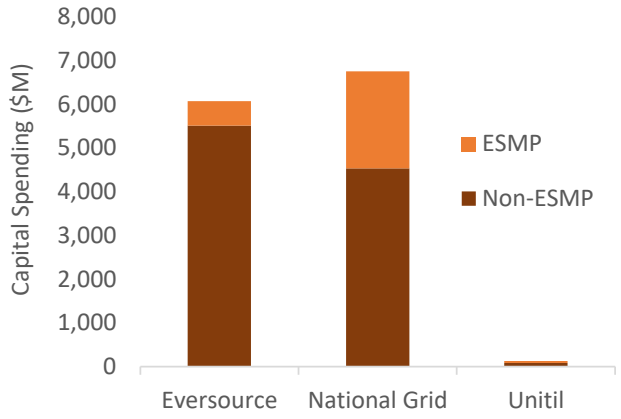
6. PROPOSED ESMP AND NON-ESMP INVESTMENTS

The EDCs state that they are requesting the Department to approve only the 2025–2029 ESMP investments included in the ESMPs.[94] In this chapter we discuss both the ESMP and the non-ESMP investments proposed by the EDCs to provide context on the full amount of investments proposed.

6.1. Total Proposed Investments

Figure 25 presents the proposed capital investments broken out by ESMP and non-ESMP investments for each of the EDCs. Eversource put much more of its proposed new investments into the non-ESMP category than National Grid. Unitil's investment breakdown is closer to National Grid's, with two-thirds of investments in non-ESMP categories.

Figure 25. Proposed Capital Spending: 2025-2029 ($ mil)

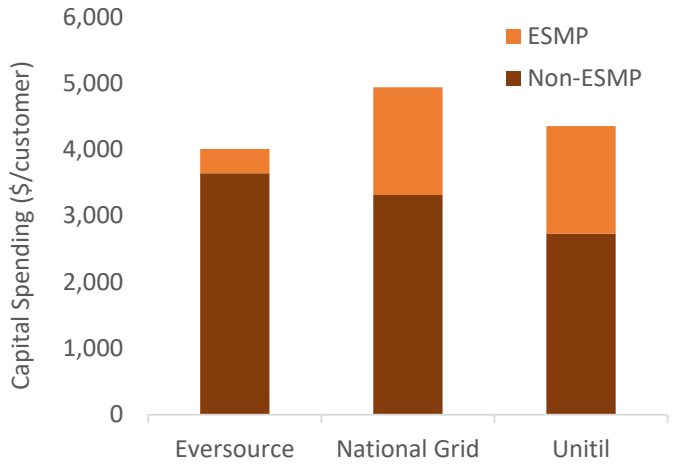


Eversource: Exhibit ES-ESMP-1, page 43. Unitil: Exhibit UN-ESMP-1, pp. 152-155. National Grid: D.P.U. 23-150, Exhibit NG-CPIP-1, p. 58, Table 2. These values are not consistent with the values in Exhibit NG-ESMP-1, page 358, but they are close.

Figure 26 presents the same information as Figure 25, but in terms of capital spending per customer, to normalize the information for the size of each EDC. As indicated, National Grid is spending the most per customer, then Unitil, and then Eversource. National Grid and Unitil have a similar breakdown of ESMP versus non-ESMP capital spending.

[94] Exhibit ES-Policy/Solutions-1, page 32, lines 4-10; Exhibit NG-Policy/Solutions-1, page 28, lines 9-12; Exhibit UN-Policy/Solutions-1, page 23, lines 11-14.

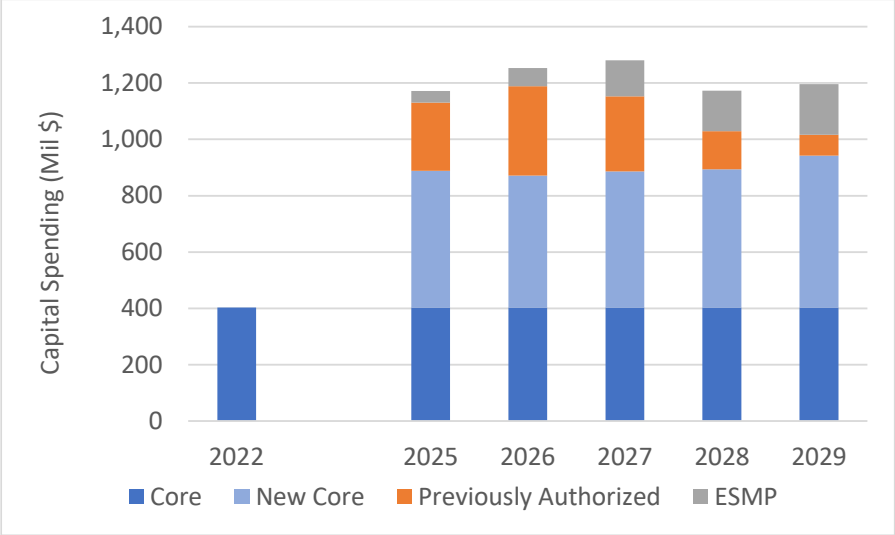
Figure 26. Proposed Capital Spending: 2025-2029 (dollars per customer)



Capital spending is from Figure 25. Eversource, National Grid, and Unitil number of customers is 1,514k, 1,368k, and 31k, respectively

Figure 27 presents Eversource's proposed capital spending on ESMP and non-ESMP investments relative to comparable investments in 2022. From 2022 to 2025, Eversource's capital investments increase by a factor of three, and then remain roughly constant after that.

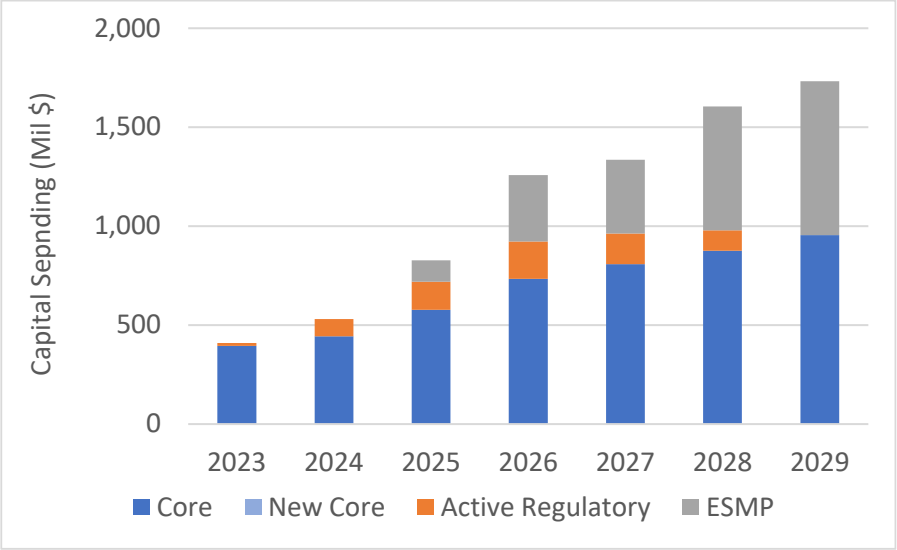
Figure 27. Proposed Capital Spending: Eversource



2022 investments are from Eversource's 2022 FERC Form 1.
ESPM and non-ESPM investments are from Exhibit ES-ESMP-1, pp. 433-437.

Figure 28 presents National Grid's proposed capital spending on ESMP and non-ESMP investments relative to comparable investments in 2022. From 2023 to 2029 National Grid's capital investments increase from $409 to $1732, which is more than a factor of four.

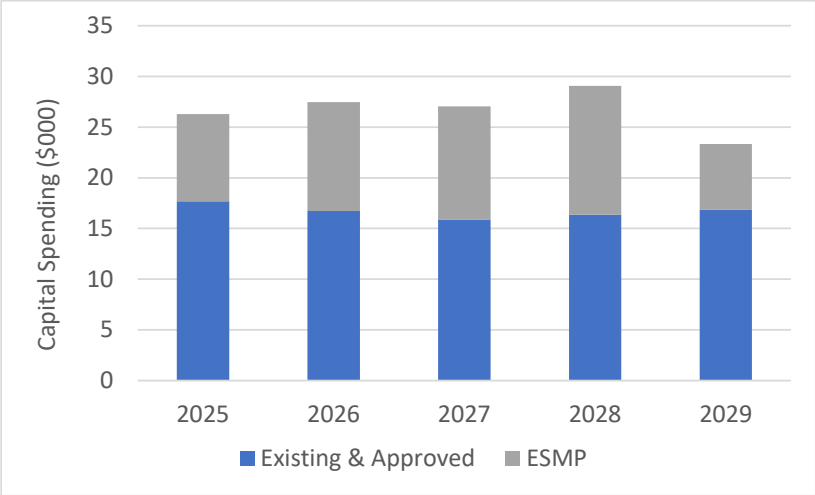
Figure 28. Proposed Capital Spending: National Grid



D.P.U. 23-150, Exhibit NG-CPIP-1, p. 58, Table 2. These values are not consistent with the values in Exhibit NG-ESMP-1, page 358, but they are close.

Figure 29 presents Unitil's proposed capital spending on ESMP and non-ESMP investments for 2025 through 2029. Unitil's spending remains roughly constant through this period.

Figure 29. Proposed Capital Spending: Unitil



ESPM and non-ESPM investments are from Exhibit UN-ESMP-1, Tables 51, 52, and 53.

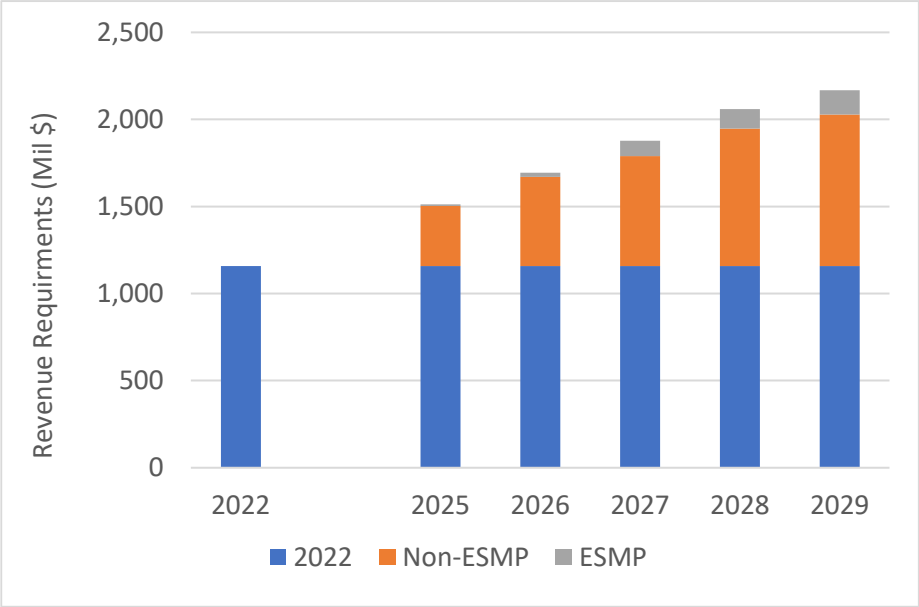
6.2. Revenue Requirements

The investments described above affect EDC customers' rates in the form of revenue requirements. Revenue requirements are calculated by amortizing the capital costs over the book life of the investment to recover debt and equity and adding in O&M costs and taxes. Because the costs are

amortized over many years, the annual revenue requirements tend to be much lower than the annual expenditures.

Figure 30 presents estimates of Eversource's revenue requirements from ESMP and non-ESMP investments relative to comparable revenue requirements in 2022. Eversource's revenue requirements are estimated to increase by 87 percent from 2022 to 2029.

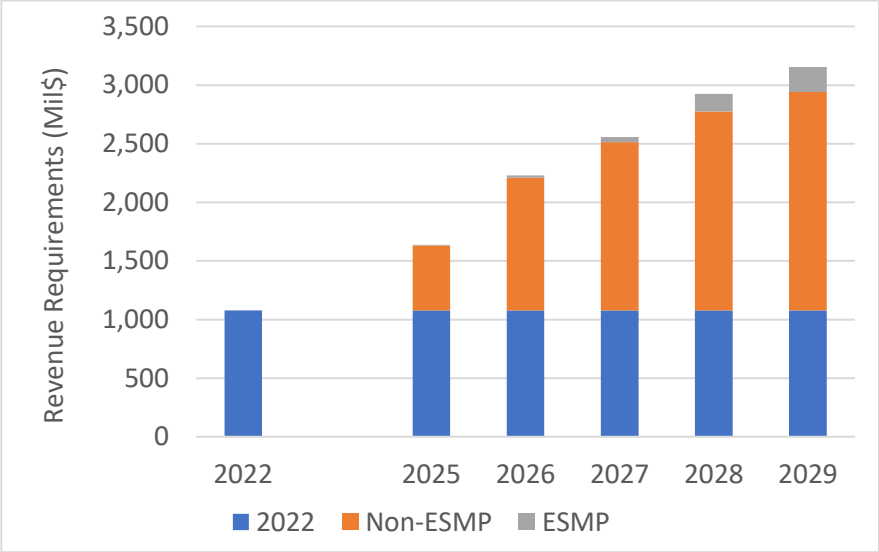
Figure 30. Revenue Requirements of Proposed Investments Relative to 2022: Eversource



2022 revenue requirements are from Eversource's recent rate case, D.P.U. Order 22-22, November 30, 2022, Schedule 1, p. 523. The ESMP and non-ESMP revenue requirements were calculated by the GMAC consultants using information from Eversource's ESMP and recent rate case.

Figure 31 presents estimates of National Grid's revenue requirements from ESMP and non-ESMP investments relative to comparable revenue requirements in 2022. National Grid's revenue requirements are estimated to roughly triple from 2022 to 2029.

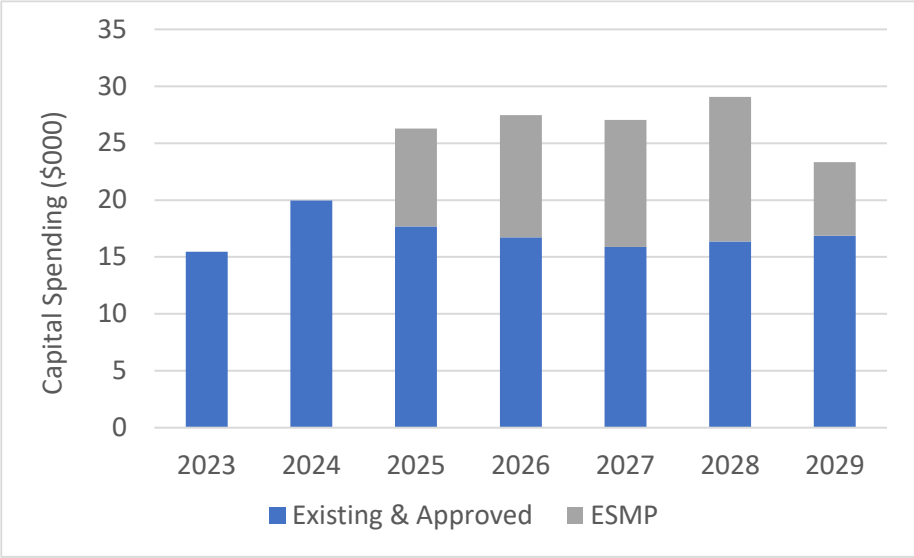
Figure 31. Revenue Requirements of Proposed Investments Relative to 2022: National Grid



2022 revenue requirements are from National Grid's on-going rate case, D.P.U. 23-150. The ESMP and non-ESMP revenue requirements were calculated by the GMAC consultants using information from National Grid's ESMP and recent rate case.

Figure 32 presents estimates of Unitil's revenue requirements from ESMP and non-ESMP investments relative to comparable revenue requirements in 2022. Unitil's revenue requirements are estimated to increase by 46 percent from 2022 to 2029.

Figure 32. Revenue Requirements of Proposed Investments Relative to 2022: Unitil



2022 revenue requirements are from Unitil's recent rate case, D.P.U 23-80, Exhibit Unitil-CDGN10, Schedule 1, page 2. The ESMP and non-ESMP revenue requirements were calculated by the GMAC consultants using information from Unitil's ESMP and recent rate case.

6.3. Consultant Comments

Bifurcation of ESMP and non-ESMP investments

The bifurcation of ESMP and non-ESMP investments makes it difficult to assess the proposed investments holistically. These two categories of investments need to be evaluated together in order to optimize the proposed investments across both categories by considering alternative investments and combinations of investments across them both. This concern is exacerbated by the fact that the EDCs categorize their costs differently without explanation for doing so.

The EDCs have conducted BCAs and bill impact analyses on only the proposed ESMP investments and have ignored the non-ESMP investments. Consequently, they have not demonstrated that the ESMPs as a whole will provide net benefits to customers or minimize bill impacts. (See Chapters 8 and 10.)

Magnitude of Proposed Investments

The increase in expenditures and revenue requirements proposed by each of the three EDCs are remarkably high. If these ESMP and non-ESMP investments were approved and implemented, they would undoubtedly result in dramatic rate increases, which might impose excessive burdens on customers and make it even more difficult to support the electrification necessary to meet Massachusetts's decarbonization goals. For this reason, it is all the more important that the proposed ESMP and non-ESMP investments be fully justified by the EDCs in their ESMPs.

7. PROPOSED ESMP INVESTMENTS

7.1. Comparison of All Electric Distribution Companies

Table 5 presents the ESMP investment categories used by the EDCs, a common description of each category across EDCs, and example projects that are specific to each EDC. While the EDCs claim they have common definitions for the investment categories, the definitions are different in practice. For example, substation investments appear in both the Network and CIP investment categories. Integrated energy planning appears under the Customer investment category for Eversource and under the Network investment category for National Grid. Some investment categories contain multiple types of investments. National Grid's Network investments contain investments in: (1) Substation and Feeder Line Projects for Load Growth, (2) Expanded CVR/VVO, (3) Early Fault Detection, (4) Integrated Energy Planning, and (5) Warehouse Expansion to Support Company Workplan NG Facilities EV Fleet. Unitil's Network investments are also a mix of substation construction, substation expansion, and distribution VVO investments. National Grid's and Unitil's Platform investments are also a mix of project types. Eversource's, National Grid's, and Unitil's Customer investments are a mix of project types including planning (FERC 2222 and integrated energy planning); DER deployment (Southhampton BESS and virtual power plants, or VPP); non-wires alternatives (NWA); and customer metering, billing, and portals.

The EDCs are not investing in all of the categories. For example, National Grid does not have Resiliency and LMI Solar investments, while Eversource does. And Eversource has no ESMP Program Administration investments, while National Grid and Until have these investments.

Though there is a wide range of investments types included in the ESMP portfolio for each EDC, the EDCs are asking for pre-authorization of the portfolio as a whole. The EDCs do not provide alternative portfolios for comparison to this one. The EDCs also do not provide complete cost and benefit information for each of the investment types in the portfolio which would enable comparisons of the cost-effectiveness of one type of investment to another.

Table 5. Summary of EDC Proposed 2025–2029 Investments

Category	Investment Category Descriptions	Example Projects		
		Eversource	**National Grid**	**Until**
Network	New substation and distribution line upgrades to support electrification load growth and DER interconnections, as well as investments to install and manage additional technology hardware to improve network operations and management	Not included (Included in Core investments instead)	• Substation and Feeder Line Projects for Load Growth • Expanded CVR/VVO • Early Fault Detection • Integrated Energy Planning • Warehouse Expansion to Support Company Workplan NG Facilities EV Fleet	• Lunenberg Substation Expansion • South Lunenberg Substation Construction • Distribution Programs (VVO)
Platform	Investments identified to leverage data, digitalization, and other platforms to optimize infrastructure and meet evolving customer needs	DERMS Phase II	• Network Management Technologies (i.e., DERMS) • Security • New Digital Products for Asset Planning, Management, and Operations • Telecommunications • Data Management	• ADMS/DERMS • Cybersecurity • Automation
CIP	Substation and line upgrades to enable DER interconnections with cost allocation	New CIP	New CIPs (Substation Projects)	Not Included
EV	Continuation of existing EV make-ready and charging-infrastructure enablement programs	EV Charging and Make-Ready Extension	EV Phase III Program Extension	FG&E EV Program
Resiliency	Undergrounding, reconductoring and other storm-hardening infrastructure upgrades	Resiliency Investments	Not Included	Resiliency Investments (Spacer Cables/ Undergrounding)
Customer	New programs and demonstrations to advance VPPs and use of DERs for grid services, and investments in new clean energy customer portals & enabling technologies	• FERC 2222 • Integrated Energy Planning • Southampton BESS • Enable Grid Services/NWA	• Customer Portals for Clean Energy • Grid Services Compensation Fund • VPPs in EJCs • Building to Grid • Metering and Billing Systems	• FERC 2222 • Enable Grid Services/NWA
Solar	Programs to support adoption of solar and storage technologies in EJ communities	LMI Solar	Not Included	Not Included
ESMP Prog. Admin.	Program administration of incremental ESMP projects	Not Included	ESMP Program Administration	ESMP Program Administration

Sources: Figure 1 – Common Proposed ESMP Investments Summary Across EDCs on Page 14 of Exhibit ES-Net Benefits-1, Pages 13 and 14 of Exhibit NG-Net Benefits-1, and Page 11 of Exhibit UN-Net-Benefits-1.

Table 6 summarizes each EDC's proposed spending by investment category. National Grid's and Unitil's largest investments are in Network, whereas Eversource's largest investments are in CIPs and Resiliency (as it claims its Network investments are already included in its Planned Core Investments).

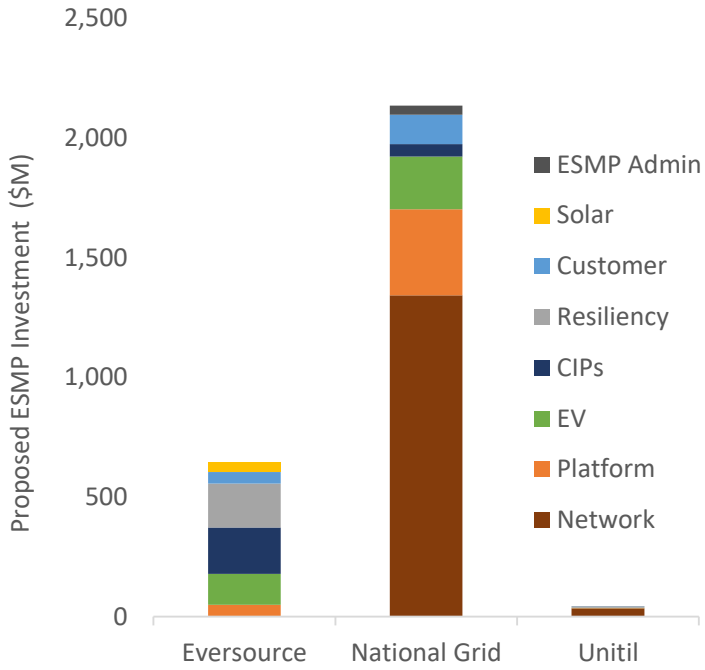
Table 6. Proposed 2025–2029 ESMP Investments ($M): Eversource, National Grid, Unitil

Investment Categories	Eversource	National Grid	Until
Network	0	1,342	34.2
Capital Investment Project (CIP)	193	52	0.0
EV	129	221	0.8
Platform	50	360	1.9
Resiliency	184	0	4.0
Customer	48	122	0.9
Solar	39	0	0.0
ESMP Program Administration	0	38	0.3
Total	**643**	**2,135**	**42.1**

Sources: Appendix G: Detailed Total Costs by Investment Category from Exhibit ES-Net Benefits-3 page 32, Exhibit NG-Net Benefits-3 page 32, and Exhibit UN-Net Benefits-3 page 31.

Figure 33 presents the same information as Table 6 in graphical form.

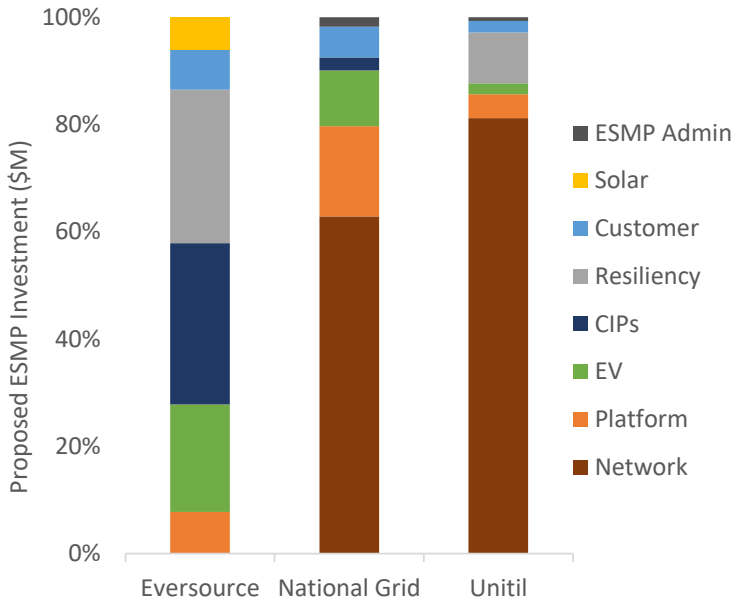
Figure 33. 2025–2029 ESMP Investments ($M): Eversource, National Grid, Unitil



Sources: Appendix G: Detailed Total Costs by Investment Category from Exhibit ES-Net Benefits-3 page 32, Exhibit NG-Net Benefits-3 page 32, and Exhibit UN-Net Benefits-3 page 31.

Figure 34 presents the same information as Table 6 and Figure 33 in terms of the percentage of each investment category relative to total investment. As indicated, most of Eversource's investments are in CIPs and Resiliency; most of National Grid's investments are in Network and Platform; and most of Unitil's investments are in Network.

Figure 34. 2025–2029 ESMP Investments, % of Total: Eversource, National Grid, Unitil

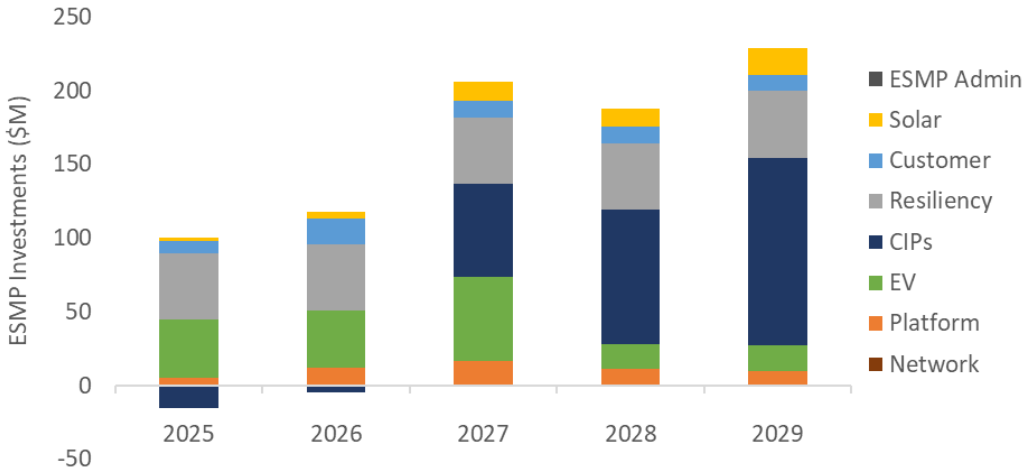


Sources: Appendix G: Detailed Total Costs by Investment Category from Exhibit ES-Net Benefits-3 page 32, Exhibit NG-Net Benefits-3 page 32, and Exhibit UN-Net Benefits-3 page 31.

7.2. Electric Distribution Company Details

Figure 35 presents Eversource's proposed ESMP investments by investment category for each year from 2025 to 2029. These include both capital and O&M costs. The CIP investments increase significantly in the last three years.

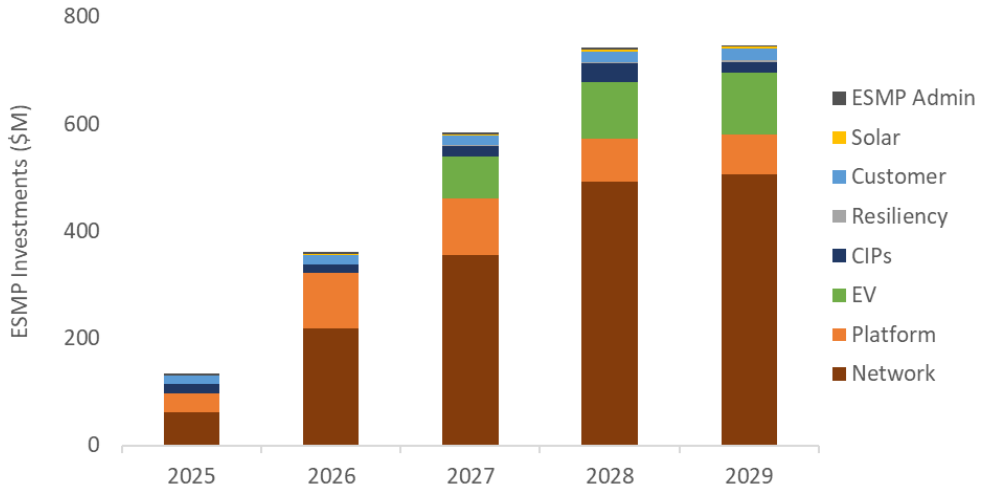
Figure 35. ESMP Investments by Category and by Year: Eversource



Sources: Exhibit ES-Net Benefits-4-ESMP Net-Benefits-Model-workpapers, Cost tabs.

Figure 36 presents National Grid's proposed ESMP investments by category for each year from 2025 to 2029. These include both capital and O&M costs. The Network investments increase significantly each year, and the EV investments ramp up in the last three years.

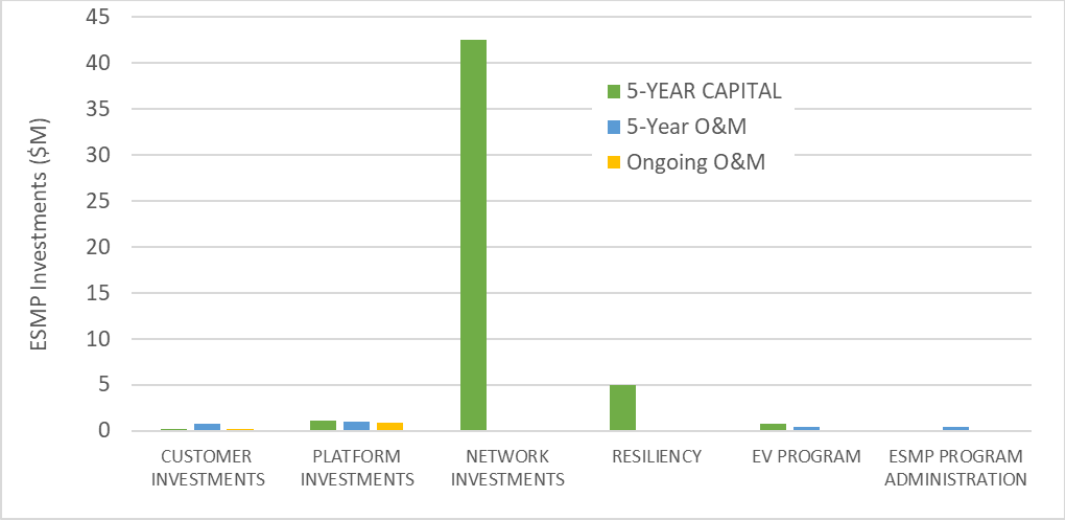
Figure 36. ESMP Investments by Category and by Year: National Grid



Sources: Exhibit NG-Net Benefits-4-ESMP Net-Benefits-Model-workpapers, Cost tabs.

Figure 37 presents Unitil's ESMP investments by investment by category for the total period of 2025 to 2029. Unitil did not provide this information separately by year.

Figure 37. Unitil ESMP Investments



Sources: Exhibit UN-Net Benefits-3, Net Benefits Analysis Report, p. 31.

7.3. Consultant Comments

The three EDCs propose including some very different categories of investments within their ESMP investments. In particular:

- Eversource does not include any Network investments within its ESMP investments, while these make up the largest portion of the other EDC's ESMP investments. Eversource is apparently categorizing its Network investments as non-ESMP investments, which means those costs will be reviewed and recovered through rate cases.
- Eversource's CIP investments are very large, while National Grid's are very small. National Grid apparently includes a larger portion of its CIP investments in its non-ESMP investments than Eversource, which means that those costs will be reviewed and recovered through rate cases.
- National Grid includes no Resilience investments in its ESMP investments, while Eversource's Resilience investments are a large portion of its ESMP investments. National Grid is apparently categorizing its Resilience investments as non-ESMP investments, which means those costs will be reviewed and recovered through rate cases.

These differences raise several questions. Which categories of investments should be included in ESMP versus non-ESMP investments? Non-ESMP investments will be reviewed and recovered through rate cases, instead of being Pre-authorized in the current ESMP dockets. Are rate cases the more appropriate review forum for these investments? Why should some types of investments receive pre-authorization for some EDCs but not for others?

This issue of which categories of investments to include as ESMP versus non-ESMP can have significant implications for review of the ESMPs. First, the costs involved represent a very large portion of the total ESMP costs (see Section 7.2). Second, this bifurcation of ESMP and non-ESMP costs is problematic for the EDC BCA and bill impact analyses (see Sections 9.5 and 10.4). The lack of clarity regarding which investment categories to include in ESMP versus non-ESMP investments exacerbates these problems. Third, pre-authorization of investments creates the risk that utilities will propose more investments than necessary (see Section 5).

8. CAPACITY AVAILABLE FOR ELECTRIFICATION AND DERS

The EDCs dedicate significant portions of their ESMPs to describing the current state of their distribution systems. This information is necessary for determining the extent to which the distribution infrastructure requires investments to ensure sufficient capacity for accommodating growth in electrification (i.e., heat pumps and EVs) and DERs (especially PV and storage).

The term "headroom" refers to the difference between substation capacity and the peak demand on those substations. While many factors can affect the ability of the distribution system to support electrification and DERs, this metric provides a general benchmark indicating the system's ability to support system needs.

Ideally, the ESMPs should articulate what is an appropriate amount of headroom, both for supporting electrification and the installation of new DERs. In addition, they should articulate the headroom that they are planning for and how the proposed investments properly balance costs versus risk tolerance. Without this information it is difficult to assess whether the proposed infrastructure investments are at the appropriate level.

The ESMPs provide a little information that can be used to assess the amount of headroom on their systems. We summarize and comment on that information below.

8.1. Eversource

Eversource states that it currently has little capacity available to accommodate electrification. Figure 38 presents Eversource's headroom for its four subregions and for its total system. While local conditions for specific substations and circuits will always be different from the macro level, meaning that exceptions requiring attention will always exist, it appears that the Western MA sub-region has more headroom than necessary, while the others are closer to a reasonable planning margin.

Figure 38. Current Headroom for Average Substations, by Sub-Region: Eversource

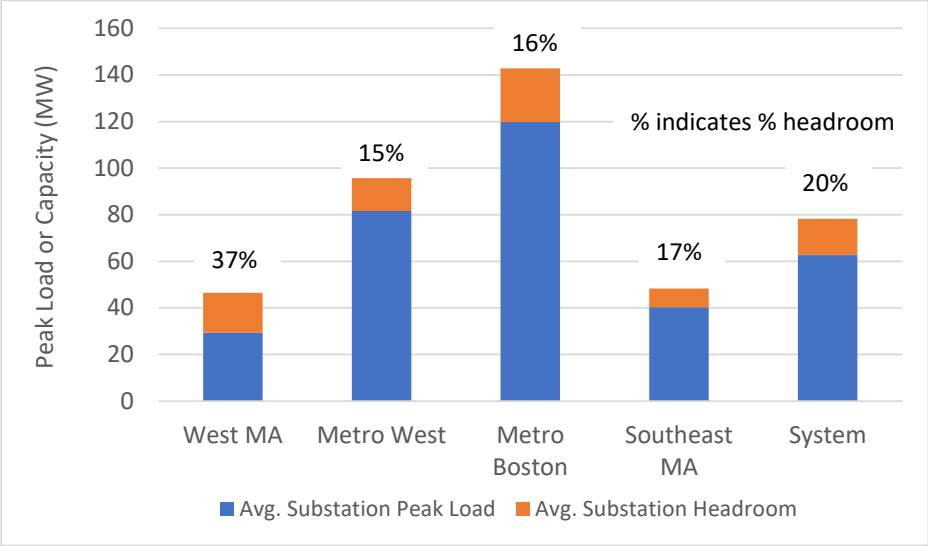


Exhibit ES-ESMP-1, Figure 4-13, p. 94.

Figure 39 presents an estimate of headroom on Eversource's system by comparing peak demand forecasts to forecasted substation capacity from its ESMP for 2025 to 2034.[95] The headroom in 2025 is roughly 29 percent of the peak demand and remains at 29 percent in 2034. Headroom of 29 percent is relatively high and suggests that Eversource might be building more capacity than needed, especially given that currently the average amount of substation headroom is roughly 20 percent (see Figure 38).

[95] We note that simplifying assumptions were necessary for estimating Eversource's headroom, because this data was not directly provided in its ESMP. This introduces some uncertainty in the data presented here. Ideally, this type of data would be presented directly and clearly in each ESMP to allow the Department and others to assess the extent to which the EDC is building infrastructure to support growing demand.

Figure 39. Eversource Headroom, System-Wide

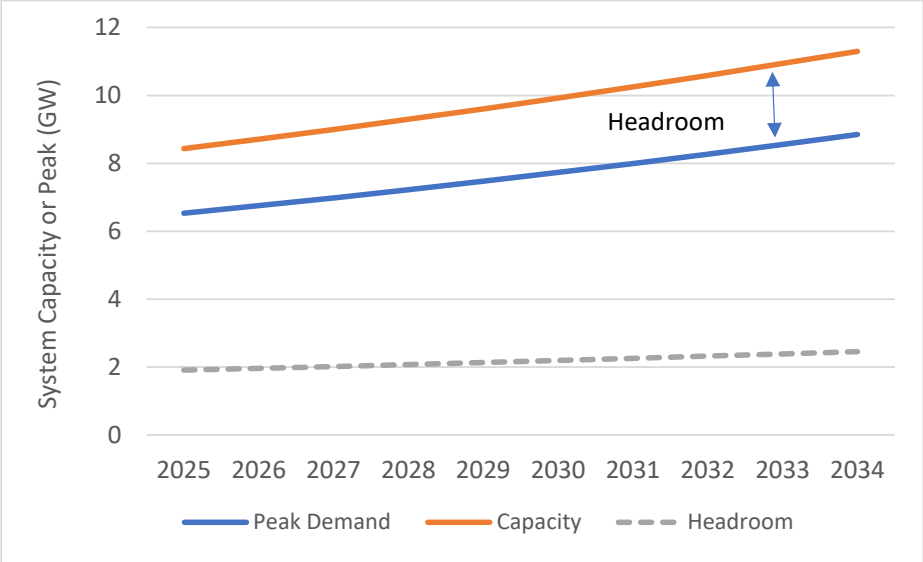


Exhibit ES-ESMP-1 p. 298 and p. 474. Annual values of system peak demand are an interpolation between current (6.1 GW) and projected 2050 (15.2 GW). Annual values of system capacity are an interpolation between current (7.9 GW) and 2034 (11.3).

Regarding capacity available to support the installation of new DERs, Eversource reiterates that the greatest need to invest is in the rural parts of the EDC's service area, where land to develop solar is available and less costly. Eversource's CIP applications currently before the D.P.U., and our experience in other states, confirm this phenomenon. However, Eversource's ESMP proposes DER hosting capacity capital spending that is the largest by far of the EDCs, at $262 million in the first 5-year plan alone.[96] Eversource does not explain why it needs DER capacity more than three times the total of all DERs in the Group Studies associated with such projects.

8.2. National Grid

National Grid also claims that the need to spend capital to increase electrification capacity is immediate.[97] Yet National Grid's ESMP filing does not provide the current capacity of its grid or the headroom on its system. This makes it difficult to evaluate whether the timing, locations, and extent of electrification capacity expansion projects National Grid proposes in its ESMP are appropriate, or whether it optimizes the balance between risk tolerance and cost.

National Grid's ESMP describes three CIP projects to accommodate DERs in its ESMP, at the cost of $71 million.[98] It proposes to install 244 MW of substation capacity in order to support only 53 MW of DERs in

[96] Exhibit NG-Policy/Solutions, p. 14, line 15; Exhibit-ES-Net Benefits-4-ESMP Net-Benefits-Model-workpapers, tab "CIP-Cost."

[97] Exhibit NG-Policy/Solutions, p. 14, line 15.

[98] D.P.U. 24-11 Exhibit NG-Net Benefits-4, CIP-cost tab.

Group Studies.[99] This suggests that National Grid might be overbuilding its system relative to the need to accommodate new DERs. While there might be additional considerations justifying some or all of this additional building, National Grid does not articulate those additional considerations in its ESMP filing.

8.3. Unitil

Given its compact service area, Unitil does not distinguish between capacity expansion for electrification and capacity expansion for DERs. Unitil's ESMP proposes to increase capacity that can be used to meet either electrification or DER accommodation needs.

Figure 40 presents an estimate of headroom on Unitil's system by comparing peak demand forecasts to forecasted substation capacity from its ESMP for 2025 to 2034.[100] The headroom in 2025 is roughly 87 percent of the peak demand and roughly 86 percent in 2034. From this analysis it appears that Unitil, to a much greater degree than Eversource, has plenty of headroom today and proposes to maintain that level through 2050.

Figure 40. Unitil Headroom, System-Wide

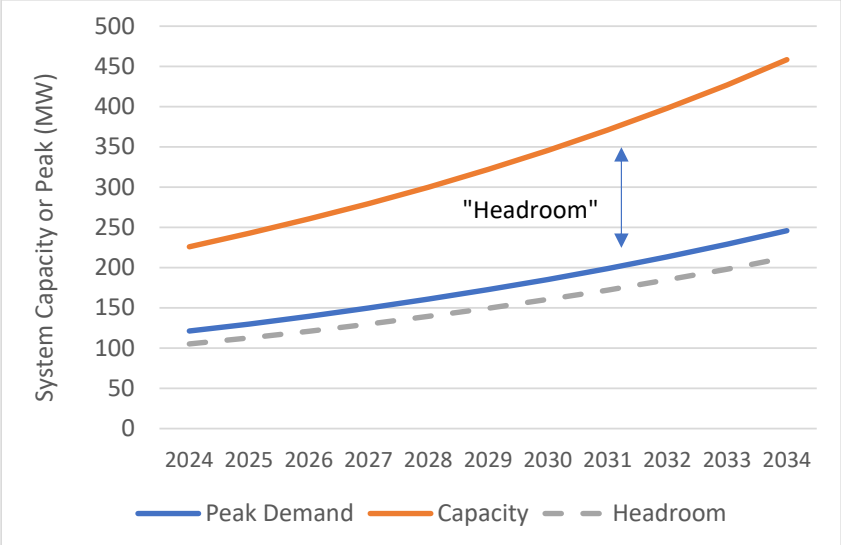


Exhibit UN-ESMP-1, p. 61, Table 12; and p. 149, Table 50.
Annual values are an interpolation between 2024 and 2050 values.

[99] D.P.U. 24-11. Exhibit NG-ESMP-1 (hereinafter, "National Grid ESMP"). Pp. 320, 332, and 339.

[100] We note that simplifying assumptions were necessary for estimating Unitil's headroom, because this data was not directly provided in its ESMP. This introduces some uncertainty in the data presented here. Ideally, this type of data would be presented directly and clearly in each ESMP to allow the Department and others to assess the extent to which the EDC is building infrastructure to support growing demand.

9. BENEFIT-COST ANALYSES

9.1. Summary of All Electric Distribution Companies

Benefit-Cost Ratios

Table 7 presents the benefit-cost ratio results by investment category for each of the three EDCs. (Comparing the net benefits across the EDCs is less useful because the magnitude of the investments will dictate the magnitude of the net benefits, and those magnitudes vary significantly across the EDCs. The benefit-cost ratios, on the other hand, normalize the BCA results for the magnitude of the investment.)

It is important to recognize that there are many qualitative benefits unaccounted for in the quantitative results presented here.

Table 7. Comparison of Benefit-Cost Ratios Across EDCs

Investment	Benefit-Cost Ratios		
	Eversource	National Grid	Unitil
Customer	0.0	0.0	0.3
Platform	0.2	0.1	0.2
Resiliency	1.2	--	0.1
Network	--	1.0	0.9
CIPs	2.0	6.4	--
EV Program	2.4	3.7	2.5
LMI Solar	1.6	--	--
ESMP Admin	--	0.0	0.0
Total	**1.5**	**1.2**	**0.8**

Regarding the BCA results for the ESMP investments in aggregate, Eversource and National Grid estimate they will provide positive net benefits, while Unitil estimates that they will not.

Regarding the BCA results for the individual BCA investment categories, the benefit-cost ratios are roughly consistent across the EDCs, except that (a) National Grid's results for the CIP investments are much higher than Eversource's; and (b) National Grid's results for the EV program are much higher than Eversource's and Unitil's.

Some of the investment categories provide positive net benefits while others do not. There are no, or very few, benefits attributed to ESMP Admin, Customer, and Platform investments which is why investments in these categories are not cost-effective. Network investments are also not cost-effective, though more benefits are attributed to this category. CIPs, the EV Programs, and LMI Solar (Low- and Middle-Income Solar) are cost-effective because they create large benefits associated with GHG reductions due to enabled solar, EVs, and heat pumps.

9.2. Eversource

Detailed BCA Results

Table 8 provides more detail on the BCA results for Eversource's ESMP. The benefits from reduced GHGs represent 72 percent of the total benefits.

Table 8. Benefit-Cost Analysis of ESMP Investments (Mil PV$): Eversource

Investment	Costs	Benefits				Results	
		Reduced GHG	Reliability & Resilience	Minimization of Rate Impacts	Total Benefits	Net Benefits	BCR
Customer	48	0	0	0	0	-48	0.0
Platform	50	9	0	0	9	-41	0.2
Resiliency	184	0	137	78	215	30	1.2
CIPs	193	385	0	0	385	192	2.0
EV Program	129	304	0	0	304	175	2.4
LMI Solar	39	3	0	60	63	24	1.6
Total	643	701	137	138	975	332	1.5

Exhibit-ES-Net Benefits-4-ESMP Net-Benefits, Model-workpapers, Summary Tab.

Figure 41 shows the total costs, benefits, and net benefits for each investment category in Eversource's ESMP. The EV category is the most cost-effective, with substantial costs and benefits. The CIPs category is also cost-effective with the largest costs and the largest benefits. The Resiliency category has large costs and benefits and is slightly cost-effective.

Figure 41. Benefit-cost Analysis of ESMP Investments: Eversource

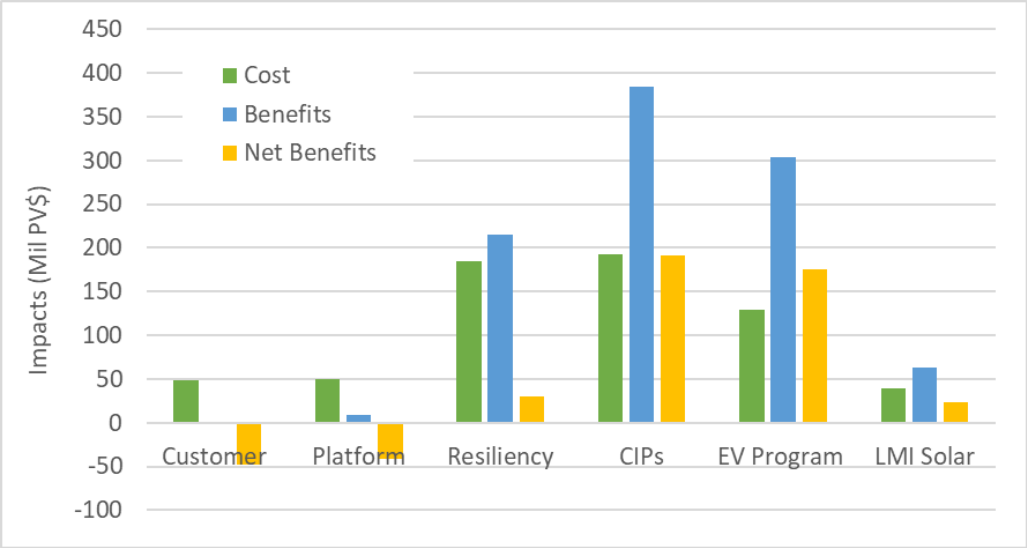


Exhibit-ES-Net Benefits-4-ESMP Net-Benefits, Model-workpapers, Summary Tab.

Enabled New Technologies

As noted above, one of the key factors driving the ESMP investments is the need to allow for new technologies to connect to the distribution system, including electrification technologies (heat pumps and EVs) and DERs (especially PV and storage).

Table 9 presents Eversource's assumptions for the heat pumps, EVs, and distributed generation (DG) (including both PV and storage) that will be enabled by 2030 as a result of its ESMP investments—broken out by four different investment categories. It also presents the amount of these technologies that are used to set 2030 targets in the Massachusetts CECPs. The CECP target amounts for Eversource were estimated by pro-rating the statewide 2030 CECP target by Eversource's electricity sales as a portion of state sales.

As indicated, Eversource's ESMP investments are estimated to enable many fewer technologies than assumed in the CECP 2030 targets. Eversource already has a large amount of these technologies installed on its system and will continue to have more installed between now and 2025, and these installations will help make up some of the difference. Nonetheless, these differences indicate that Eversource might not be enabling enough new technologies through its ESMP investments. A more complete analysis that includes technologies installed to date and between now and 2025 would provide a much better indication of this point.

Table 9. Technologies Enabled by 2030, ESMP vs. CECP Targets: Eversource

ESMP Investment Categories	DG (MW)	EVs (# units)	HPs (# units)
Platform	120	-	-
CIP	390	58,000	30,000
EV	N/A	63,000	N/A
Solar	11	N/A	N/A
Total ESMP	521	121,000	30,000
2030 Eversource Targets	2,980	450,000	128,766
2030 Eversource Targets as % of ESMP	**17%**	**27%**	**23%**

2030 Eversource Targets for DG and EVs: Exhibit ES-ESMP-1, Table 5-2: MA CECP 2030 Target and Eversource DER Assumptions, page 209. 2030 Eversource Target for HPs: Exhibit ES-ESMP-1, Table 8-10, page 503. DG, EVs, and HPs Enabled by Eversource ESMP Investments: Exhibit ES - Net Benefits - 3, Appendix D: Total Quantifiable Benefits by Investment Category, page 29.

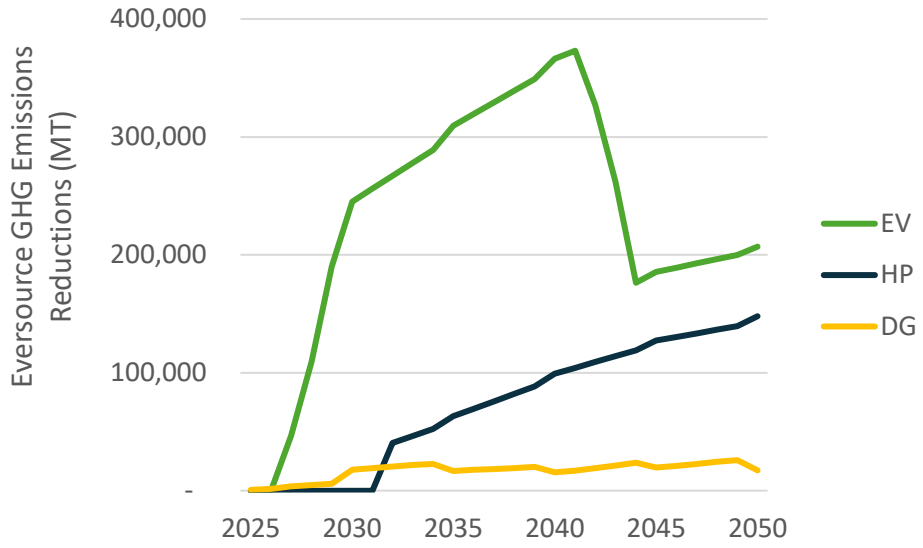
GHG Reductions from Enabled New Technologies

Figure 42 presents Eversource's estimates of the GHG reductions expected from each type of new technology enabled by the ESMP investments, for the period of 2025 through 2050.

As indicated, EVs account for 72 percent of the GHG reductions in Eversource's ESMP. The dip in the EV GHG reductions around 2045 is due to the fact that these measures are assumed to reach the end of their life after 15 years.

Ideally, these GHG emission reductions would be compared with Eversource's GHG emission reduction targets from the CECPs to shed light on Eversource's statement that its ESMP investments are consistent with state decarbonization goals.

Figure 42. GHG Reductions by Technology and Year: Eversource



Sources: Exhibit-ES-Net Benefits-4-ESMP Net-Benefits, Model-workpapers.

9.3. National Grid

Detailed BCA Results

Table 10 provides more detail on the BCA results for National Grid's ESMP. The benefits from reduced GHGs represent 96 percent of the total benefits.

Table 10. Benefit-Cost Analysis of ESMP Investments (Mil PV$): National Grid

Investment	Costs	Benefits				Results	
		Reduced GHG	Reliability & Resilience	Minimization of Rate Impacts	Total Benefits	Net Benefits	BCR
Customer	122	-	-	-	-	(122)	0.0
Platform	358	26	-	-	26	(332)	0.1
Network	1,343	1,213	40	55	1,308	(35)	1.0
CIPs	54	348	-		348	294	6.4
EV Program	221	809	-	3	811	590	3.7
ESMP Admin	38	-	-	-	-	(38)	0.0
TOTAL	2,136	2,396	40	58	2,493	357	1.2

Exhibit-NG-Net Benefits-4-ESMP Net-Benefits, Model-workpapers, Summary Tab.

Figure 43 shows the total costs, benefits, and net benefits for each investment category in National Grid's ESMP. The CIPs category is the most cost-effective and has relatively small costs and benefits relative to other categories. The EV category is also cost-effective, with relatively small costs and larger benefits. The Network category is not cost-effective, though it has the largest costs and benefits.

Figure 43. Benefit-Cost Analysis of ESMP Investments: National Grid

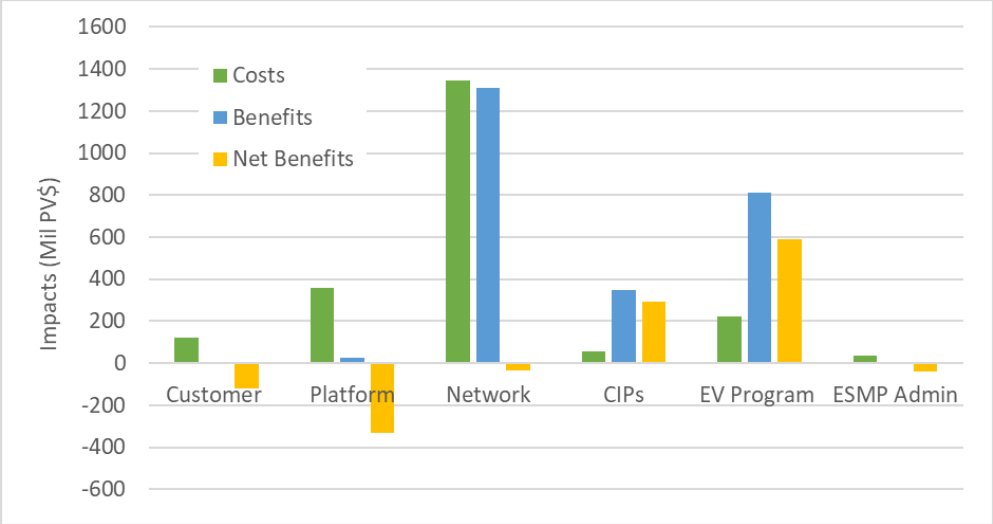


Exhibit-NG-Net Benefits-4-ESMP Net-Benefits, Model-workpapers, Summary Tab.

Enabled New Technologies

Table 11 presents National Grid's assumptions for the heat pumps, EVs, and DG (including both PV and storage) that will be enabled by 2030 as a result of its ESMP investments—broken out by different investment categories. It also presents the amount of these technologies that are used to set 2030 targets in the Massachusetts CECPs. The CECP target amounts for National Grid were estimated by pro-rating the statewide 2030 CECP target by National Grid's electricity sales as a portion of state sales.

As indicated, National Grid's ESMP investments are estimated to enable many fewer technologies than assumed in the CECP 2030 targets. National Grid already has a large amount of these technologies installed on its system and will continue to have more installed between now and 2025. Nonetheless, these results indicate that National Grid might not be enabling enough new technologies through its ESMP investments. A more complete analysis that includes technologies installed to date and between now and 2025 would provide a much better indication of this key point.

National Grid is estimated to enable significantly larger portions of DG, EVs, and heat pumps than Eversource.

Table 11. Technologies Enabled by 2030, ESMP vs. CECP Targets: National Grid

ESMP Investment Categories	DG (MW)	EVs (# units)	HPs (# units)
Network	815	240,000	65,000
CIP	244	72,000	19,000
Platform	120	-	-
EV	N/A	180,000	N/A
Total	1,179	492,000	84,000
2030 National Grid Targets	3,611	500,477	147,231
2030 National Grid Targets as % of ESMP	**33%**	**98%**	**57%**

2030 National Grid Targets: Exhibit NG-ESMP-1, Appendix F: DER Scenarios Inputs of its ESMP, pages 90, 93, 96, and 103. DG, EVs, and HPs Enabled by National Grid ESMP Investments: Exhibit ES - Net Benefits - 3, Appendix D: Total Quantifiable Benefits by Investment Category, page 29.

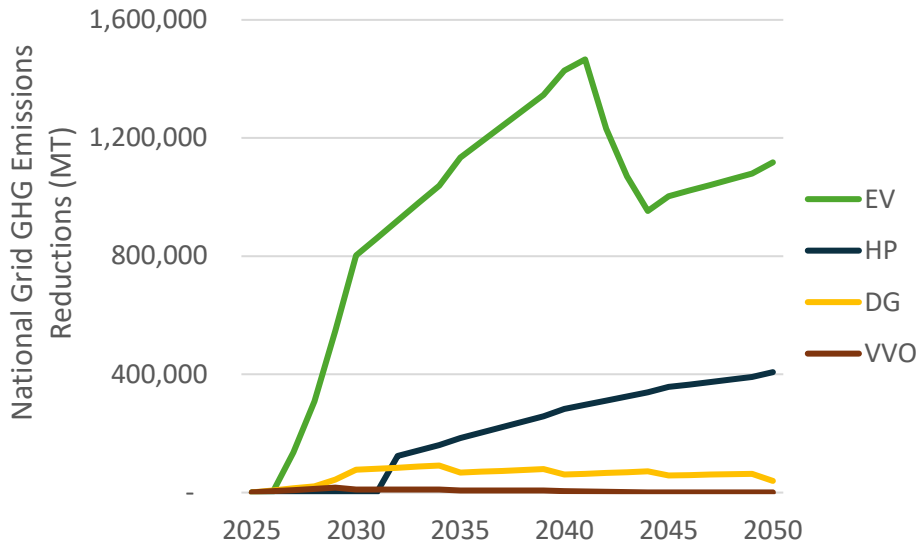
GHG Reductions from Enabled New Technologies

Figure 44 presents National Grid's estimates of the GHG reductions expected from each type of new technology enabled by the ESMP investments, for the period of 2025 through 2050.

EVs account for 78 percent of the GHG reductions in National Grid's ESMP. The dip in the EV GHG reductions around 2045 is due to the fact that these measures are assumed to reach the end of their life after 15 years.

Ideally, these GHG emission reductions would be compared with National Grid's GHG emission reduction targets from the CECPs to shed light on National Grid's statement that its ESMP investments are consistent with state decarbonization goals.

Figure 44. GHG Reductions by Technology and Year: National Grid



Sources: Exhibit-NG-Net Benefits-4-ESMP Net-Benefits, Model-workpapers.

9.4. Unitil

Detailed BCA Results

Table 12 below provides more detail on the BCA results for Unitil's ESMP. The benefits from reduced GHGs represent 87 percent of the total benefits.

Table 12. Unitil Costs, Benefits, and Net Benefits for ESMP Investments (mil PV$)

Investment	Costs	Benefits				Results	
		Reduced GHG	Reliability & Resilience	Minimization of Rate Impacts	Total Benefits	Net Benefits	BCR
Customer	0.9	0.0	0.3	0.0	0.3	-0.6	0.3
Platform	1.9	0.0	0.3	0.0	0.3	-1.6	0.2
Resiliency	4.0	0.0	0.3	0.0	0.3	-3.7	0.1
Network	34.2	27.5	0.3	3.2	31.0	-3.2	0.9
EV Program	0.8	2.0	0.0	0.0	2.0	1.2	2.5
ESMP Admin	0.3	0.0	0.0	0.0	0.0	-0.3	0.0
Total	42.1	29.5	1.2	3.2	33.9	-8.2	0.8

Exhibit-UN-Net Benefits-3, Net Benefits Analysis Report, page 17.

Figure 45 shows the total costs, benefits, and net benefits for each investment category in Unitil's ESMP. The EV category is the most cost-effective and has relatively small costs and benefits relative to other categories. The Network category is not cost-effective, though it has the largest costs and benefits.

Figure 45. Unitil Costs, Benefits, and Net Benefits for ESMP Investments

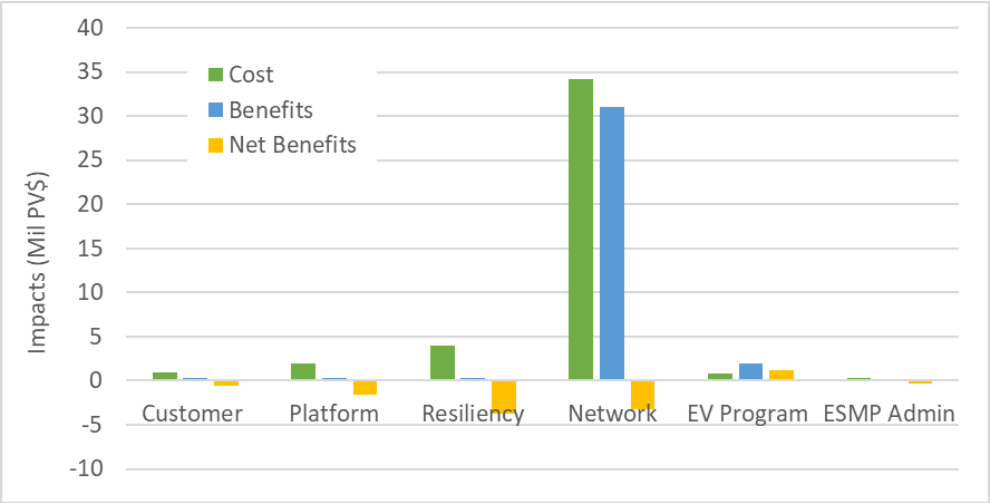


Exhibit-UN-Net Benefits-3, Net Benefits Analysis Report, page 17.

Enabled New Technologies

Table 13 presents Unitil's assumptions for the heat pumps, EVs, and DG (including both PV and storage) that will be enabled by 2030 as a result of its ESMP investments, for its Network investments. It also presents the amount of these technologies that are used to set 2030 targets in the Massachusetts CECPs. The CECP target amounts for Unitil were estimated by pro-rating the statewide 2030 CECP target by Unitil's electricity sales as a portion of state sales.

As indicated, Unitil's ESMP investments are estimated to enable more than its 2030 targets from the CECP. This does not account for the amount of these technologies installed on its system or that will continue to be installed between now and 2025. This result suggests that Unitil is building infrastructure to greater amounts than is needed to meet the CECP targets. A more complete analysis that includes technologies installed to date and between now and 2025 would provide a better indication of this key point.

Unitil is estimated to enable significantly larger portions of DG, EVs, and heat pumps by 2030 than Eversource and National Grid. Further, the results here are consistent with other information suggesting that Unitil has, and plans to continue to have, a large amount of headroom on its systems (see Section 8.3).

Table 13. Technologies Enabled by 2030, ESMP vs. CECP Targets: Unitil

ESMP Investment Categories	DG (MW)	EVs (# units)	HPs (# units)
Network	30	4,748	2,550
Total	30	4,748	2,550
2030 Unitil Targets	21	1,325	1,374
2030 Unitil Targets as % of ESMP	**143%**	**358%**	**186%**

2030 Unitil Targets: Exhibit UN-ESMP-1, Table 26 – Load Forecast Contributions by Type of Exhibit UN-ESMP-1, page 102. DG, EVs, and HPs Enabled by Unitil ESMP Investments: Exhibit ES - Net Benefits - 3, Appendix D: Total Quantifiable Benefits by Investment Category, page 29.

GHG Reductions from Enabled New Technologies

Until did not provide detailed BCA workpapers so we do not have yearly MT GHG reductions by technology.

9.5. Consultant Comments

Common Methods and Assumptions

The three EDCs hired a consultant to conduct the BCAs using similar methods and assumptions. The comments provided in this section refer to those common methods and assumptions.

We agree with the EDCs that there are many benefits of ESMP investments that are hard to quantify and monetize, that these benefits should be considered qualitatively, and that the determination of whether an investment provides net benefits to customers should include both quantitative and qualitative benefits.

In this chapter we focus on the quantitative (monetary) analyses presented by the EDCs. As described in more detail below, we have little confidence in the quantitative results of the EDC's BCAs. This is partly because BCA for grid modernization and distribution-system planning investments is relatively new and very challenging, and partly because of some important flaws in the analysis described below. This finding does not mean that the proposed ESMP investments will not provide net benefits to customers. It does mean, however, that (absent any improvements to the quantitative analysis) a determination of whether the ESMP investments will provide net benefits to customers must be made almost entirely on the assessment of qualitative benefits.

<u>Key Drivers of the Proposed ESMP Investments</u>

The EDCs provide many reasons why they need to make ESMP and non-ESMP investments. Understanding the key drivers behind the need for ESMP and non-ESMP investments helps to understand some of the key benefits of the proposed ESMP investments. Here we summarize the four most important drivers.

Load growth. Most of the costs associated with new load growth are for investments that support safe and reliable service, including equipment repair, new customer connections, peak load growth, and

maintaining reliability in line with Service Quality metrics. These costs will be recovered as Core investments and are not one of the drivers behind the ESMP investments. We address the EDCs assumptions and results for their load growth forecasts in Chapter 4.

Reliability. Most of the costs associated with reliability needs will be recovered as Core investments and are not one of the drivers behind the ESMP investments (see Section 5).

Resiliency. Eversource and Unitil have a category of ESMP investments to address resilience needs. National Grid does not include resilience in its ESMP investment; presumably it will recover costs associated with resilience as Core investments. Thus, resilience is one of the drivers for the Eversource and Unitil ESMP investments, but not for the National Grid ESMP investments.

Enabling new technologies. One of the main reasons for making the ESMP investments is that they "enable" the adoption of new technologies such as heat pumps, EVs, distributed solar, utility-sale solar, and storage. These new technologies will increasingly be adopted by customers (with and without utility programs), and a significant increase in these new technologies will be required to meet the Massachusetts decarbonization goals and the targets established in the CECPs. Consequently, most of the quantified and monetized benefits of the ESMP investments are in the form of GHG emission reductions. (See Section 9.)

Bifurcation of ESMP and non-ESMP investments

The BCAs consider only the costs and benefits of the ESMP investments; they do not consider the costs and benefits of the non-ESMP investments. The problem with this approach is that it bifurcates the determination of net benefits of ESMP investments from non-ESMP investments. Consequently, the non-ESMP investments cannot be analyzed together or consistently with the ESMP investments. The Department is left with analyzing the net benefits of the ESMP investments in these ESMP dockets and analyzing the net benefits of non-ESMP investments in the EDC's rate cases and other dockets. Separating the analyses this way precludes the EDCs from optimizing their investments across ESMP and non-ESMP categories of investments.

This is a critical problem for several reasons. First, some alternative investments, such as NWAs, VPPs, incremental energy efficiency, incremental distributed solar, and incremental storage can help defer or avoid the need for both ESMP and non-ESMP investments. Some of these might even increase the need for both types of investments. Second, the EDCs appear to have different approaches to defining ESMP and non-ESMP investments, making it difficult to know which type of investment should be analyzed in which D.P.U. docket. Third, this bifurcation requires that BCAs be conducted for the non-ESMP investments as part of the EDC's future rate cases, which has not been proposed by the EDCs. In sum, this bifurcation of the BCAs between ESMP and non-ESMP investments makes it impossible for the Department to determine in these ESMP dockets whether the ESMP (or non-ESMP) investments will provide net benefits to utility customers.

Finally, the Climate Act requires that in "order to be approved, a plan shall provide net benefits for customers..."[101] This reference to "a plan" applies to the entire ESMP, which includes both the ESMP and non-ESMP investments. Thus, this approach to bifurcating the BCAs between ESMP and non-ESMP investments is not consistent with the Climate Act.

Optimization of Investments

The BCAs essentially consider only two scenarios: one without the proposed ESMP investments, and one with them. A robust analysis of the cost-effectiveness of the ESMP investments should include analyses of alternative investments that might have lower costs or provide greater benefits, or both. While the EDCs claim to investigate several alternative investment options in the ESMPs, they provide little detail on (a) what those options are; (b) the magnitude of those investments; (c) the costs or benefits of those investments, or (d) how the proposed ESMP investments were optimized relative to alternatives.

As noted above, one of the key drivers of the ESMP investments is the reduction of GHG emissions to meet Massachusetts' decarbonization goals. There are many alternative resources that could be used to reduce GHG emissions, including NWAs, VPPs, incremental energy efficiency, incremental distributed solar, and incremental storage.[102] These alternative resources can help reduce GHG emissions and perhaps defer or avoid the need for some of the proposed ESMP investments.

Without considering these alternative resources, there is no way of knowing whether the EDCs have optimized their ESMP investments. While the BCAs might indicate that the ESMP investments will provide net benefits (assuming for the sake of argument that the other concerns described here were not an issue), this simplistic approach that ignores alternative resources does not demonstrate that the EDCs have *maximized* net benefits, i.e., optimized costs and benefits. It is possible that a combination of proposed ESMP investments with alternative resources would provide greater net benefits. It is also possible that a lower amount of total investment would provide the same level of benefits at lower costs.

This is a critical problem with the BCA because the Climate Act requires that the EDCs demonstrate that the ESMPs will "minimize or mitigate impacts on ratepayers."[103] If the BCAs do not demonstrate that the ESMPs maximize the net benefits, then there is no way to demonstrate that the ESMPs will mitigate rate impacts. This same problem applies to the ESMP bill impact analyses (see Chapter 10).

Capital Costs and Revenue Requirements

Capital costs are input to the BCA in the years in which the expenditure is made, suggesting that all costs are recovered by expensing them and that all costs will be recovered from 2025–2029. This approach is

[101] G.L. c. 164, § 92B(d).

[102] In this context, the term "incremental" is used to refer to additional resources above those included in the load forecasts, which are based on continuation of current practices.

[103] G.L. c. 164, § 92B(a)(vi).

not accurate for some investment types (i.e., substation investments) and significantly increases the annual costs included in the BCAs. Instead, some costs should be capitalized over many years and input to the BCA in terms of revenue requirements because this more accurately reflects the impacts on utility customers and is standard practice for BCAs.

Selection of Costs and Benefits

The BCAs account for all the costs incurred by the EDCs to make the ESMP investments.[104] The BCAs account for the benefits of the technologies enabled by the ESMP investments, including safety, grid reliability and resilience, facilitation of the electrification of buildings and transportation, integration of distributed energy resources, avoided renewable energy curtailment, reduced GHG emissions and air pollutants, avoided land-use impacts, and minimization or mitigation of impacts on the ratepayers.[105] This list of benefits is consistent with the requirements of the Climate Act.[106] The BCAs quantify and monetize the benefit of reduced GHG emissions and the mitigation of impacts on ratepayers, but the other benefits are addressed qualitatively.

However, the BCAs do not account for all the *utility system costs and benefits* of the technologies enabled. For example, when additional distributed solar resources or heat pumps are enabled, they will create benefits and costs on the utility system that will be passed on to customers. Further, the BCAs do not account for all the *host customer costs and benefits* of the technologies enabled. For example, customers will incur costs and experience benefits when they install distributed solar resources or heat pumps that are enabled by ESMP investments. This approach is not consistent with the BCA test used for assessing energy efficiency in Massachusetts, which includes all utility system impacts and all host customer impacts.

The ESMPs note that the BCAs adhere to the principles of the National Standard Practice Manual (NSPM), which recommends that BCA tests be based on a state's policy goals, including those outlined in legislation.[107] The Climate Act is clear about the costs and benefits listed above. It is silent, however, on whether the ESMP BCA should account for all the utility system impacts or the host customer impacts of the technologies enabled.

The NSPM is clear that all *utility system* impacts should be included in BCAs used for screening new resources.[108] This suggests that the ESMP BCAs should account for the utility system impacts of the technologies enabled by the ESMP investments.

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[104] Exhibit ES-ESMP-1, page 451, for example.

[105] Exhibit ES-ESMP-1, page 452, for example.

[106] Exhibit ES-ESMP-1, page 452, for example.

[107] National Energy Screening Project, the *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, 2020.

[108] NSPM for DERs, p. 3-6.

The NSPM is also clear that whether to include *host customer* impacts should depend upon the policy goals of the state.[109] Given that the Climate Act is silent on this point, it is not clear whether the ESMP BCAs should account for host customer impacts.

We recognize that accounting for all utility system and host customer impacts of the technologies enabled by the ESMP investments is a challenging task. Nonetheless, the EDCs have accounted for the GHG emission benefits of those investments, and it would be appropriate and consistent with the NSPM to at least account for the utility system impacts. For those technologies that typically provide net utility system benefits, such as distributed solar resources, the inclusion of all utility system impacts will increase the net benefits. For any technologies that typically increase utility system costs, such as EVs and heat pumps, the inclusion of all utility system impacts will decrease the net benefits.

Interrelated Functions Across Investment Categories

The EDCs note that the BCAs should present the results of all ESMP investment categories at an aggregated level, as opposed to separately by investment category because of the interrelated functions of the investment categories.[110] Further the EDCs note that they "inspect and build the costs and benefits by closely scrutinizing the individual projects and programs."[111]

We agree that there are interrelated functions between some of the ESMP investment categories, and that it is useful to consider the BCA results for all the ESMP investment categories in aggregate. We also believe, however, that the BCA results for the separate ESMP investment categories are also useful information for determining whether the investments will provide net benefits to customers. There is value in knowing the net benefits provided by each ESMP investment type without regard to the interrelated functions. Benefits due to the interrelated functions could be considered qualitatively and accounted for in combination with the BCA results. For example, an ESMP investment category with a benefit-cost ratio that is very low (e.g., 0.25) suggests that the interrelated benefits must be very large to justify the investment relative to an ESMP investment category with a benefit-cost ratio that is much higher (e.g. 0.95).

In addition, there are some investment categories and types that might have very few interactive effects with other investment categories and types, e.g., EV investments or the LMI Solar program. The degree to which some categories and types of investments are interrelated could be a consideration when reviewing their standalone BCA results. Those investments with greater interrelated effects that have poor BCA results would need to qualitatively demonstrate that the interrelated effects are sufficient to demonstrate net benefits when added to the quantitative BCA results.

[109] NSPM for DERs, p. 3-7.

[110] Exhibit NG-Net-Benefits-1, page 21, for example.

[111] Exhibit NG-Net-Benefits-1, page 21, for example.

For these reasons, we present and discuss BCA results separately for each ESMP investment category, for each EDC in Chapter 9. The EDCs do not provide enough information to break out these BCA results even further, i.e., for subcategories within each investment category.

Macroeconomic Impacts

The macroeconomic impacts include only the macroeconomic benefits created by the construction of the ESMP investments. They do not include any macroeconomic impacts created by electric utility rate increases or decreases, which can be significant with large increases or decreases in rates. This approach violates the symmetry principle in the NSPM[112] and is inconsistent with best practices for macroeconomic analyses.

It is difficult to assess whether the ESMP and non-ESMP investments are likely to cause significant electricity rate increases or decreases, given the limitations in the ESMP bill impact analyses (see Chapter 10). However, given the large magnitude of investments proposed in the ESMPs and the potential for significant increases and decreases in electricity sales, ignoring the macroeconomic effects of rate impacts significantly reduces the confidence that we have in the macroeconomic results. Therefore, we give these results very little weight.

Choice of Discount Rate

The BCAs assume a discount rate equal to the EDC's weighted average cost of capital (WACC). This is inconsistent with the discount rate that the EDCs used for BCAs of energy efficiency programs, which is a low-risk discount rate that is much lower than the WACC. Further, there are many reasons why the WACC is not a good basis for a discount rate when evaluating plans designed to provide net benefits to customers.[113]

This assumption significantly reduces both the costs and the benefits in the BCA. It will especially reduce the GHG benefits because they are incurred over many years into the future.

Inconsistent Operating Life Assumptions

Assumptions about operating lives of investments can have a large impact on the BCA results. The up-front costs are generally not changed by this assumption, but the benefits will be overstated using assumptions of lives that are too long and understated using assumptions for lives that are too short.

Eversource assumes that resilience measures will be operational for 20 years, while National Grid and Unitil assume they will be operational for 50 years.[114] This discrepancy is concerning, partly because the

[112] NSPM for DERs, p.2-3.

[113] NSPM for DERs, Appendix G.

[114] Exhibit ES-Net Benefits-3 page 34; Exhibit NG-Net Benefits-3 page 34.

assumptions are so very different, and partly because resilience investments are a large portion of Eversource's ESMP investments.

Eversource assumes that DERMs will be operational for 28 years, while Unitil assumes 20 years.[115] Both assumptions might be too high. We have seen other estimates of DERMS operating lives closer to 10 years.

Summary

Combined, the concerns outlined above make it difficult to have confidence in the BCA results. The most consequential concerns are the optimization of investments and the way the capital costs were not input as revenue requirements. Some of the concerns described above, if corrected for, might improve the BCA results, while others might worsen them.

This finding does not mean that the ESMP investments will not provide significant benefits to customers. It means that the EDCs have not demonstrated that their ESMP investments will provide net benefits. It also means that the EDCs have not demonstrated that their investments will maximize net benefits, which is a necessary condition for demonstrating that their investments will minimize or mitigate rate impacts (see Section 10.4).

Finally, it is important to note that the quantitative BCA results discussed here do not account for the qualitative benefits that the ESMP investments are likely to provide.

[115] Exhibit ES-Net Benefits-3 page 34; Exhibit UN-Net Benefits-3 page 33.

10. BILL IMPACTS ANALYSES

10.1. Eversource

Table 14 presents Eversource's estimated bill impacts for average residential customers, for the EMA region, for years 2025 through 2030.

Table 14. Bill Impacts, Average Residential Customer: Eversource (EMA region)

	2025	2026	2027	2028	2029
Average Bill ($)	189.70	190.21	192.33	193.16	194.07
Bill Increase ($)	0.27	0.51	2.12	0.83	0.91
Bill Increase (%)	0.1	0.3	1.1	0.4	0.5

Exhibit ES-Bill Impacts-4, Bill Summary tab. Values for average bills were calculated from the other values.

Eversource calculates bill impacts for each rate class and for the EMA and WMA regions. For each rate class, Eversource estimates the total revenue requirements (capital and O&M) of the ESMP investments in the relevant year, and divides those by the 2024 forecast sales to determine the ESMP rate adjustment (in $/kWh). These are then applied to average consumption levels by each customer class to determine the bill increase for each year.

Eversource uses the same 2024 sales forecast for each year of its analysis, and therefore does not account for increases or decreases in sales over this period.

10.2. National Grid

Table 15 presents National Grid's estimated bill impacts for average residential customers, for years 2025 through 2030.

Table 15. Bill Impacts, Average Residential Customer: National Grid

	Year 1	Year 2	Year 3	Year 4	Year 5
Average Bill ($)	--	211.07	211.26	211.93	211.13
Bill Increase ($)	0.00	0.19	0.67	1.2	4.79
Bill Increase (%)	0.0	0.1	0.3	0.6	2.2

Exhibit-NG-Bill Impacts-3 Revised, p. 1. Values for average bills were calculated from the other values.

National Grid estimates bill impacts for only the residential rate class. For this class, National Grid estimates the total revenue requirements (capital and O&M) for the ESMP investments that will begin to go into rates at the end of each year, starting with 2025. These are divided by the forecast residential electricity sales for each of the years associated with the revenue requirements recovery. Year 1 is defined as the year before any ESMP investments are recovered in rates, and Year 2 is the first year in which ESMP revenue requirements are recovered in rates.

National Grid uses forecasts of electricity sales for each year of its bill impact analyses, and therefore accounts for increases or decreases in sales over this period.

10.3. Unitil

Table 16 presents Unitil's estimated bill impacts for average residential customers, for years 2025 through 2030.

Table 16. Bill Impacts, Average Residential Customer: Unitil

	Year 1	Year 2	Year 3	Year 4	Year 5
Average Bill ($)	264.93	267.96	271.08	274.86	278.34
Bill Increase ($)	1.03	3.03	3.12	3.78	3.48
Bill Increase (%)	0.4	1.1	1.2	1.4	1.3

Exhibit-UN-Bill Impacts-4, Bill Impact Summary Tab. Year 1 refers to the rates going into effect on July 2026.

Unitil estimates the bill impacts for each rate class. For each class, Unitil starts with an estimate of its bills as of January 2024. It then estimates the changes to its grid modernization factor necessary to recover the revenue requirements associated with the ESMP investments. The changes in the grid modernization factor are then applied to the rest of the January 2024 rates and customer charges to estimate the impact on bills that would go into effect in Year 1. This process is repeated in each of the following years, where the rate and bill impacts are compared to the previous year.

Unitil uses forecasts of electricity sales for each year of its bill impact analyses, and therefore accounts for increases or decreases in sales over this period. However, the assumptions used to forecast those sales were not provided in the ESMP filings.

10.4. Consultant Comments

These comments apply to the bill impact analyses of all three EDCs. We did not find any concerns with the individual EDC analyses, other than those summarized below.

The bill impact analyses suffer from many of the same flaws as the BCAs. In particular:

- Lack of analysis of non-ESMP investments. All three ESMPs conduct bill impact analyses on only the ESMP investments. The analyses do not account for the non-ESMP investments.[116] This is especially problematic for the bill impact analyses because the EDCs are proposing large increases in capital and O&M costs in their non-ESMP investments, relative to today's costs (see Chapter 6). There is no question that these large increases in costs relative to today's costs will have bill impacts much greater than those identified by the EDCs in their bill impact analyses. Further, the Climate Act requires that ESMPs should "minimize or mitigate impacts on

[116] Exhibit ES-Bill Impcts-1, p. 24; Exhibit ES-Bill Impacts-1, page 15; and Exhibit-UN-Bill Impacts-1, p. 16.

ratepayers."[117] This reference is to the entire ESMP, which includes both ESMP and non-ESMP investments. Thus, this approach to bifurcating the ESMP and non-ESMP investments for the bill impact analysis is not consistent with the Climate Act.

- Optimization of investments. The EDCs have not considered a meaningful level of alternatives to their investment opportunities, either for the ESMP or the non-ESMP investments (see Section 9.5). Consequently, it is unlikely that they have optimized either their ESMP or non-ESMP investment, or that they optimized their investments *across* ESMP and non-ESMP investments. This means that there is no way to tell whether the EDCs could reduce costs or increase benefits, or both, to lead to lower bill impacts.

- Selection of costs and benefits. The EDCs have not accounted for the utility system costs and benefits associated with the technologies enabled by their ESMP investments (see Section 9.5). These costs and benefits will impact revenue requirements, which will impact customer bills. Including these additional costs and benefits might increase or decrease revenue requirements and bills.

Further, Eversource and National Grid do not base their bill impacts on an estimate of current rates; they present impacts only for the incremental revenue requirements in future years. This makes it difficult to compare the rate and bill impacts to current rates, and to get a full understanding of the results of the analysis.

Finally, Eversource uses the same 2024 sales forecast for each year of its analysis, and therefore does not account for increases or decreases in sales over this period. Properly accounting for these might increase or decrease rates and bills depending upon the net impact on sales of changes to the system over time.

Combined, these concerns make it difficult to have confidence in the bill impact analyses. The most consequential concern—the lack of analysis on non-ESMP investments—means that the bill impacts are very likely to be significantly understated.

[117] G.L. c. 164, § Sec 92B(a)(vi).

11. COST RECOVERY MECHANISMS

11.1. Eversource[118]

Core Investments. These will be reviewed through base rate cases. The capital costs will be recovered through Eversource's existing K-Bar mechanism, and the operating costs will presumably be recovered through Eversource's multi-year rate plan. The K-bar mechanism, approved by the Department in Eversource's recent rate case, allows Eversource to recover capital costs up to an amount equal to 10 percent of the rolling average of capital investments in recent years.

These investments can be recovered without being reviewed by the Department, but the "Department may investigate the prudency of any capital investment project included in the K-Bar at any time and make any adjustment necessary if Company expenditures are determined to be imprudent."[119] Further, Eversource notes that as "part of the Company's base distribution budget, all Electric Operations investments are subject to prudence review by the Department, following the date at which they are placed in service."[120]

Planned Clean Energy Investments. These will be reviewed and recovered through existing regulatory mechanisms, including CIP filings, Grid Mod mechanism, EV Mechanism, and individual projects filed with the Department.

ESMP Investments. These are reviewed in the current ESMP dockets. The costs will be recovered through the appropriate existing cost recovery mechanisms, including the grid mod and AMI mechanism, the EV mechanism, and the CIP mechanism.

11.2. National Grid[121]

Core Investments. The investments will be reviewed through base rate cases. The capital and operating costs will be recovered through the Infrastructure, Safety, Reliability, and Electrification (ISRE) mechanism proposed in National Grid's ongoing rate case. According to National Grid, the ISRE is "similar to what is already in place for National Grid's incremental Grid Mod and AMI investments and will permit the timely recovery of any O&M and in-service capital investment up to a cap, subject to a prudency review in the year following the spend."[122]

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[118] Exhibit ES-Bill-Impacts-1, pp. 8-9; 11-12; and 16-22. Exhibit ES-ESMP-1, p. 435, Table 7-1.

[119] D.P.U. Order 22-22, p. 64, footnotes 32 and 33.

[120] Exhibit ES-ESMP-1, p. 439.

[121] Exhibit NG-ESMP-1. p. 356; Exhibit NG-Policy/Solutions-1. P. 212; and Exhibit-NG-Bill-Impacts-1, pp. 9-11.

[122] Exhibit NG-ESMP-1. p. 356.

Active Regulatory Investments. These will be reviewed and recovered through existing regulatory mechanisms, including CIP filings, Grid Mod mechanism, and the EV Mechanism.

ESMP Investments. These investments are reviewed in the current ESMP dockets. The costs will be recovered through the ISRE mechanism proposed in National Grid's ongoing rate case.

11.3. Unitil[123]

Core Capital. These investments will be reviewed and recovered in base rate cases.

Pre-authorized Investments. Some investment types (energy efficiency, existing Grid Modernization, AMI, and EV) will be recovered through existing recovery mechanisms. CIP investments, whenever relevant, will be recovered through appropriate already Department-approved cost recovery mechanisms.

ESMP Investments. These investments are reviewed in the current ESMP dockets. The costs will be recovered through the existing grid modernization mechanism. This includes the recovery of upgrades and enhancements to the Lunenberg and South Lunenberg substations. Unitil is not proposing to recover these substation costs through a CIP filing because it does not currently have a Department-approved CIP. The Company is also prepared and willing to address a separate ESMP-related cost recovery mechanism through a separate proceeding.

11.4. Three EDCs

Table 17 summarizes the EDC's cost recovery mechanisms, using the information provided above.

Table 17. Cost Recovery Mechanisms: Eversource, National Grid, Unitil

	Review and Cost Recovery Mechanism		
Category	**Eversource**	**National Grid**	**Unitil**
Core	Rate cases K-Bar mechanism	Rate cases ISRE mechanism	Rate cases
Planned Clean Energy / Active Regulatory / Pre-Authorized	Existing mechanisms	Existing mechanisms	Existing mechanisms
ESMP Investments	Grid Mod mechanism	ISRE mechanism	Grid Mod mechanism

The three EDCs request that the following aspects of ESMP implementation be reviewed by the Department in other proceedings:[124]

- Consideration of potential rate design options.

[123] Exhibit UN-ESMP-1, p. 2 and p. 160; and UN-Bill Impacts-1, pp. 5-12.

[124] Exhibit ES-Policy/Solutions-1, pp. 32-33.

- Consideration of opportunities to dispatch energy storage technologies.
- Review of additional alternative approaches to financing.
- Consideration of ESMP metrics.

11.5. Consultant Comments

The three EDCS are seeking to recover ESMP investments through riders equal to or similar to the Grid Mod cost recovery mechanism. In establishing the Grid Mod mechanism, the Department has established the practice of pre-authorization of the investments, which means that "the Department will not revisit whether the company should have proceeded with the investments as proposed."[125]

We are concerned that pre-authorization encourages utilities to propose future capital spending that is much greater, much earlier, and much less likely to be cost-effective than the capital spending that would be made absent pre-authorization. Pre-authorization introduces moral hazard into the EDC's planning processes because EDCs have nothing to lose by including more aggressive capital spending in an investment plan, and everything to gain, including excessive rate base increases and associated returns on rate base.

This risk of utility overspending in the context of pre-authorization could potentially be mitigated if the Department is able to conduct a transparent, robust, and comprehensive review of proposed investments which finds that the utility has fully justified those investments. As indicated throughout these comments, however, the EDCs have not provided sufficient justification for either their ESMP or their non-ESMP investments. This means that pre-authorization of these investments creates a significant risk of undue, excessive cost burdens on utility customers.

In establishing the Grid Mod mechanism, the Department was clear that "it is appropriate to investigate the implementation of each company's grid modernization plan, including the final prudence reviews for grid modernization investments, at the conclusion of the three-year investment term."[126] Since the Department will not revisit the question of whether the utility should have proceeded with the investments, as noted above, this prudence review will be limited to the question of how well the money was spent, e.g., whether the final budget was within or close to the proposed budget. Thus this requirement for an after-the-fact prudence review does little to mitigate a utility's financial incentive to propose excessive capital budgets in the first place.

Further, we believe it is imperative that the Department clarify when and how the ESMP investments that are Pre-authorized will be reviewed for prudence. The order cited above establishing the Grid Mod mechanism requires a prudence review at the end of the three-year term for grid modernization investments authorized at the time of that order. That three-year term is no longer relevant in the

[125] D.P.U. 15-120, 15-121, and 15-122. Order dated May 10, 2018. p. 110.

[126] D.P.U. 15-120, 15-121, and 15-122. Order dated May 10, 2018. p. 112.

context of the ESMPs. A lack of clarity on the timing and nature of prudence reviews for Pre-authorized investments further undermines regulatory oversight of the proposed ESMP investments.

Finally, it is generally best for utilities to recover similar costs through similar recovery mechanisms. Otherwise, a utility might choose the mechanism that is most favorable (i.e., with the least review or least risk). Core costs that are reviewed and recovered in rate cases will be reviewed and recovered differently from ESMP investments that are Pre-authorized and recovered through the Grid Mod or ISRE mechanism. Utilities might be encouraged to categorize more costs as ESMP investments relative to core investments if they believe that pre-authorization gives them more flexibility regarding their cost proposals. It is incumbent upon the EDCs to clearly justify which investments warrant pre-authorization and which do not. This justification has not been provided in the ESMPs, and the different approaches to categorizing ESMP versus non-ESMP investments suggests that more justification is necessary before any costs are Pre-authorized.

12. INTEGRATED GAS-ELECTRIC PLANS

12.1. Summary of Discussion in ESMPs

Integrated Energy Planning (IEP) is planning conducted between the EDCs serving electric customers, the Local Distribution Companies (LDC) serving gas customers, regulatory entities, and stakeholders. IEP attempts to coordinate and optimize decision-making related to energy infrastructure.

The EDCs highlight how gas planning and electric planning currently have little overlap and are bifurcated.[127] However, the recently issued Order 20-80, summarized below, mandates that the "evaluation of any proposed investments will have to take place in the context of joint electric and gas system planning."[128] IEP is no longer a voluntary action but a mandated regulated component of EDC and LDC business operations. Implementation of Order 20-80 will take years and resolve many currently unanswered questions. This process will take place over many dockets and involve both the LDCs and EDCs. Thus, the summary of IEP offered by the EDCs in their respective ESMPs represents their visions of what the process will look like.

The ESMP focuses on the five-year investment period of 2025–2029. IEP was not used in the construction of the 2024 ESMPs for the investments that occur during this period. However, the 2024 ESMPs were influenced by Order 20-80 regarding the modeling assumptions used for creating their forecasts. (See Chapter 4.1.)

The IEP process involves two primary goals: long-term coordinated planning and near-term investment decisions. These goals are not distinct, as long-term planning forms near-term investment decisions and vice versa. The proposed coordinated IEP working group would discuss these goals and determine how the former informs the latter and vice versa. The EDCs provide more detail and structure for conducting near-term investment decisions and thus will be the focus of this section.

Within the goal of near-term investment decisions, the IEP process outlined by the EDCs can be broken into three tasks: (1) Identification of Investment Alternatives; (2) Determination of Investment Alternatives; (3) Implementation of Determined Investment. This structure is fundamentally the same as that carried out throughout the non-IEP sections of the ESMP. Key differences between the proposed IEP processes and the ESMP is that the IEP process does not have a mandated structure and that it involves immense cooperation between previously non-cooperating entities.

Identification of Investment Alternatives

Gas investments decisions must take place in joint gas-electric planning, per Order 20-80. As such, alternatives to (deferment of) gas investments, or non-pipeline alternatives, must be explored and

[127] For example, see Eversource 2024 ESMP, p. 643.

[128] FoG Order 20-80, p. 131

evaluated by the EDCs and LDCs. This task is primarily focused on examining gas infrastructure projects and identifying possible alternative electric investments.

Eversource calls this process the Electrification Feasibility Assessment. It plans to conduct potential investment alternative assessments on a pilot scale in Q2 2024, expand to multiple areas by Q4 2024, and be expanded to all Eversource service territory over the course of 2025.[129] The pilot phase will focus on regions with Eversource gas and electric service territory overlap, the expansion phase will focus on regions with Eversource electric and non-Eversource gas service, and the final maturation phase will focus on all Eversource service territory.[130] Unitil proposes a comparable system, though not called an Electrification Feasibility Assessment; it occurs on a longer timescale, with the pilot phase occurring around March 2026.[131] National Grid does not provide a comparable process or timeline.

This task is comparable to steps 1 through 6 in Eversource's Electrification Feasibility Assessment.[132]

Determination of Investment Alternatives

A primary goal of the Electrification Feasibility Assessment is to determine if gas infrastructure projects can be deferred or avoided and if electric infrastructure projects are feasible or infeasible. The process of determining feasibility of electric infrastructure projects comes from the results of joint modeling of the EDCs and LDCs.[133] The exact method for determining the alternative investment and the feasibility of that investment is not explicitly clear and appears to be subject to future planning decisions.

This task carries out steps 7 through 10 in Eversource's Electrification Feasibility Assessment.[134]

Implementation of Determined Investment

For electric infrastructure investments deemed feasible, the projects can be implemented. However, the timing of the investment may change according to ESMP plans, the appropriate Clean Energy Community Plan, or prioritization of other projects relevant for gas infrastructure retirement.[135]

When electric infrastructure investment alternatives are deemed infeasible, gas infrastructure investments must be made instead. In this case, the electric utilities will supply the gas utilities with the information needed to identify the impact of electrification on the gas system relevant to the necessary

[129] Eversource 2024 ESMP, p. 646, 649.

[130] Eversource 2024 ESMP, p. 646.

[131] Unitil 2024 ESMP, p. 267.

[132] Eversource 2024 ESMP, p. 647.

[133] Eversource 2024 ESMP, p. 650.

[134] Eversource 2024 ESMP, p. 651.

[135] Eversource 2024 ESMP, p. 648.

gas investment.[136] The LDCs may also investigate non-electrification alternatives to the proposed gas infrastructure investments. If that is not applicable, the gas investment will occur.[137]

Joint Utility Planning Working Group

The gas and electric utilities are proposing to create a working group which will discuss all of the stages of IEP and promote coordination between the utilities, regulatory entities, and stakeholders. This working group will meet every two months with stakeholders[138] to continue ongoing IEP. The working group, and particularly the robust involvement of stakeholders, is endorsed by the Department: "[t]he Department emphasizes that joint electric and gas utility planning must occur in a broad stakeholder context so that the LDCs and electric distribution companies exclusively are not defining the process and outcome."[139] It will incorporate IEP processes from both international investor-owned utility affiliates and other jurisdictions which have begun carrying out IEP.[140]

The working group has not been established and there is no specific timeline for establishing it.

12.2. Department of Public Utilities Gas Planning Order

Appendix A contains a summary of the Department's order. This section includes some key requirements that have implications for the EDC's ESMPs.

Joint Electric and Gas System Planning

The section of D.P.U. 20-80 most relevant to Chapter 11 of the ESMPs is Section G(b) Comprehensive and Coordinated Planning. The Department establishes that the "evaluation of any proposed investments will have to take place in the context of joint electric and gas system planning."[141] The scope of Order 20-80 is limited to the LDCs, rather than both the LDCs and EDCs. However, the LDCs and EDCs have the same parent companies and thus are clearly aware of this requirement. The current ESMPs do not comply with this component of the order.

[136] Eversource 2024 ESMP, p. 647.

[137] Eversource 2024 ESMP, p. 648.

[138] National Grid 2024 ESMP, p. 462.

[139] Unitil 2024 ESMP, p. 286.

[140] Eversource 2024 ESMP, p. 650 and National Grid, pp. 458-459.

[141] FoG Order 20-80-B, p. 131.

Stakeholder Input

The EDCs proposed the creation of an Integrated Energy Planning Working Group.[142] The Department also highlighted the creation of a stakeholder process, sharing common characteristics with the ESMPs' proposed Joint Planning Working Group, in the Future of Gas Order.[143] This engagement process and the working groups will likely overlap with ESMP processes.

The requirement for joint planning also creates a stronger foundation to insist that cost-benefit analyses and ratepayer impact analyses conducted by the EDCs throughout the ESMP process factor in impacts on gas customers.

Hybrid Heating

The Future of Gas Order provides clarification on certain innovative electrification and decarbonization technologies, including networked geothermal, targeted electrification, hybrid heating systems, renewable hydrogen, and demonstration projects. Most importantly, the Order departs from the E3 study submitted by the LDCs and earlier EEA reports (The Decarbonization Roadmap and CECPs) by turning away from pathways reliant on hybrid electrification.

Instead, it promotes networked geothermal and targeted electrification. Targeted electrification occurs when "a participant would disconnect from the gas distribution system and fully electrify space heating and appliance loads."[144] The ESMPs, however, overestimate the role of hybrid heating and conflict with this Order. (See Section 4.4).

For the ESMPs to be consistent with the Gas Order, the *Full Electrification* scenario would need to be the "base case" for all demand forecasts used in the ESMPs. The 20-80 Order highlights how renewable natural gas and other liquids are inappropriate and how hybrid heating is only a short-term stop-gap. Put simply, the *Full Electrification* scenario is the only scenario in 2050 without gas and liquid fuels, along with an extremely small hybrid heating component. Therefore, though the Department does not endorse a specific pathway in the 20-80 Order, its rejection of hybrid heating implies that the ESMPs should be evaluated based on compliance with the *Full Electrification* scenario.

Climate Compliance Plans

Gas utilities will be required to file Climate Compliance Plans to be issued every five years starting in 2025. Each plan must include total investments required as well as an analysis and cost estimate for alternative potential investments. After each deadline, the companies will have nine months to file an additional Climate Act Compliance Term Report Filing to demonstrate whether or not they have achieved required emissions reductions.

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[142] Eversource ESMP p. 650.

[143] FoG Order 20-80-B, p. 131.

[144] FoG Order 20-80-B, p. 86.

Standards for Justifying Gas Investments

Going forward, before gas utilities can recover any system replacement investments, the gas utilities will be required to prove that those replacement investments are consistent with state emissions reduction targets, that they adequately considered non-gas pipeline alternatives (which use electrification, thermal networked systems, targeted energy efficiency, and demand response), and that replacement was the best alternative.

Addition of New Customers

Order 20-80 seeks to develop a ratemaking approach to disincentivize gas utilities from adding new customers and starts by directing the companies to review the potential magnitude of stranded investments, identify the impacts of accelerated depreciation proposals, and identify potential alternatives.

13. METRICS

13.1. Comparison of Metrics to Goals Established by Legislation

The EDCs jointly proposed the same set of metrics. The purpose of the metrics is to evaluate whether and the extent to which the ESMPs address each of the goals associated with grid modernization in the Act on Climate.

The EDCs proposed eight metrics, including three stakeholder metrics and five investment metrics. The EDCs note that the stakeholder metrics are to be measured immediately whereas the investment metrics will be delayed to align with the start of the ESMP investments.

The stakeholder metrics are summarized below.

1. Number of outreach meetings about EDC's ESMP filing with stakeholders
2. Number of outreach meetings about infrastructure projects with stakeholders
3. Number and category of requests made as part of stakeholder feedback on infrastructure projects (Implemented during pre-permitting & permitting phase of projects)[145]

We attempted to align the investment metrics with the Act on Climate Grid Modernization Goals in Table 18 below.

[145] Exhibit ES-Metrics-1, Page 4

Table 18. Alignment of Metrics with Grid Modernization Goals

Goals for Grid Modernization	Investment Metrics
Improve grid reliability, communications, and resilience	Investment Metric: Percentage of customers benefiting from incremental resilience investments
Enable increased, timely adoption of renewable energy and distributed energy resources	Investment Metric: Increase in DER hosting capacity and substation load-serving capacity including what percentage of these benefits are located in environmental justice communities Investment Metric: Number of DERM sites, kW of non-company owned dispatchable assets, number of times assets dispatched
Promote energy storage and electrification technologies necessary to decarbonize the environment and economy	Investment Metric: GHG impact of proposed investments
Prepare for future climate-driven impacts on the transmission and distribution systems	
Accommodate increased transportation electrification, increased building electrification and other potential future demands on distribution and, where applicable, transmission systems	Investment Metric: Ready for load dates
Minimize or mitigate impacts on the ratepayers of the Commonwealth, thereby helping the Commonwealth realize its statewide greenhouse gas emissions limits and sublimits under Chapter 21N	

Sources: MA Legislature.gov, General Law - Part I, Title XXII, Chapter 164, Section 92B. Exhibit ES-Metrics-1, page 5.

13.2. Details by Electric Distribution Company

Eversource

Eversource provides detailed DER baselines for connected DERs, historical reliability in the form of SAIFI and SAIDI, and substation capacity.

Eversource provides a description of the efforts to ensure information is accessible to environmental justice communities on page 51 of its ESMP. For example, meetings will be accessible to both 9 to 5 workers and other shift workers by providing variable meeting times, and meeting materials. Also, Eversource will translate communications into multiple languages according to the language identification data it collected.

National Grid

National Grid provides detailed DER, reliability, and substation capacity baselines in Chapter 4 of the ESMP.

National Grid includes SAIFI and SAIDI historical data for 2018–2022 desegregated by subregion.[146] The graphs provided summarize four years of outages by cause on blue sky days and additional maps provide data on the outage impact on environmental justice communities.

Until

In addition to data on current DER hosting capacity by substation, Unitil provides data about the number of each type of DER currently connected to its system as well as the capacity breakdown by DER type.[147] Aside from these statistics, Unitil does not quantify other baselines and target outcomes.

13.3. Consultant Comments

- Eversource's commitment in its ESMP to ensuring the accessibility of meetings is an important step to making sure the meetings are attended by the intended stakeholders. The proposed stakeholder metrics do not measure the reach of stakeholder engagement efforts. Quantifying the number of languages in which feedback was submitted could capture the reach of stakeholder engagement efforts, especially when compared to the language identification data Eversource is collecting.
- The EDCs did not propose investment metrics for some Act on Climate goals. In particular, cost-efficiency metrics are missing.
- Also, many goals have one or two investment metrics at most. There are many existing metrics that could help to measure performance of the ESMPs in achieving the Act on Climate goals and could be applied to this effort. Some consistency in the metrics used to evaluate different packages of investments over time can enable comparisons between one round of investment (i.e., ESMP investments) to another (i.e., Core investments). There is currently little overlap between ESMP metrics and metrics associated with other grid modernization efforts.
- It is unclear how the proposed investment metrics will measure the performance of ESMP investments separately from that of non-ESMP investments and ensure there is no double-counting. It is unclear whether the EDCs will report the investment metrics at the measure level as well as in aggregate to provide greater transparency and help alleviate concerns around double-counting.

[146] NG-ESMP Chapter 4.

[147] UN-ESMP, page 57-59, table 10-11.

- While the EDCs specify start dates for the reporting, they do not specify the reporting schedule, frequency, and duration of this reporting. The investment metrics proposed by the EDCs are measured from the end of the permitting process, prior to the completion of construction.
- It is also not clear whether the EDCs intend to provide reporting post construction and whether that reporting will measure achieved vs. planned performance.
- Also, this timing will not provide a historical baseline to compare to once the project is completed. No EDC has provided detail on how they will calculate baselines, though some useful data for calculating baselines are present in the ESMPs as detailed below.
- The EDCs should provide investment metrics for the proposed ESMPs as they can be useful in determining whether the ESMP should be approved as proposed. For example, we did not see data in the ESMPs on the number and percentage of customers benefiting from each of the EDC's proposed investments (it would be helpful to have this information for more than just resilience investments as proposed by EDCs). We also did not see data in the ESMPs on the number of environmental justice customers benefiting from each of the EDC's proposed investments; this would be helpful to have for all of the proposed investment categories as well.
- EDCs did not propose to measure the accuracy of their estimates of capacity needs and the timing of those needs. A metric that compares enabled to installed capacity due to solar, batteries, EVs, and heat pumps can be useful to confirm that the EDCs are not overbuilding the system and that alternative approaches to mitigate these capacity needs are being appropriately accounted for in forecasts and future ESMP plans.

14. EDC RESPONSES TO GMAC RECOMMENDATIONS

A detailed list of the EDC's responses to all the GMAC recommendations is provided in Appendix B. This section provides a summary of the themes that we found in the EDC's responses.

The GMAC provided a total of 88 recommendations to the EDCs in response to their 2023 ESMPs. In addition, the Equity Working Group put forward 12 recommendations concerning the same plans. The EDCs in turn responded to each of these recommendations within their 2024 ESMPs.

At first pass, the EDCs appear to be generally amenable to these recommendations. The EDCs are also highly aligned in their responses, agreeing on whether to "Adopt," "Adopt with Modifications," or "Reject" individual recommendations for all recommendation but one: the recommendation about information on substation flooding vulnerabilities in Section 4 (R-22). In total, the EDCs adopt 26 of the 100 total recommendations, adopt but modify 63 of the recommendations, and reject 11 of the recommendations.[148] Table 19 presents a summary of the EDCs' responses to GMAC recommendations, by report section.

Table 19. Summary of EDCs' responses to GMAC recommendations

	Adopted	Adopted But Modified	Rejected
Section 1: Overarching Recommendations	1	10 (7)	0
Section 2: Compliance with the Climate Act	1	1	0
Section 3: Stakeholder Engagement	1	3	1
Section 4: Current State of the Distribution System	0	4 (1)	0
Section 5: 5- and 10-Year Electric Demand	3	4 (1)	0
Section 6: 5- and 10-Year Planning Solutions	5	14 (3)	0
Section 7: 5-Year Electric Sector Plan	4	2 (1)	1
Section 8: 2035-2050 Policy Drivers	4	3 (1)	0
Section 9: 2035-2050 Solution Set	2	0	0
Section 10: Reliable and Resilient Distribution System	2	3 (2)	0
Section 11: Integrated Gas-Electric Planning	0	2	5
Section 12: Workforce, Economic, and Health Benefits	1	2	1
Section 13: Conclusion	1	6 (5)	1
Section 14: Equity Working Group Recommendations	1	9 (3)	2

The indication that a recommendation has been "Accepted, but modified" may mean many several different things. In certain cases, the EDCs have essentially accepted the recommendation and have only

[148] For these summary purposes, R-22 is counted as "Adopted, but modified" since National Grid and Until both provide this disposition and only Eversource has accepted the recommendation.

introduced very modest changes. Or, alternatively, the EDCs have expressed full agreement with the recommendation but state concern about their ability to strictly fulfill all aspects of the recommendation. In other cases, the modification is the dominant feature, with acceptance of only a limited portion of the original recommendation. Still, in many other cases, the EDCs have indicated that a recommendation is accepted with modifications because the EDCs have not been able to fully comply with the recommendation for this ESMP given statutory time limitations. In these instances, the EDCs generally put forward a boilerplate expression of support for the recommendation in concept but indicate that the EDCs have not been able to comply within the appointed timeframe. Often, in these instances, the EDCs suggest specific procedural next steps (e.g., generic proceedings) and set forward timelines for effectuating the recommendation (e.g., in the *next* ESMP).

In total, the EDCs indicate that 24 recommendations have "Accepted, but modified" because of the inability to comply with recommendations in the current ESMP cycle. This disposition is most common for the overarching recommendations – with seven out of eleven (64 percent) of these recommendations being deferred, including all recommendations involving further stakeholder process (R-3 through R-8) and the recommendation that the ESMPs include consideration of alternative rate designs (R-10).

As noted above, the indication of acceptance with modification *does not* necessarily mean that a recommendation has been substantively accepted. Some of the recommendations offered by the GMAC with the greatest potential implications on the ESMP process are deemed "Accepted, but modified" when in actuality, they have been substantively rejected. One example of this dynamic is seen in the EDCs response to the first recommendation offered by the GMAC, which is provided below:

> R-01. The EDCs should include in their ESMPs more detail on whole-of-business strategic planning, program implementation and investment timelines, and plans for continued sector-specific stakeholder engagement through either existing or new working groups. The ESMPs should be the central distribution system planning document and any filing in which the EDCs have received or requested cost recovery should be clearly described and connected. The GMAC and ESMP process represents an opportunity to ensure that the EDC distribution system plans meet the objectives in the Climate Law, coordinate multiple investment streams, propose right-sized future investments, and ensure stakeholder engagement and input.

The response to this recommendation from the EDCs is largely dismissive. Notably, the EDCs reject the indication that the ESMPs should be the "central distribution system planning document" because this would exceed the scope of the Climate Act and the discrete objectives for the ESMP process set forth in this law. The EDCs contend in their response to this recommendation that "ESMPs should remain focused on the information required by statute, for the purpose delineated by statute, and need not be laden with the myriad of information already required by Department precedent to be provided in other regulatory filings." Nonetheless, the EDCs indicate that this recommendation has been "Accepted, but modified" because they have included information on investment timelines in their plans.

Another example of a recommendation that has been designated as accepted with modifications but is substantially *not* accepted is R-06, concerning load forecasting. While this is a multipart recommendation, core components of it including the call for the inclusion of sensitivities in the short-term load forecast and additional clarity about the relationship between the load forecast and the investments proposed have not been accepted. While the EDCs do offer justification for the exclusion of sensitivities from the short-term forecasts of Eversource and Until (National Grid includes sensitivities), the EDCs do not respond to the portion of this recommendation calling for better elucidation of the relationship between the load forecast and investment proposal.

As noted above, the EDCs reject a total of 11 recommendations, with nearly half of the rejected recommendations (5) in Section 11 on integrated gas-electric planning. The EDCs also reject recommendations in the following sections: Section 3: Stakeholder Engagement (1 recommendation rejected); Section 7: 5-Year Electric Sector Plan (1 recommendation rejected); Section 12: Workforce, Economic, and Health Benefits (1 recommendation rejected); Section 13: Conclusion (1 recommendation rejected); Section 14: Equity Working Group Recommendations (2 recommendations rejected).

The EDCs reject several recommendations from the GMAC on integrated gas-electric planning on the basis that these recommendations fall outside the scope of the GMAC/ESMP process or concern topic areas outside the purview of the EDCs:

- Concerning the first recommendation on integrated gas-electric planning (R-70), that the ESMPs should detail how the transition from gas to electric will be coordinated and where the two systems overlap, and provide recommendations for how this transition occurs, the EDCs respond that per D.P.U. 20-80-B Order, evaluation of gas investments is to occur in a joint gas-electric planning context with stakeholder participation. Similarly, for both the second recommendation in this section (R-71), which calls for the ESMPs to provide more detail about future integrated planning, and for the sixth recommendation in this section which addresses the need for information on Climate Act impacts and integrated planning, the EDCs reference the response to R-70.
- For the fourth recommendation in this section (R-73), which calls for information on gas and utility customer rate impacts, and for the fifth recommendation (R-74), which calls for information on costs and benefits to gas customers in the context of net benefit analysis, the ESMPs stress that their focus is on electric customer impacts.

Several of the other recommendations that are rejected by the EDCs concern the approach to evaluating and selecting investment solutions.

- The EDCs reject the fourth recommendation from Section 7 on the 5-Year Electric Sector Plan, which calls for a standardized approach to solution prioritization, selection, and investment-deferral decisions, and for the EDCs to develop and codify standardized processes for engaging with stakeholders throughout the investment decision-making process, on the basis that the EDCs are “different companies with different organization structures…”

- The EDCs reject the third recommendation from Section 12 on Workforce, Economic, and Health benefits, which calls for consideration of job losses in addition to job gains, and for the evaluation of the macroeconomic impacts of electric and gas rates, because of the (implied) limitations of the EDCs' macroeconomic modeling tool (RIMS II), and because job losses are "out of scope for the ESMP."

- The EDCs reject much of the fifth recommendation from the concluding Section 13, which suggests detailed guidelines for evaluating the net benefits of proposed investments by indicating that have already developed an analytical framework with support from experts and grounded in best practices.

Finally, the EDCs reject three recommendations with implications for equity:

The EDCs reject the second recommendation from Section 3 on Stakeholder Engagement that the CESAG should be included within the structure of the GMAC, and possibly as a part of the Equity Working Group (R-15), because "the CESAG and GMAC and/or Equity Working Group serve different purposes." The EDCs response to this recommendation stresses that while the EDCs are primarily responsible for providing safe and reliable electric service to customers (and perhaps by implication, suggesting a limit to the appropriate scope for the GMAC and ESMP) –but that they can also accomplish energy justice goals– the CESAG is intended to facilitate partnership between the EDCs and community-based organizations.

The ECDs also reject the final two recommendations from Section 14, which contains the recommendations of the Equity Working Group: that Disadvantaged communities, EJCs, and LMI customers should have priority access to innovative financing, technology, energy-efficiency upgrades, building weatherization, and electrification adoption (EWG-11), and that the EDCs should work to rectify any existing differences in service quality by working with disadvantaged communities and should also work to remedy anticipated future differences in service quality in communities whose infrastructure is vulnerable to climate change impacts, as identified by the EDCs' climate vulnerability assessments (EWG-12).

Concerning EWG-11, the EDCs do not categorically reject this recommendation but rather reply that it is better addressed through the respective three-year efficiency plans of the EDCs and in the context of the Energy Efficiency Advisory Council. On the other hand, the EDCs do categorically reject EWG-12, stating that they "disagree with the premise of this recommendation," because service quality is a system-wide issue, it is reviewed in separate service quality proceedings, and because environmental justice communities do not, on average, experience worse reliability than other communities within the EDCs' service territories.

APPENDIX A. DEPARTMENT ORDER 20-80 ON GAS PLANNING

A1. Procedural History

This Appendix summarizes the recent Gas Order published by the Department December 6, 2023, that establishes a framework for managing the gas distribution industry through the clean energy transition. The Order makes recommendations and orders and identifies future areas of inquiry.

The Department has broad authority to supervise gas companies, and its regulatory authority has been developed to focus more on GHG emissions reductions, beyond traditional concerns such as reliability, affordability, etc. Specifically, in 2021 the Legislature added Section 1A to G.L. c. 25 of the Climate Act, which provides:[149]

> "In discharging its responsibilities under [chapter 25] and chapter 164, the department shall, with respect to itself and the entities it regulates, prioritize safety, security, reliability of service, affordability, equity and reductions in greenhouse gas emissions to meet statewide greenhouse gas emission limits and sublimits established pursuant to chapter 21N."

In 2020, the Department opened Case No. 20-80 to "develop a regulatory and policy framework to guide the evolution of the gas distribution industry in the context of a clean energy transition that requires the Department to consider new policies and structures to protect ratepayers as the Commonwealth reduces its reliance on natural gas." At the same time, the EEA was in the process of developing the 2050 Decarbonization Roadmap[150] and initial CECP for 2030 to analyze feasible pathways for the energy transition to meet MA's GHG reduction targets (another CECP for 2050 was published later).[151] To recap, those targets are: to reduce GHG emissions between 10 and 25 percent from 1990 levels by 2020, at least 50 percent from 1990 levels by 2030, at least 75 percent from 1990 levels by 2040, and achieve net-zero emissions by 2050 with a gross reduction in emissions of 85 percent from 1990 levels.[152]

As part of this docket, the Department ordered Massachusetts' LDCs to hire an independent consultant to evaluate strategies to achieve net zero emissions, building off the 2050 Roadmap. The gas utilities worked with E3 consultants and added to the scope by including recommendations for new business models, regulatory frameworks, and other initiatives that could be implemented in the short-term. E3's final report, known as the "Pathways Report" and published March 18, 2022, included analyses of rate base and revenue over time, customer costs and decision-making, and quantified impacts of targeted electrification to allow asset retirement.

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[149] Future of Gas Order, pp. 18 – 19.

[150] https://www.mass.gov/info-details/ma-decarbonization-roadmap

[151] https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2025-and-2030; https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2050.

[152] Global Warming Solutions Act G.L. c. 21N § 4.

Later that March, the Department initiated a stakeholder review process where it received over 230 initial comments.

The Department ultimately issued the Order on Regulatory Principles and Framework (Order 20-80) in this docket on December 6, 2023.

A2. E3 Report: Pathways

This section provides a high-level overview of the E3 report produced for this docket.

Pathways and Uncertainties

The Pathways Report[153] identified six uncertainties to inform their sensitivity analysis. These assumptions were:[154]

1. Incremental costs of cold-climate air-source heat pumps
2. Technical performance of cold-climate ASHPs
3. Incremental electric sector distribution system costs
4. Networked geothermal system installation costs
5. Cost and availability of renewable fuels
6. Opportunities for gas system cost avoidance

The consultants modeled several pathways, all designed to comply with climate legislation. Table 1 provides an overview of those pathways.

[153] The Future of Gas See Customer Resources -> Final Independent Consultant Reports

[154] FoG Order, p. 23.

Table 20. Key Narratives by Decarbonization Pathway[155]

Pathway	Overview	Projected Cumulative Energy System Cost $2020
Low Electrification (inspired by 2050 Decarbonization Roadmap *Pipeline Gas*)	High electrification in the transportation sector. Buildings partly electrify. Building sector electrifies 65 percent of buildings through the adoption of ASHPs. Gas customer count declines by 40 percent compared to today.	$73 billion to $95 billion
High Electrification (inspired by 2050 Decarbonization Roadmap *All Options*)	High electrification in both buildings and transportation sector. Building sector electrifies more than 90 percent primarily through the adoption of ASHPs.	$87 billion to $111 billion
Interim 2030 CECP	Accelerated electrification and building shell measures based on the interim 2030 building sector target.	$93 billion to $121 billion
Hybrid Electrification	Heat pumps are paired with gas or fuel oil backup to mitigate electric sector impacts. More than 90 percent of buildings electrify through ASHPs paired with renewable gas back-up (hybrid heat pumps) that supply heating in cold hours of the year.	$63 billion to $92 billion
Networked Geothermal	Part of the gas system is strategically replaced by networked geothermal systems. LDCs evolve their business model and convert +/- 25 percent of the building sector to networked geothermal systems. Remaining gas customers use renewable gas as their main source of heating by 2050.	$81 billion to $124 billion
Targeted Electrification	Part of the gas system is strategically decommissioned with customers adopting ASHPs. More than 90 percent of buildings are electrified through a combination of technologies. LDC customers converting to ASHPs do so in a "targeted" approach.	$73 billion to $109 billion
Efficient Gas Equipment	Building sector will adopt increasingly efficient gas appliances supplied by decarbonized gas. The industrial sector converts to dedicated hydrogen pipelines	$66 billion to $105 billion
100 Percent Gas Decommissioning	Building sector and industry will fully electrify allowing for 100 percent decommissioning of the gas distribution system. Building and industrial sectors fully electrify by 2050. +/- 25 percent of the building sector converts to networked geothermal systems.	$94 billion to $135 billion

Additionally, each pathway was evaluated by the following criteria:[156]

1. Cumulative energy system costs
2. Technology readiness
3. Air quality
4. Workforce transition
5. Customer practicality
6. Near-term customer affordability

[155] FoG Order, pp. 25-26.

[156] FoG Order, p. 27

7. Long-term customer affordability
8. Customer equity

Summary of E3 Conclusions

The report generally shows that gas throughput declines in all pathways, requiring transformational changes in customer end uses, energy supply, and networks and coordination among gas and electric utilities. The analysis highlighted the opportunity to use targeted electrification to reduce gas system investment and mitigate cost recovery challenges and stranded costs from customer migration that may be substantial in several pathways. The consultants reported that building electrification will be key to achieving net-zero emissions and customers will likely ultimately rely on electricity for most heating needs. The Report also recommended that gas utilities promote hybrid electrification strategies.

A3. The Department's Responses to the E3 Report

This section covers the Department's responses to E3's regulatory design recommendations and some of the Order's most important conclusions about the Future of Gas across many areas, with the most important points highlighted for each section. E3 made six regulatory design recommendations covered by the following headings:

1. Support customer adoption of and conversion to electrified/decarbonized heating technologies
2. Blend renewable gas supply into gas-resource portfolios
3. Pilot and deploy innovative electrification and decarbonized technologies
4. Manage gas embedded infrastructure investments and cost recovery
5. Evaluate and enable customer affordability
6. Develop LDC transition plans and chart future progress

Support Customer Adoption of and Conversion to Electrified/Decarbonized Heating

Energy Efficiency

The Department generally found that LDCs will need to increase the level of energy efficiency implementation beyond what has been seen in the 2022-2024 Three-Year Plans. It urged LDCs to pursue non-ratepayer sources of funding but rejected an exit fee as a measure for increasing energy efficiency funding, as this would make electrification more expensive.[157] It directed program administrators to seek outside funding more aggressively than previously. Further, the Department emphasized that there should be more stakeholder and workforce engagement on the part of the LDCs.[158]

Restructuring of Electric and Gas Rates

The Department found that the LDCs should switch from per-customer revenue decoupling to a total revenue or revenue cap decoupling mechanism.[159] In this section, the Department also highlighted its

[157] FoG Order, p. 52.

[158] FoG order, pp. 53-54.

[159] FoG order, p. 54.

disapproval of reliance on hybrid heating. It ordered that the LDCs must provide customers with information on the capabilities of heat pumps so that they can assess the need for backup heating, in the view that backup heating may be unnecessary.[160] Further, no costs associated with marketing of natural gas services shall be permitted to be included in rates.[161]

Affordability and Customer Choice

The department did not think it has the statutory authority to prohibit the addition of new gas customers but stated that LDCs shouldn't serve new customers where the addition of new customers would raise the cost of gas service for existing firm ratepayers.[162] Costs associated with extending service to new customers were also reviewed in Section VI.E. of the Order.

Blend Renewable Gas Supply Into Gas-Resource Portfolios

The Order established that RNG does not meet the Department's least-cost supply planning standards, thus inclusion of RNG to LDC's resource pipeline would "violate our goal of providing gas service at the lowest possible cost."[163] The Department found that there are insufficient RNG stocks to support RNG dependent pathways.[164] If an LDC offers a customer RNG, it must be voluntary and all associated costs must be recovered by the RNG opt-in participants.[165] Further, all LDCs must create separate accounting for RNG costs.[166] Further, all costs associated with RNG must be borne by utility shareholders or opt-in participants:

> "If the LDCs need to upgrade their systems or incur additional interconnection and metering equipment costs to make these fuels available, all of the relevant system-upgrade costs, in addition to traditional costs borne by gas ratepayers, must be assumed by those who will take RNG supply and not by all customers."[167]

Pilot and Deploy Innovative Electrification and Decarbonized Technologies

The Department considered the proposal that the LDCs pilot and deploy the following four technologies: (1) networked geothermal, (2) targeted electrification, (3) hybrid heating, and (4) renewable hydrogen. It found networked geothermal projects to have the highest potential impact on GHG emissions and also supported targeted electrification.

[160] FoG order, p. 55.

[161] FoG order, p. 56.

[162] FoG order, p. 58.

[163] FoG Order, p. 68.

[164] FoG Order, pp. 68 – 69.

[165] FoG Order, pp. 70- 71.

[166] FoG Order, p. 71.

[167] FoG Order, p. 71.

Networked Geothermal

The Department generally welcomes networked geothermal technology. Upon the results of the evaluation of current networked geothermal demonstrations, more guidance on networked geothermal will be issued.[168]

Targeted Electrification

The Department generally welcomes targeted electrification technologies. Targeted electrification consists of when "a participant would disconnect from the gas distribution system and fully electrify space heating and appliance loads."[169] The Department rules that each LDC must work with overlapping EDCs to study the feasibility of piloting targeted electrification.[170]

Hybrid Heating Systems

It appears as though the department would reject hybrid heating outright if it had the ability to do so: "The Department cannot reject or prohibit hybrid heating systems as an option for customers."[171] It ruled that no additional ratepayer dollars may be used for hybrid heating systems, and should instead focus on targeted electrification and networked geothermal.[172]

Given that hybrid heating will occur, the Department is issuing data mandates for the LDCs regarding hybrid heating in their Climate Compliance Plan filings.[173] Note: this is contradictory to the expectations in the E3's report.

Renewable Hydrogen and RNG

The Department found that Hydrogen should only play a modest role in our future energy system. Targeted end uses may have hydrogen demonstrations, including a thorough explanation of how the application is hard to decarbonize.[174] The department also ruled that no projects can contribute to a decline in indoor air quality.

As for RNG, pilots must include cost-effectiveness screening or in its absence, an outline of net benefits.[175]

[168] FoG Order, p. 86.

[169] FoG Order, p. 86.

[170] FoG Order, p. 87.

[171] FoG Order, p. 81.

[172] FoG Order, p. 81.

[173] FoG Order, p. 82.

[174] FoG Order, p. 84.

[175] FoG Order, p. 84.

Manage Gas Embedded Infrastructure Investments and Cost Recovery

There will be a decline in the number of LDC customers and system utilization. This causes two issues: higher costs for remaining customers, and mismatch between how infrastructure costs are currently recovered and predicted system utilization.

Pre-Authorization and Capital Investments

The Department determined that pre-authorization is not appropriate.[176] The Department encourages investment in non-gas pipeline alternatives such as energy efficiency, demand response, electrification, and networked geothermal. The recoverability of additional investment in natural gas infrastructure will require an analysis of whether such investments are consistent with state emissions reduction targets and the thorough evaluation of non-gas pipeline alternatives. As part of any future cost recovery proposals, LDCs will bear the burden of demonstrating that non-gas pipeline alternatives were adequately considered and found to be non-viable or cost prohibitive in order to receive full cost recovery.[177]

Line Extensions

The Department determined that the standards for investments to serve new customers should be revised. A review of existing tariff policies is required to determine: (1) the number of de facto free extension allowances; (2) possible mismatches in income and recovery investment timing; (3) whether new customers be incentivized relative to state policy.[178]

Statutory and legislative changes may be necessary; the Order suggests the legislative repeal of Section 3 of Gas Leaks Act which promotes investments in new main and service extensions.[179] The department will now define "public interest" in the context of broader climate mandates rather than existing natural gas customers.[180]

Additionally, alternative electrification proposals will be given more heft in the review process.[181]

Accelerated Depreciation

The energy transition poses important questions about depreciation and stranded assets that the LDCs and stakeholders wanted addressed.[182] Stranded assets are assets beyond their useful life, and utilities

[176] FoG Order, p. 97.

[177] FoG Order, p. 98.

[178] FoG Order, p. 99.

[179] FoG Order, p. 100.

[180] FoG Order, p. 100.

[181] FoG Order, p. 101.

[182] FoG Order, p. 101.

can no longer recover a return on them. As the energy system is expected to move away from gas, gas system investments increasingly risk of becoming stranded assets. Accelerated depreciation would allow utilities to reduce the useful life of an asset and recover costs on an accelerated basis.

As an initial step to address these questions, the Department has ordered a comprehensive review. LDCs must forecast the magnitude of all stranded investments.[183] LDCs must also investigate cost recovery of existing infrastructure investment balancing ratepayer and shareholder risk, while addressing affordability and equity concerns.[184] This review is an initial step.[185]

Evaluate and Enable Customer Affordability

Transition Costs

The increasing number of gas customers leaving the gas system will likely result in higher rates for remaining gas customers.[186] A transition framework will be developed to identify and quantify: (1) uncollected costs from previously-gas customers; (2) costs associated with design and implementation of proposed regulatory reforms; (3) workforce transition; (4) costs associated with restructuring gas supply portfolios.[187] The impact of such transition should be evaluated via: (1) by-customer-class bill impacts; (2) GHG emissions reductions; (3) public health and safety; (4) equity.[188]

Alternative Cost Recovery

No gas-customer exit fee should be implemented, due to disincentive to electrification.[189] Securitization will not be implemented due to lack of scope of impacts.[190] There will be further investigation on alternative funding mechanisms.[191]

To explore strategies to better serve low-income populations, the Department encourages the LDCs to work with the Energy Efficiency Advisory Council regarding weatherization, further energy efficiency funding, and heat pump installation.[192]

[183] FoG Order, p. 101.

[184] FoG Order, p. 102.

[185] FoG Order, p. 101.

[186] FoG Order p. 117.

[187] FoG Order, pp. 117 – 118.

[188] FoG Order, p. 118.

[189] FoG Order, p. 119.

[190] FoG Order, p. 120.

[191] FoG Order, p. 120.

[192] FoG Order, pp. 120-121.

Develop LDC Transition Plans and Chart Future Progress

The department will not commit to a single pathway.[193]

Comprehensive and Coordinated Planning

This section is probably the most relevant to the ESMPs. The Department stated that the EDCs and LDCs will need to work in tandem for the energy transition: "Any proposed investments will have to take place in the context of joint electric and gas system planning."[194] Furthermore, EDCs and LDCs should consult with stakeholders in a joint planning process.

There will not be a comprehensive map of the gas distribution network to facilitate planning, as suggested by the Attorney General, due to confidential information issues.[195] At this time, there will also be no directives that may contradict upcoming Gas System Enhancement Plans (GSEPs).

Climate Compliance Plans

Climate Compliance Plans will be issued every five years, beginning April 1, 2025.[196] These plans will expand on previous Net Zero Enable Plans by including: (1) Contribution to sublimits for both scope 1 and scope 3 emissions; (2) satisfy standards related to safety, reliability etc.; (3) propose pilots; (4) incorporate evaluation from prior metrics; (5) implement recommendations for future plans.[197] The Climate Compliance Plan will include total investment required and at least one alternative method of meeting emissions reductions with reasoning why alternative was not chosen.

To track compliance with the Commonwealth's interim emissions reduction deadlines, each LDC will be required to file an informational Climate Act Compliance Term Report Filing nine months after each interim deadline (i.e., 2025, 2030, 2035, 2040) indicating whether or not the LDC achieved the required emissions reductions.[198]

Climate Compliance Incentives

PBR will be continued. The LDCs should file PIMs related to climate compliance in the next proceeding.[199]

[193] FoG Order, p. 130.

[194] FoG Order, p. 131.

[195] FoG Order, p. 132.

[196] FoG Order, p. 134.

[197] FoG Order, pp. 134 – 135.

[198] FoG Order, p. 135.

[199] FoG Order, p. 136.

APPENDIX B. EDC RESPONSES TO GMAC RECOMMENDATIONS

This will include the document that we sent to the GMAC on February 12.

Introduction

In September 2023, Massachusetts electric distribution companies (EDCs) submitted their draft electric system modernization plans (2023 ESMPs) to the Massachusetts Grid Modernization Advisory Council (GMAC). In November 2023, the GMAC issued a set of recommendations regarding how the 2023 ESMPs could be improved to better meet multiple state energy policy goals and statutory requirements. In January 2024, the EDCs submitted updated ESMPs (2024 ESMPs) to the Department of Public Utilities for review. In those ESMPs, the EDCs provided explanations of whether and how they complied with the GMAC recommendations.

The purpose of this document is to collate the EDC responses to the GMAC recommendations into one place. Each of the EDCs provide their own responses to the recommendations in several different documents. All of the responses are summarized in the tables below, with references to where they can be found in the 2024 ESMP filings. The tables below are organized according to the chapters in the 2024 ESMPs.

Further, the ESMPs provide some text explaining whether and how they accepted, accepted with modifications, or rejected the GMAC recommendations. That text is also provided below each of the tables. The GMAC recommendations are presented below in black text and the EDC's responses are provided below that in red text.

The GMAC consultants are currently preparing a set of comments on the 2024 ESMPs for the GMAC. This document will be an appendix to those comments.

This document does not provide any response from the GMAC consultants regarding the EDCs' responses below. Any such responses will be summarized in the forthcoming comments from the consultants.

Overarching Recommendations

Table 21. EDCs' Compliance with Overarching Recommendations

Recommendations	EDC Disposition	References
R-01. Whole-of-Business Planning	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 1, 13, and 14 Exh. ES-ESMP-1, at Section 4.1.6 Exh. NG-ESMP-1, at Appendix Exh. UN-ESMP-1, at Section 1.7
R-02. Proposed Investment Status	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 2 and 15 Exhs. ES-ESMP-1, NG-ESMP-1 and UN-ESMP-1 at Section 7.1 Exhs. ES-ESMP-1 and NG-ESMP-1 at Glossary Exh. UN-ESMP-1 at Definitions
R-03. Long-Term DG Planning Process	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 2, 16, and 17
R-04. Interconnection Cost Allocation Methodology	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 3 and 18 Exhibits ES-Stakeholder-1_2_3_4, pages 1 and 6
R-05. Streamlined Review of Group Studies	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 3 and 19
R-06. Load Forecast Transparency	Adopted, but modified	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 1, 5, and 6
R-07. Investment Alternatives and Alternative Approaches to Financing Investments	Adopted, but modified	Exhibits ES-Bill Impacts-1_2, GMAC Recommendations, pages 1, 4, and 5 Exh. ES-ESMP-1, at Sections 4.1.7, 6.5 through 6.8, and 7.1; Exh. NG-ESMP-1, at Section 6.4 and 7.1; Exh. UN-ESMP-1, at Section 6.4.
R-08. Equity Working Group Recommendations	Adopted, but modified	Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 1 and 7 Exhibit ES-Stakeholder-2; Exhibit NG-Stakeholder-2; Exhibit UN-Stakeholder-2.
R-09. Policies Supporting Distribution System Development	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 4 and 20 Exhibit ES-ESMP-1, at Section 9.4; Exhibit NG-ESMP-1, at Section 6.4; Exhibit UN-ESMP-1, at Sections 7.3 and 9.6
R-10. Alternative Rate Designs	Adopted, but modified	Exhibits ES-Bill Impacts-1_2, GMAC Recommendations, pages 2 and 6 Exhibits ES-ESMP-1, NG-ESMP-1, and UN-ESMP-1, at Section 9.6
R-11. Standardized Definitions of Key Terms	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 4 and 21 Exhibits ES-ESMP-1 and NG-ESMP-1 at Glossary Exhibit UN-ESMP-1, at Definitions

R-01. The EDCs should include in their ESMPs more detail on whole-of-business strategic planning, program implementation and investment timelines, and plans for continued sector-specific stakeholder engagement through either existing or new working groups. The ESMPs should be the central distribution system planning document and any filing in which the EDCs have received or requested cost recovery should be clearly described and connected. The GMAC and ESMP process represents an opportunity to ensure that the EDC distribution system plans meet the objectives in the Climate Law,

coordinate multiple investment streams, propose right-sized future investments, and ensure stakeholder engagement and input.

Rejected. This part of the recommendation seeks this ESMP to be the EDCs' respective "central distribution system planning document" that includes "any filing in which the EDCs have received or requested cost recovery" and "connect such filings" to the investments listed in each ESMP. If implemented, this recommendation would potentially create an ESMP that is beyond the scope of G.L. c. 164, § 92B(a), which states that the ESMPs should be plans to proactively upgrade the distribution system (and where applicable, transmission systems) to:

(1) improve grid reliability, communications and resilience;

(2) enable increased, timely adoption of renewable energy and distributed energy resources;

(3) promote energy storage and electrification technologies necessary to decarbonize the environment and economy;

(4) prepare for future climate-driven impacts on the transmission and distribution systems;

(5) accommodate increased transportation electrification, increased building electrification and other potential future demands on distribution and, where applicable, transmission systems; and

(6) minimize or mitigate impacts on the ratepayers of the commonwealth, thereby helping the commonwealth realize its statewide greenhouse gas emissions limits and sublimits under chapter 21N.

These very important public policy goals are but a subset of goals that each EDC is required to plan their respective distribution systems to meet. Although each ESMP presented to the Department includes comprehensive details regarding each EDC's "whole-of-business" strategic planning, the statutory purpose of the ESMP is not to represent the entire planning scope for each EDC. The Department requires information on each EDC's broader distribution planning to be developed and presented to the Department on different timelines than the ESMPs, and include a series of detailed information supporting such filings. See e.g., D.P.U. 23-ARR-1. The ESMPs should remain focused on the information required by statute, for the purpose delineated by statute, and need not be laden with the myriad of information already required by Department precedent to be provided in other regulatory filings. The EDCs note that the Clean Energy Transmission Working Group issued its report on transmission planning in December 2023.

At minimum, the EDCs should all provide summary figures that show the timelines for how their grid planning and operational practices will evolve over time to meet the Commonwealth's policy goals and of different investments and program periods that impact their distribution systems, such as the Figure ES-1 "Key Progress and Plans" included in National Grid's New York Distribution System Implementation Plan.

Adopted, but modified. The EDCs adopt the second recommendation in GMAC Recommendation 1. Each EDCs has added summary figures depicting the timelines of their respective grid planning and

operational practices that will evolve over time to meet the Commonwealth's policy goals and of different investment and program periods that impact their respective distribution systems. These summary figures can be found here:

- *Exh. ES-ESMP-1, at Section 4.1.6;*
- *Exh. NG-ESMP-1, at Appendix;*
- *Exh. UN-ESMP-1, at Section 1.7.*

R-2. The ESMPs should be clear in identifying and describing which investments have been approved by the D.P.U., are pending before the D.P.U., or are newly proposed. For those investments that are not newly proposed, the ESMPs should identify which investments are already approved by the D.P.U., and which investments (and in what quantity) are under review in a current proceeding. Furthermore, the solutions listed in Section 6: 5- and 10-Year Planning Solutions should be clearly tied to the 5-year investment plans in Section 7, clearly identifying which regional projects are already funded (and if funded, which D.P.U. Order has authorized the funding) and which are seeking to be funded through the ESMP proposal, if any. Across the three ESMPs, the EDCs should collaborate to streamline the terms they use to describe their investments and display the investments in a standardized manner.

Adopted, but modified. Each EDC has included a chart identifying and describing which investments have been approved by the Department, are pending before the Department, or are newly proposed. For those investments that are not newly proposed, the charts identify which investments are already approved by the Department, and which investments (and in what quantity) are under review in a current proceeding. Each chart also includes information regarding funding approved, or requested, for such investment. Please see:

- *Exh. ES-ESMP-1, at Section 7.1;*
- *Exh. NG-ESMP-1, at Section 7.1;*
- *Exh. UN-ESMP-1, at Section 7.1.*

Regarding consistency and streamlining of terms, each EDC has included a highly aligned-upon Glossary section, in which terms used to describe their respective investments will be defined. Please see:

- *Exh. ES-ESMP-1, at Glossary;*
- *Exh. NG-ESMP-1, at Glossary;*
- *Exh. UN-ESMP-1, at Definitions.*

Please note, however, that investments cannot be described in a perfectly standardized manner, given that each EDC has different investments in their respective ESMPs.

R-3. The ESMPs should propose a long-term proactive distribution system planning process for the interconnection of distributed generation (DG), utilizing the analysis process proposals and subsequent

comments submitted in D.P.U. 20-75. Proactive distribution system investments are critical to ensuring that DERs, including DG, can interconnect to the grid at a reasonable cost and in an expeditious manner to meet the Commonwealth's goals and that such investments to enable DERs are cost-effective. The proactive planning process should be as uniform across all three EDCs as possible, ensuring coordination of overarching assumptions and DER stakeholder engagement. The proposed long-term proactive distribution system planning process for the interconnection of distributed generation should include factors that drive development of DG by enabling hosting capacity in locations that benefit the Commonwealth as a whole and further the state's clean energy objectives. Factors should include land use, siting near load, and coordination with infrastructure upgrades necessary to meet overarching clean energy goals. Proactive planning should account for existing group studies and queue, as well as creating hosting capacity to meet service territory and subregion pro rata shares of DER development needed to meet the Commonwealth's objectives. Planning should account for the lapse in time between enabling hosting capacity and achieving installed capacity.

Adopted, but modified. The 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act, contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, the proactive distribution system planning process envisioned in GMAC-Recommendation-3 would be very difficult for the EDCs to develop and the Department to review and adjudicate in the time period allowed by statute.

However, the EDCs accept the purpose of the recommendation, and propose to work with interested stakeholders to develop long-term proactive distribution system planning proposals utilizing the analysis, process, proposals and comments submitted in D.P.U. 20-75. Through such process, the EDCs would endeavor to align where possible on such long-term planning methodologies and assumptions, and address the factors recommended by the GMAC in GMAC-Recommendation-3. Once the Department's adjudication of the ESMPs is completed (currently scheduled for first half of 2024), the EDCs will work with stakeholders during 2024 and the early part of the 2025-2029 ESMP term to this end and present their respective long-term planning proposals to the Department for its review in a proposed generic proceeding, with a goal of receiving Department feedback on such proposals in time for the 2030-2034 ESMPs.

R-4. The ESMPs should propose a long-term cost allocation methodology for proactive infrastructure upgrades to enable the interconnection of DG to succeed the reactive investment approval process conducted through the Provisional System Planning Program. The ESMPs should contemplate both a cost allocation methodology for medium and large DG and for small residential DG facilities. If this is not possible before the January filing, the EDCs should submit a detailed proposal and timeline for a stakeholder process that will develop a long-term cost allocation methodology. This proposal should include how stakeholder engagement and discussion will occur in parallel to the ESMP proceedings and should propose a date by which the EDCs will file a long-term cost allocation proposal at the D.P.U..

Adopted, but modified. The 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act, contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, a long-term cost allocation methodology for proactive infrastructure upgrades envisioned in GMAC-Recommendation-4 would be very difficult for the EDCs to develop and for the Department to review and adjudicate in the time period allowed by statute.

However, the EDCs accept the purpose of the recommendation, and propose to work with interested stakeholders to develop a long-term cost allocation methodology for proactive infrastructure upgrades for small, medium and large distributed generation facilities. Once the Department's adjudication of the ESMPs is complete (currently scheduled for the first half of 2024), the EDCs will work with stakeholders during 2024 and the early part of the 2025-2029 ESMP term to this end and present their long-term cost allocation methodology for proactive infrastructure upgrades to the Department for its review in a proposed generic proceeding, with a goal of receiving Department feedback on such proposals in time for the 2030-2034 ESMPs.

R-5. Extension of the Provisional System Planning Program as currently proposed in the ESMPs would require significant additional adjudicatory proceedings over the next five years and would not incorporate proactive system planning as required by the Climate Act. The EDCs should submit a detailed proposal for streamlining of the review of group studies over the next five years, including incorporation of group study solutions into long-term proactive system planning in advance of the next ESMP process. The proposal should include, at a minimum, batch review of existing group studies as well as application of the long-term proactive analysis process and cost allocation methodology in the interim between this and the next ESMP process. If an EDC proposes an interim alternative cost allocation approach for one or more group studies, the EDC should explain why it believes the group study or group studies are eligible for such alternative cost allocation. Relevant factors to such an assessment should include, for example, the overall costs and benefits associated with a proposed group study solution; the overall impacts to the grid; and how, considering the EDC's other ongoing and proposed investments, a proposed group study solution advances and aligns with the Commonwealth's objectives.

Adopted, but modified. The 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act, contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, a proposal for streamlining the review of group studies envisioned in GMAC-Recommendation-5 would be very difficult for the EDCs to develop and for the Department to review and adjudicate in the time period allowed by statute.

However, the EDCs accept the purpose of the recommendation, and propose to work with interested stakeholders to address refinements to the process for proposing capital investment projects (CIPs) in the future. The EDCs will work with stakeholders during the 2025-209 plan term to this end and present proposals for refining the CIP process to the Department for its review in a generic proceeding, with a goal of receiving Department feedback on such proposals in time for the 2030-2034 ESMPs.

R-6. The EDCs should be more transparent about the short-term (5- to 10-year) load forecast and long-term (out to 2050) electric demand assessment in their ESMPs and better leverage the stakeholder community in Massachusetts to develop future forecasts and demand assessments. Current forecasts in the ESMPs are not clear in describing underlying assumptions. The short-term load forecasts do not include sensitivities or uncertainties. The ESMPs do not analyze the impact of the adoption of new building energy codes. The ESMPs lack an explanation of how the forecasts specifically translate to the investments proposed in the ESMP, and therefore how changes in the load forecast may mitigate particular investments. More comprehensive stakeholder engagement in the forecasting process for future ESMPs is necessary across multiple sectors, including the transportation sector, buildings sector, and DER sectors. Existing working groups across these sectors should be leveraged to provide additional information, diverse perspectives, and support in forecast assumptions, scenarios, and uncertainties. Where necessary, new working groups should also be established to support forecast development and understanding in advance of the next ESMP.

Adopted, but modified. In the September 1, 2023 version of the ESMP, National Grid had included sensitivities, uncertainties and all underlying assumptions on their 5- and 10-year forecasts, in the Appendix to that ESMP. They were not included in Chapter 5 to avoid confusion, since National Grid plans to a single forecast. For the 2025-2029 ESMP, however, sensitives to the forecasts developed by the EDCs are not particularly meaningful to determine the need for each EDC's proposed proactive investments, given the near-term confidence in the various statistical inputs used by the EDCs for this coming term. The EDCs have better tied their respective forecasts to their 2025-2029 incremental ESMP investment proposals. Please see:

- *Exhs. ES-ESMP-1, at Sections 5.0, 5.1, 8.2. 8.3, 8.4; ES-Forecast-1*
- *Exhs. NG-ESMP-1, at Sections 5.1, 8.0, 8.1, 8.2, 8.3, 8.4; NG-Forecast-1*
- *Exhs. UN-ESMP-1, at Sections 5.1, 8.2, 8.3, and 8.4; Un-Forecast-1*

The EDCs will have much more time than was available this past year to engage stakeholders on the inputs for the forecasts to be used during the 2030-2034 plan term. Prior to the development of the submittal of the draft 2030-2034 ESMP to the GMAC in September of 2028, the EDCs will present stakeholders with opportunities to engage with EDCs on their respective then-initial forecasts. The EDCs will request and capture data from stakeholders that may allow the EDCs to refine such forecasts, as appropriate.

R-7. The EDCs should include more discussion of investment alternatives and alternative approaches to financing investments, and clearly communicate these alternatives to stakeholders. The Climate Act

requires the EDCs to discuss investment alternatives (including changes in rate design, load management, flexible demand, dispatchable demand response)23 and alternative approaches to financing investments (including cost allocation between developers and ratepayers, and equitable allocation of costs across other states and populations).24 Given advancing technologies and opportunities to use time-varying rates, as well as challenges in siting and constructing infrastructure, the ESMPs should explore and proactively plan for alternatives to traditional utility investment such as incremental DERs and NWAs and ensure that investments minimize or mitigate impacts on ratepayers.

The discussion of investment alternatives should include which technologies were considered, the assumptions used regarding those technologies, a benefit-cost analysis supporting the evaluation of alternatives considered, and a narrative of why the EDCs chose their preferred solution. If an alternative investment was chosen, the EDCs should provide an explanation of the process and timeline by which that alternative investment will be sought. For technologies not considered, the EDCs should explain why.

Adopted, but modified. The EDCs have expanded their respective ESMPs to address investment alternatives and the assumptions used by the EDCs with respect to such alternatives. Please see:

- *Exh. ES-ESMP-1, at Sections 4.1.7, 6.5 through 6.8, and 7.1;*
- *Exh. NG-ESMP-1, at Section 6.4 and 7.1;*
- *Exh. UN-ESMP-1, at Section 6.4.*

With respect rate redesign and cost allocation methodologies for proactive investments, the 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act, contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, a full analysis of rate redesign options, and a long-term cost allocation methodology for proactive infrastructure upgrades envisioned in GMAC- Recommendation-7 would be very difficult for the EDCs to develop and for the Department to review and adjudicate in the time period allowed by statute.

However, as noted in response to GMAC-Recommendation-4 and GMAC-Recommendation-10, the EDCs propose to work with interested stakeholders to develop a long-term cost allocation methodology for proactive infrastructure upgrades for small, medium and large distributed generation facilities. They also support addressing rate redesign options with stakeholders and the Department in a generic proceeding.

R-8. The EDCs should review and respond to the recommendations included in the Memorandum of the GMAC Equity Working Group. The Memorandum of the GMAC Equity Working Group is included as Appendix A of this document.

Adopted, but modified. The EDC's responses to the EWG recommendations unrelated to metrics can be found here:

- *Exhibit ES-Stakeholder-2;*
- *Exhibit NG-Stakeholder-2;*
- *Exhibit UN-Stakeholder-2.*

With regard to the metrics proposed by the EWG, the 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act, contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, the review of the EWG metrics, and metrics generally, would be very difficult for the EDCs to develop and for the Department to review and adjudicate in the time period allowed by statute.

However, the EDCs accept the purpose of the recommendation, and propose to work with interested stakeholders to address metrics relating to the EDCs' respective incremental ESMP investments in a future phase of the ESMP dockets subsequent to the Department's review of the ESMPs.

R-9. The ESMPs should include a list of areas where effective state or local policy could help to direct more efficient or cost-effective development of the distribution system to further the Commonwealth's clean energy objectives. For instance, policies that direct or incentivize the location of or criteria for electrification adoption or DER siting, and in so doing provide more certainty in locations needing significant investment or where alternatives may be particularly effective. The EDCs and the GMAC should consider pursuing these areas as the focus of future collaborative policy development before the next 5-year ESMPs.

Adopted, but modified. Although the EDCs have not developed an exhaustive list of areas where effective state or local policy could help to direct more efficient development of the distribution system to further the Commonwealth's clean energy objectives, the ESMPs address discrete areas of potential state and local public policy changes here:

- *Exhibit ES-ESMP-1, at Section 9.4;*
- *Exhibit NG-ESMP-1, at Section 6.4;*
- *Exhibit UN-ESMP-1, at Sections 7.3 and 9.6.*

R-10. The ESMPs should describe in detail how alternative rate designs can be utilized, in both the short and long term, to manage load, mitigate peak demand, and reduce or delay the need for infrastructure investments. Additionally, the EDCs, the GMAC, and other stakeholders should remain engaged on rate design reform and on developing an approach to address rate design issues promptly and comprehensively. Such an approach should consider, among other things, AMI functionality, increased

DER adoption, and increased transportation and building electrification. Further, alternative rate design proposals must: (1) be fair and equitable; (2) consider affordability; and (3) be informed by careful study of potential impacts on customers, including low- to moderate-income (LMI) customers and customers in environmental justice communities (EJCs) and disadvantaged communities. To provide additional guidance through examples of specific rate design concepts, the GMAC recommends that: (1) based on concerns that they would reduce customers' ability to manage their bills and have disproportionate and adverse impacts on low-income ratepayers, alternative rate design proposals should avoid broadly imposing demand charges on residential customers; and (2) alternative rate design proposals should consider peak-time rebate programs that incentivize demand reduction.

Adopted, but modified. The 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, an analysis of alternative rate designs that may be utilized in both the short and long term, to manage load, mitigate peak demand, and reduce or delay the need for infrastructure investments envisioned in GMAC Recommendation 10, would be very difficult for the EDCs to develop and for the Department to review and adjudicate in the time period allowed by statute.

However, the EDCs accept the purpose of the recommendation, and recommend that the Department open a generic proceeding to address rate redesign issues and possible rate redesign options or to other dockets currently open to consider such options (e.g., with respect to electric vehicle time-of-use rates, D.P.U. 23-84 and D.P.U. 23-85 and energy affordability in D.P.U. 24-15). The EDCs address various issues that might be considered by the Department in such a proceeding here:

- *Exhibit ES-ESMP-1, at Section 9.6;*
- *Exhibit NG-ESMP-1, at Section 9.6;*
- *Exhibit UN-ESMP-1, at Section 9.6.*

R-11. The EDCs should clearly define the terms "distributed generation" and "distributed energy resource" in their ESMPs and standardize across the three ESMPs. Where applicable, the EDCs should identify any difference between the term DER and the term DG as a defined term used by the D.P.U. and subject to applicable D.P.U.-approved tariffs, such as the Standards for Interconnection of Distributed Generation.

Adopted. The EDCs have aligned their definitions of DER and DG as far as reasonable; however, there are still minor differences. As such, Eversource and Unitil do not include energy efficiency as a DER. Eversource and Unitil also consider storage to be a DER, but not a DG. At this stage, the EDCs all have ongoing dockets utilizing their respective definitions and will work to get full alignment for the next filing.

For details on the definitions, please see:

- *Exhibit ES-ESMP-1, at Glossary;*
- *Exhibit NG-ESMP-1, at Glossary;*
- *Exhibit UN-ESMP-1, at Definitions.*

Section 2: Compliance with the Climate Act

Table 22. Summary of EDC Disposition to Compliance with the Climate Act Recommendations

Recommendations	EDC Disposition	References
R-12. Alignment of Recommendations with Objectives of Climate Act	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 4 and 22
R-13. Detail on Alignment with Climate Act	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 4 and 23 Section 2 of each ESMP Tables and citations in the Policy/Solutions testimony for each EDC

R-12. The GMAC recommendations listed within this document regarding the other sections of the ESMPs should be adopted to make them fully aligned with the objectives of the Climate Act.

Adopted, but modified. The EDCs address each of the GMAC's recommendations, by topic, in the second exhibit to each testimony.

The GMAC recommendations have not been adopted in full, however, as noted in each of the exhibits. Each EDC has submitted comprehensive testimony addressing how each ESMP is aligned with the Climate Act.

R-13. Section 2 should be expanded to provide more detail about how the ESMPs provide the information required by and are aligned with the objectives of the Climate Act. Specifically:

a. Instead of a simple reference to another section or subsection of the ESMP, Section 2 should include text explaining how the section or subsection is aligned with the Climate Act.

b. Section 2 should include a chart or table summarizing and mapping the requirements of the Climate Act with the specific location in the ESMP that demonstrates compliance with those requirements.

Adopted. Please see Section 2 of each ESMP and the Policy/Solutions testimony for each EDC for tables and citations responsive to this recommendation.

Section 3: Stakeholder Engagement

Table 23. Summary of EDC Disposition to Stakeholder Engagement Recommendations

Recommendations	EDC Disposition	References
R-14. Develop Goals and Reporting Metrics	Adopted, but modified	Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 2, 8, and 9 Exhs. ES-ESMP-1, at Section 3.5, and ES-Stakeholder-1; Exhs. NG-ESMP-1, at Section 3.5, and NG-Stakeholder-1; Exhs. UN-ESMP-1, at Section 3.5, and UN-Stakeholder-1.
R-15. CESAG in GMAC Structure	Rejected	Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 2 and 10 Exhs. ES-ESMP-1, at Section 3.5, and ES-Stakeholder-1; Exhs. NG-ESMP-1, at Section 3.5, and NG-Stakeholder-1; Exhs. UN-ESMP-1, at Section 3.5, and UN-Stakeholder-1.
R-16. CESAG Co-Chair Structure	Adopted, but modified	Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 2 and 11 Exhs. ES-ESMP-1, at Section 3.5, and ES-Stakeholder-1; Exhs. NG-ESMP-1, at Section 3.5, and NG-Stakeholder-1; Exhs. UN-ESMP-1, at Section 3.5, and UN-Stakeholder-1.
R-17. CESAG Success Metrics	Adopted, but modified	Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 2 and 12 Exh. ES-ESMP-1, at Section 3.5; Exh. NG-ESMP-1, at Sections 3.2, 3.3, and 3.5; Exh. UN-ESMP-1, at Section 3.5
R-18. Municipal Outreach	Adopted	Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 3 and 13

R-14. The EDCs in coordination with the CESAG should develop goals and clear reporting metrics of success by which to measure the efficacy of proposed stakeholder engagement, including:

a. Clearly defined identification of stakeholder groups, historical concerns, and potential conflicts with other stakeholder groups' interests,

b. ESMP goals and outcomes for each stakeholder group,

c. Information stakeholders need to be well informed,

d. Information utility companies need to understand stakeholders' concerns,

e. Appropriate and diverse vehicles for meaningful dialogue, and

f. Methods for tracking, organizing, analyzing, and responding to stakeholder feedback in a way that provides transparency so that stakeholders know what input was incorporated and what input was not incorporated.

Adopted, but modified. As discussed in testimony and the ESMPs, the EDCs intend to co-lead the CESAG. At this time, the EDCs do not intend to pre-identify stakeholder involvement in the CESAG. Rather, the EDCs intend to tailor the CESAG to be the most representative of each EDC's service territory and their needs. The CESAG will be the avenue or forum to develop a statewide comprehensive stakeholder engagement framework that can be implemented prior to project development. The EDCs are establishing the CESAG to further enable continuous constructive engagement geared towards making the process of implementing the ESMP more transparent and increasing EDC accountability to impacted

stakeholders. The EDCs recognize the valuable role community-based organizations can play in developing trust with the communities they serve. The CESAG will enable co-development of a Community Engagement Framework to guide the EDCs on best ways to engage communities about proposed clean energy infrastructure projects and best practices for soliciting their feedback. The EDCs recognize that engaging stakeholders early and often is necessary and that those potentially impacted by this transition deserve to play a role in energy discussions that affect their lives.

Additionally, as discussed in response to GMAC Recommendation 8, the EDCs are requesting metrics be discussed subsequent to the Department's review of the ESMPs. Therefore, it is premature to develop reporting metrics beyond those already proposed.

Please refer to:

- *Exhs. ES-ESMP-1, at Section 3.5, and ES-Stakeholder-1;*
- *Exhs. NG-ESMP-1, at Section 3.5, and NG-Stakeholder-1;*
- *Exhs. UN-ESMP-1, at Section 3.5, and UN-Stakeholder-1.*

R-15. To avoid duplication, the GMAC recommends having the CESAG within the GMAC structure, possibly within the Equity Working Group. The D.P.U. should review the proposed CESAG framework before a working group is established.

Rejected. The EDCs respectfully reject this recommendation because the CESAG and GMAC and/or Equity Working Group serve different purposes. At their core, the EDCs are responsible for providing safe and reliable energy to all customers. However, the EDCs believe reliability and energy justice goals can be accomplished simultaneously and that this balance will improve the collective success in achieving our shared clean energy goals. The CESAG is intended for the EDCs to partner with community-based organizations representing territories across the state. As the EDCs continue to build and enhance their community engagement efforts, it is important the EDCs remain continuously informed by the voices of the communities they serve. The EDCs will further this goal by directly partnering with community-based experts as part of this process. The best path towards successful and clear community engagement is to have a governing framework co-developed by those stakeholders that live in and engage with communities daily.

Please refer to:

- *Exhs. ES-ESMP-1, at Section 3.5, and ES-Stakeholder-1;*
- *Exhs. NG-ESMP-1, at Section 3.5, and NG-Stakeholder-1;*
- *Exhs. UN-ESMP-1, at Section 3.5, and UN-Stakeholder-1.*

R-16. The GMAC recommends that the CESAG have a co-chair structure, where the group is led in part by EDCs and GMAC.

Adopted, but modified. The EDCs agree the CESAG should have a co-chair structure. However, given the CESAG focus on developing best practices around stakeholder outreach and establishing a co-authored community engagement framework, the EDCs feel it is pivotal that a community-based organization serve as the CESAG co-chair.

Please refer to:

- *Exhs. ES-ESMP-1, at Section 3.5, and ES-Stakeholder-1;*
- *Exhs. NG-ESMP-1, at Section 3.5, and NG-Stakeholder-1;*
- *Exhs. UN-ESMP-1, at Section 3.5, and UN-Stakeholder-1.*

R-17. To clarify the CESAG's focus and measure its success, the GMAC recommends that the CESAG:

a. Develop consistent definitions of equity, inequity, and discrimination,

b. Include more specific definitions of equity,

c. Adopt quantifiable reporting metrics,

d. Develop a detailed explanation of the stakeholder engagement process (timeline, stakeholder groups, potential trainings, desired outcomes), and

e. Define parameters/process for community benefits agreements.

Adopted, but modified.

a., b. The EDCs have developed consistent definitions where possible.

c. As stated in Exhibits ES-Metrics-1, NG-Metrics-1, and UN-Metrics-1, the EDCs are requesting the Department review metrics subsequent to its review of the ESMP.

d. The EDCs provided additional detail on stakeholder engagement in their respective Stakeholder testimonies and ESMPs. However, currently, it is premature to develop a prescribed list of stakeholder groups, potential trainings, and desired outcomes as that will be the goal and outcome of the CESAG.

e. The parameters and process for developing community benefits agreements will be discussed as part of CESAG to ensure community-based organizations and experts are involved in the decision making.

Please refer to:

- *Exh. ES-ESMP-1, at Section 3.5;*
- *Exh. NG-ESMP-1, at Sections 3.2, 3.3, and 3.5;*
- *Exh. UN-ESMP-1, at Section 3.5.*

R-18. The ESMPs articulate the concerns and interests municipalities have with engaging with the decision-making process and supporting the siting of infrastructure; however, additional detail and

structure is needed in the Municipal Outreach subsections with regards to how EDCs will effectively and proactively engage municipal officials and coordinate with municipalities on providing transparent information and supporting education and awareness around infrastructure improvements, particularly as the locations of needed infrastructure projects over the next 10 years are already well-established.

Adopted. Please refer to:

- *Exh. ES-ESMP-1, at Section 3.3;*
- *Exh. NG-ESMP-1, at Section 3.4;*
- *Exh. UN-ESMP-1, at Section 3.3.*

Section 4: Current State of the Distribution System

Table 24. Summary of EDC Disposition to Current State of the Distribution System Recommendations

Recommendations	EDC Disposition	References
R-19. Consistent Distribution System Data	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 5 and 24
R-20. Consistent Distribution System Definitions, Tables, and Graphics	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 5 and 25 Exhs. ES-ESMP-1 and NG-ESMP-1, at Section 4.2 Exh. UN-ESMP-1, at Section 4.1 Exhs. ES-ESMP-1 and NG-ESMP-1, at Glossary Exh. UN-ESMP-1 at Definitions
R-21. Load Reductions from NWAs, DERs, and Other Technologies	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 6 and 26 Exh. ES-ESMP-1, at Sections 4.1.4, 4.3.7, 4.4.7, 4.5.7, and 4.6.7 Exh. NG-ESMP-1, at Section 4.1 Exh. UN-ESMP-1, at Sections 4.1.5 and 4.1.6
R-22. Substation Flooding Vulnerabilities	Eversource: Adopted National Grid and Until: Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 6 and 27 Exh. NG-ESMP-1, at Section 10.4.3; Exh. UN-ESMP-1, at Section 10.4

R-19. The ESMPs should use consistent methods across EDCs for presenting the following information regarding the current system:

a. The age and condition of existing infrastructure (substations, transformers, feeders, breakers, reclosers, and poles), including descriptions of the rationale that is used for determining when to replace each type of infrastructure,

b. Capacity deficiency for substation power transformers and feeders,

c. Existing DER capacity, including DERs online, in the queue, and current time to get through the queue, and broken out by type of DER: energy efficiency, demand response, heat pumps, DG, electric vehicles, and distributed storage,

d. DER hosting capacity, including estimates of excess capacity for substation power transformers and feeders, forecasted out for 10 years in the absence of new investments,

e. Reliability, including most relevant reliability reporting metrics and summary of outages by cause on blue-sky days,

f. Resilience, including all relevant "all-in" performance reporting metrics and summary of outages by cause on major event days, and

g. An assessment of the current distribution system hosting capacity of electrification and clean energy resources and a comparison of the corresponding 2025 interim Clean Energy and Climate Plan deployment targets for clean energy resources and electrification technologies.

Adopted, but modified. The EDCs will consider this recommendation for ESMP Section 4 for implementation in the next ESMP cycle and will attempt to implement this recommendation to the extent feasible in the next ESMP. However, for the current ESMP there is insufficient time between receipt of this recommendation and filing with the Department to achieve the degree of coordination and refinement necessary for the three EDCs to present the current state of their respective distribution systems using a common format and methodology in the identified areas. The EDCs will commit to spending additional time and resources on developing a common format and methodology in the identified areas in the next ESMP cycle, but the EDCs also acknowledge that complete alignment may be difficult to achieve given existing differences between the EDCs and their distribution systems.

R-20. The ESMPs should present all relevant distribution system information in a clearer and more transparent manner using consistent definitions, tables, and graphics.

Adopted, but modified. This recommendation for ESMP Section 4 is adopted in part for implementation in this ESMP cycle, to the extent it is feasible for each of the EDCs to insert tables and graphics consistent with those that appear in the other EDCs' ESMP Section 4 narratives. Further, the EDCs have attempted to use consistent definitions in their respective ESMP Section 4 narratives.

Examples of the implementation of this recommendation include Eversource and Unitil's inclusion of additional tables and charts showing summary DER information, consistent with information provided by National Grid. Likewise, National Grid has added a narrative summary of its sub-regions, which will align with Unitil's and Eversource's presentation of sub-regions. Please see examples of consistent tables here:

- *Exhibit ES-ESMP-1, at Section 4.2;*
- *Exhibit NG-ESMP-1, at Section 4.2;*
- *Exhibit UN-ESMP-1, at Section 4.1.*

Regarding consistency of definitions, each EDC has included a highly aligned-upon Glossary section, in which terms used to describe their respective distribution systems will be defined. Please see:

- *Exh. ES-ESMP-1, at Glossary;*
- *Exh. NG-ESMP-1, at Glossary;*
- *Exh. UN-ESMP-1, at Definitions.*

R-21. In areas of system constraint, the ESMPs should discuss how NWAs, DERs, and other technologies are currently acting to reduce load. Understanding the contribution of NWAs and DERs to the current functionality of the system is important in this section on the current state of the system. The ESMPs should also give greater consideration to mechanisms for deferring or avoiding new transmission spending, including using DERs and NWAs.

Adopted, but modified. This recommendation for ESMP Section 4 is accepted in part for implementation in this ESMP cycle. The EDCs will provide more information in ESMP Section 4 regarding NWAs, DERs, and other technologies that are currently acting to reduce load. The EDCs also note that consistent with GMAC Recommendation 7, they are incorporating discussion of NWAs as an alternative to traditional utility investment throughout each of their ESMPs.

- *Exh. ES-ESMP-1, at Sections 4.1.4, 4.3.7, 4.4.7, 4.5.7, and 4.6.7;*
- *Exh. NG-ESMP-1, at Section 4.1;*
- *Exh. UN-ESMP-1, at Sections 4.1.5 and 4.1.6.*

R-22. The EDCs should map the locations of their substations alongside projected sea level rise and floodplains for 2030 and 2050 to help readers better understand climate vulnerabilities and existing climate adaptations the EDCs have implemented for the current system.

This recommendation has been adopted by Unitil for implementation in this ESMP, while National Grid and Eversource adopt but modify this recommendation for implementation in the next ESMP cycle. National Grid and Eversource will map substations to projected sea level rise and floodplains, while Unitil maps substations to potential river flooding as they do not have sea-level rise concerns.

National Grid has provided a map of select higher risk substations mapped to projected sea level rise and floodplains, but has not provided complete maps of projected sea level rise and floodplain impacts given limitations of its developing Climate Change Risk Tool. National Grid will provide complete maps in the next ESMP. Eversource continues to evaluate which assets are impacted by sea level rise and flooding under the different climate scenarios studied and will provide complete results in the next ESMP.

Please refer to:

- *Exh. NG-ESMP-1, at Section 10.4.3;*
- *Exh. UN-ESMP-1, at Section 10.4.*

Section 5: 5- and 10-Year Electric Demand Forecast

Table 25. Summary of EDC Disposition to 5- and 10-Year Electric Demand Forecast Recommendations

Recommendations	EDC Disposition	References
R-23. DER Sensitivities	Adopted, but modified	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 2 and 7 Exhs. ES-ESMP-1, at Sections 8.2.5, 8.3.5, 9.2, 9.4; and ES-Forecast-1; Exhs. NG-ESMP-1, at Sections 8.2, 8.3, and 8.4; and NG-Forecast-1; Exhs. UN-ESMP-1, at Sections 5.1, 8.2, 8.3, and 8.4; and UN-Forecast-1.
R-24. Load Forecasting Tools	Adopted, but modified	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 2 and 8 Exhibits ES-ESMP-1, at Sections 5.0, 5.1.1-5.5.5, 8.2.5, 8.3.5, 8.4.4, and 9.2; Exhibits NG-ESMP-1, at Sections 5.1.1-5.7.7; Exhibits UN-ESMP-1, at Sections 5.0, 5.1, 8.1, 8.2, 8.3, and 8.4.
R-25. Demand Forecast Assumptions	Adopted	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 2 and 9 Exhs. ES-ESMP-1, at Sections 5.0, 8.2, 8.3, 8.4, 9.1, 9.2, and 9.4; and ES-Forecast-1; Exhs. NG-ESMP-1, at Sections 5.1, 8.2, 8.3, 8.4, 9.1, 9.3, and 9.4; and NG-Forecast-1; Exhs. UN-ESMP-1, at Sections 5.0, 5.1, 8.1, 8.2, 8.3, and 8.4; and UN-Forecast-1.
R-26. DER Forecast Assumptions	Adopted	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 2 and 10 Exhs. ES-ESMP-1, at Sections 5.0, 8.2, 8.3, and 8.4; and ES-Forecast-1; Exhs. NG-ESMP-1, at Section 5.1, 8.0, 8.1; and NG-Forecast-1; Exhs. UN-ESMP-1, at Sections 5.0, 5.1, 8.1, 8.2, 8.3, and 8.4; and UN-Forecast-1.
R-27. Consistent Load Forecasting	Adopted, but modified	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 2 and 11
R-28. Consistent Assumptions for Load Forecasting	Adopted, but modified	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 2 and 12 Exhs. ES-ESMP-1, at Section 5.0 - Review of Assumptions and Comparison Across EDCs; ES-Forecast-1; Exhs. NG-ESMP-1, at Section 5.1; NG-Forecast-1 Exhs. UN-ESMP-1, at Section 5.1; UN-Forecast-1.
R-29. 10-year Load Forecasts for New Customers and Each Type of DER	Adopted	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 3 and 13 Exh. ES-ESMP-1, at Sections 5.1.1, 5.2.1, 5.3.1, 5.4.1, 5.5.1; Exh. NG-ESMP-1, at Sections 5.1.1, 5.2.1, 5.3.1, 5.4.1, 5.5.1, 5.6.1, 5.7.1; Exh. UN-ESMP-1, at Section 5.1.8.

R-23. The ESMP load forecasts should include sensitivities that assume different levels of adoption of DERs and new building codes. A "high forecast" sensitivity should include assumptions about these technologies that would lead to higher loads than the base case forecast. Additionally, a "high load management" sensitivity should assume high levels of both passive and active load management. Each sensitivity should clearly identify the assumptions made for each resource type.

Adopted, but modified. The EDCs do not adopt this recommendation for the 5- and 10-year forecast (Section 5) as it serves a fundamentally different purpose than the long-term demand assessment (2035-2050, Section 8). Eversource and National Grid do not provide sensitives in the 5- and 10-year forecast because they must act on the results of the forecast in this planning horizon given current timelines to develop major capital projects. Adding additional sensitivities as recommended would not provide any

value for this shorter-term forecast and could put supply reliability at risk if plans consider scenarios that have a lower likelihood of developing. However, Unitil provides sensitivities on the 5- and 10-year forecasts for informational purposes only, but focuses on the calculated 5- and 10-year forecasts to ensure the reliability and safety of the electric system due to the short term nature of the forecast and timelines to develop major capital projects. The EDCs include load forecast sensitivities in Section 8 – 2035-2050 electric demand assessment.

For long-term demand assessment sensitivities, please refer to the following:

- *Exhs. ES-ESMP-1, at Sections 8.2.5, 8.3.5, 9.2, 9.4; and ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Sections 8.2, 8.3, and 8.4; and NG-Forecast-1;*
- *Exhs. UN-ESMP-1, at Sections 5.1, 8.2, 8.3, and 8.4; and UN-Forecast-1.*

R-24. The EDCs should provide a copy of their load forecasts, including a description of all inputs, assumptions, methods, results, and scenarios provided in a format that is reviewable. These should be in unlocked, fully functional, and linked Excel sheets.

Adopted, but modified. The EDCs will not provide live forecasting models. Forecasting tools are integrated data tools that are confidential, utilize confidential customer information, and cannot be readily provided. However, the EDCs agree to provide details on all inputs and results in tabular form within the report.

For additional detail on all inputs, please refer to the following:

- *Exhibits ES-ESMP-1, at Sections 5.0, 5.1.1-5.5.5, 8.2.5, 8.3.5, 8.4.4, and 9.2;*
- *Exhibits NG-ESMP-1, at Sections 5.1.1-5.7.7;*
- *Exhibits UN-ESMP-1, at Sections 5.0, 5.1, 8.1, 8.2, 8.3, and 8.4.*

R-25. In their demand forecasts, the ESMPs should detail the methodology used, the assumptions made, and any applicable uncertainties. All assumptions should include links and citation to relevant sources. The ESMPs should also include descriptions of how different factors such as policy, mass transit, climate change impacts, load management, electric vehicle charging infrastructure, new building codes, building weatherization, etc., impact the demand forecasts.

Adopted. The ESMPs and testimony discuss the methodology, assumptions and uncertainties. Further, the ESMPs and testimony discuss in detail the impact of the different factors listed above.

For discussion of the methodology, assumptions and uncertainties, please refer to the following:

- *Exhs. ES-ESMP-1, at Sections 5.0, 8.2, 8.3, 8.4, 9.1, 9.2, and 9.4; and ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Sections 5.1, 8.2, 8.3, 8.4, 9.1, 9.3, and 9.4; and NG-Forecast-1;*
- *Exhs. UN-ESMP-1, at Sections 5.0, 5.1, 8.1, 8.2, 8.3, and 8.4; and UN-Forecast-1.*

R-26. The ESMPs should describe how the forecasts of new DERs are derived, including whether and how they are consistent with Massachusetts goals described in the 2050 Clean Energy and Climate Plan.

Adopted. The forecasts of new DERs are consistent with the Massachusetts climate goals and are described in detail in the ESMP and testimony. For a discussion on DERs and climate goals, please refer to the following:

- *Exhs. ES-ESMP-1, at Sections 5.0, 8.2, 8.3, and 8.4; and ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Section 5.1, 8.0, 8.1; and NG-Forecast-1;*
- *Exhs. UN-ESMP-1, at Sections 5.0, 5.1, 8.1, 8.2, 8.3, and 8.4; and UN-Forecast-1.*

R-27. The three ESMPs should use consistent formatting and reporting resolution in their load forecasts.

Adopted, but modified. The EDCs aligned on formatting and reporting as much as possible before filing their respective ESMPs. The EDCs accept the intention behind the recommendation and commit to increase consistency with respect to formatting and reporting resolution in future ESMPs as much as practicable.

R-28. The three ESMPs should use consistent baseline data, assumptions, and methods for the long-term electric demand assessment, for instance using the same benchmarks and scenarios set forth by the Clean Energy and Climate Plans.

Adopted, but modified. The EDCs will consider this recommendation for the next ESMP. Consistent benchmarks and scenarios are and will continue to be used, but methods will not be common across the ESMPs. The EDCs accept the intention behind the recommendation and will align where possible; however, at times it may provide a more accurate forecast to use territory-specific data, assumptions or methodologies. The EDCs will clarify where data inputs, assumptions or methodologies may differ from one another. For a comparison of the EDCs' methodologies, please refer to the following:

- *Exhs. ES-ESMP-1, at Section 5.0 – Review of Assumptions and Comparison Across EDCs; ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Section 5.1; NG-Forecast-1*
- *Exhs. UN-ESMP-1, at Section 5.1; UN-Forecast-1.*

R-29. The ESMPs should provide 10-year load forecasts in tabular form that separately quantify expected load impacts from new customers, and each type of DER.

Adopted. The EDCs are providing the 10-year load forecast in tabular form. Please refer to the following:

- *Exh. ES-ESMP-1, at Sections 5.1.1, 5.2.1, 5.3.1, 5.4.1, 5.5.1;*
- *Exh. NG-ESMP-1, at Sections 5.1.1, 5.2.1, 5.3.1, 5.4.1, 5.5.1, 5.6.1, 5.7.1;*
- *Exh. UN-ESMP-1, at Section 5.1.8.*

Section 6: 5- and 10-Year Planning Solutions

Table 26. Summary of EDC Disposition to 5- and 10-Year Planning Solutions Recommendations

Recommendations	EDC Disposition	References
R-30. Relevant Reporting Metrics, Baselines, and Targets	Adopted, but modified	Exhibits ES-Metrics-1_2, GMAC Recommendations, pages 1, 3, and 4 Exh. ES-ESMP-1, at Section 9.2, Figure 9-4 Exh. NG-ESMP-1, at Sections 6.5.1, 6.6.2, 6.7.2, 6.8.2, 6.9.1, 6.10.1 Exh. UN-ESMP-1, at Sections 5.1 and 6.5. Exh. ES-ESMP-1, at 6.6.1, 6.7.1, 6.8.1., and 9.5 Exh. NG-ESMP-1, at Section 6.0; Exh. UN-ESMP-1, at Sections 6.4 and 6.5. Exhs. ES-ESMP-1, NG-ESMP-1, and UN-ESMP-1 at Section 10 Exhibits ES-Policy Solutions-1_2
R-31. Alternative Options	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 6 and 28
R-32. Decarbonization Goals	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 6 and 29 Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 1 and 4 Exhs. ES-ESMP-1, NG-ESMP-1, and UN-ESMP-1 at Sections 7.1.3 and 7.1.4
R-33. Transmission Level Cost Estimates	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 6 and 30 Exh. ES-ESMP-1, at Section 6.7 Exh. NG-ESMP-1, at Section 6.4 Exh. UN-ESMP-1, at Sections 6.4 and 9
R-34. Incremental DERs to Alleviate Grid Issues	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 7 and 31 Exh. ES-ESMP-1, at Sections 6.5, 6.7 and 9.3 Exh. NG-ESMP-1, at Sections 6.3, 6.4, and 9.3 Exh. UN-ESMP-1, at Sections 6.4, and 9.3
R-35. Optimization of DER Integration	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 7 and 32 Exh. ES-ESMP-1, at Sections 6.1, 6.3, 9.4, and 9.5 Exhs. NG-ESMP-1 and UN-ESMP-1 at Sections 6.4 and 9.3
R-36. Grid Service Study and Grid Compensation Fund Implementation	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 7 and 33 Exhibit ES-ESMP-1, at Section 6.9.2 Exhibit NG-ESMP-1, at Section 6.4.2.5, Section 6.11.2.5 Exhibit UN-ESMP-1, at Section 6.3.2
R-37. Alternative Options	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 7 and 34 Exh. ES-ESMP-1, at Sections 6.5, 6.7, 9.1, and 9.3; Exhs. NG-ESMP-1 and UN-ESMP-1 at Sections 6.4 and 9.3
R-38. Evolution of Distribution System Planning	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 7 and 35 Exh. ES-ESMP-1, at Section 10.5; Exh. NG-ESMP-1, at Section 6.4.2; Exh. UN-ESMP-1, at Section 6.2.
R-39. Time-Varying Rate Design	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 7 and 36 Exhibits ES-Bill Impacts-1_2, GMAC Recommendations, pages 2 and 7
R-40. AMI Implementation	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 8 and 37 Exh. ES-ESMP-1, at Section 6.3.1.9; Exh. NG-ESMP-1, at Section 6.3.2; Exh. UN-ESMP-1, at Section 6.3.1
R-41. NWA Criteria Description	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 8 and 38 Exh. ES-ESMP-1, at Section 9.3 Exhs. NG-ESMP-1 and UN-ESMP-1, at Section 6.4 and 9.3
R-42. NWA Criteria Assessment	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 8 and 39 Exhs. ES-ESMP-1 and NG-ESMP-1, at Section 9.3 Exh. NG-ESMP-1, at Sections 6.4 and 9.3

Recommendations	EDC Disposition	References
R-43. Stakeholder Engagement and Community Feedback	Adopted	Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 3 and 14 Exh. ES-ESMP-1, at Section 3; Exh. NG-ESMP-1, at Section 3.5; Exh. UN-ESMP-1, at Section 3.
R-44. Transmission System Upgrades in ESMPs	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 9, 40, and 41 Exh. ES-ESMP-1, at Section 6.7 Exh. NG-ESMP-1, at Section 6.4.2.7 Exh. UN-ESMP-1, at Section 6.4
R-45. ESMPs Dependent on Transmission System Upgrades	Adopted, but modified	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 1 and 5
R-46. Consistency in ESMPs	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 9 and 42
R-47. Proposed Investments that are Not New	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 9 and 43
R-48. Expand Stakeholder Participation	Adopted, but modified	Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 3 and 15

R-30. The planning solutions should be documented using relevant reporting metrics, baselines, and targets, such as:

a. System-wide increases in DER hosting capacity in MWs by year,

b. System-wide capacity increases in MWs by year, and

c. System-wide reliability/resilience improvements (interruption and duration, with and without major events) by year.

Adopted, but modified. This recommendation for ESMP Section 6 has been accepted in part by Eversource, National Grid, and Unitil to different extents. Insofar as this recommendation requests the use of reporting metrics, the EDCs propose to work with interested stakeholders to address metrics relating to the EDC's respective incremental ESMP investments in a future phase of the ESMP dockets. Please see the EDC's response to GMAC-Recommendation-8.

a. Unitil adopts this recommendation while Eversource and National Grid adopt this recommendation as modified. Please see:

- *Exh. ES-ESMP-1, at Section 9.2, Figure 9-4 (Eversource has included system-wide increase in DER hosting capacity in MW by 5-year increments from 2025 to 2050, and expanded its Section 9 narrative to further explain each relevant reporting metric listed in the figure.);*
- *Exh. NG-ESMP-1, at Sections 6.5.1, 6.6.2, 6.7.2, 6.8.2, 6.9.1, 6.10.1 (National Grid shows hosting capacity by project in each subregion's Major Projects);*

- *Exh. UN-ESMP-1, at Sections 5.1 and 6.5.*

b. *Unitil adopts this recommendation while Eversource and National Grid adopt this recommendation as modified. Please see:*

   - *Exh. ES-ESMP-1, at 6.6.1, 6.7.1, 6.8.1., and 9.5 (Eversource provides DER hosting capacity increase by project using relevant reporting metrics such as Reserved Operational Capacity, Enabled Electrification, and Enabled Ground Mounted DER Capacity);*
   - *Exh. NG-ESMP-1, at Section 6.0;*
   - *Exh. UN-ESMP-1, at Sections 6.4 and 6.5.*

c. *The EDCs adopt this recommendation as modified. The EDCs note that the incremental ESMP investments have been proposed largely based on projected load growth but may also provide ancillary benefits to reliability and resilience. Incremental ESMP investments will be evaluated for reliability and resilience as part of internal processes. Where feasible, the EDCs have incorporated additional discussion on system-wide reliability and resilience in their respective ESMPs. Please see:*

   - *Exh. ES-ESMP-1, at Section 10;*
   - *Exh. NG-ESMP-1, at Section 10;*
   - *Exh. UN-ESMP-1, at Section 10.*

Additionally, reliability and resilience are discussed in each EDC's testimony:

- *Exhibit ES-Policy Solutions-1;*
- *Exhibit NG-Policy Solutions-1;*
- *Exhibit UN-Policy Solutions-1.*

R-31. The ESMPs should consider alternative options to incremental (i.e., newly proposed) capital spending, such as EDC investment in and support of incremental DERs. The ESMPs should present the costs of such alternative options and compare them with the costs of the incremental investments. The ESMPs should explain which alternatives were not adopted and why. The discussion of investment alternatives should include which technologies were considered, the assumptions used regarding those technologies, a benefit-cost analysis supporting the evaluation of alternatives considered, and a narrative of why the EDCs chose their preferred solution. If an alternative investment was chosen, the EDCs should provide an explanation of the process and timeline by which that alternative investment will be sought. For technologies not considered, the EDCs should explain why those technologies were not considered.

Adopted, but modified. Please see the EDCs' response to GMAC-Recommendation-7.

R-32. The ESMPs should clarify and quantify how state decarbonization goals are accounted for and to what extent in each EDC territory, and demonstrate that across all service territories, the goals are accounted for in full.

Adopted, but modified. The EDCs' respective ESMPs include a greenhouse gas emission assessment. Although the EDCs used different underlying assumptions for some aspects of their modeling, overall their forecasts aim to enable greenhouse gas emission reductions via electrification consistent with the Commonwealth's Net Zero goal by 2050, as apportioned for their respective service territories. The EDCs note that they are not responsible for enabling 100 percent of the Commonwealth's climate goals, as municipal light plants, self-generating customers, and other sectors of the economy also bear responsibility for ensuring progress towards a Net Zero future. Additionally, although the EDCs seek to enable electrification in their respective service territories as a means to help the Commonwealth meet its Net Zero goal, it is the EDCs' customers that must choose to use electricity in new ways and participate in desired pathways to reduce greenhouse gas emissions. For discussion of greenhouse gas emission reductions enabled by the EDCs, please see:

- *Exh. ES-ESMP-1, at Sections 7.1.3 and 7.1.4;*
- *Exh. NG-ESMP-1, at Sections 7.1.3 and 7.1.4;*
- *Exh. UN-ESMP-1, at Sections 7.1.3 and 7.1.4.*

R-33. The ESMPs should include estimates of transmission level costs that are likely to be driven by distribution level investments.

Adopted, as modified. The EDCs will include in their respective ESMPs discussion of transmission level costs where identifiable; however, the EDCs are not each positioned to provide similar information. For example, Eversource is able to identify high-level transmission costs associated with the approved and pending CIP solutions previously filed with the Department, but Unitil neither has a CIP project nor owns any transmission for which it could independently develop estimates of transmission level costs. Moreover, transmission level costs for the majority of the investments proposed by the EDCs have simply not yet been identified given the stage of development of these projects. The Clean Energy Transmission Working Group (CETWG) December 2023 report to the Legislature discusses how transmission is planned, how it is paid for, the benefits it provides to the electric grid and to the consumers that fund it, and impediments to transmission development. The CETWG Report recommends actions at the federal, regional, and state levels in connection with transmission infrastructure.

Please see:

- *Exh. ES-ESMP-1, at Section 6.7;*
- *Exh. NG-ESMP-1, at Section 6.4;*
- *Exh. UN-ESMP-1, at Sections 6.4 and 9.2.*

R-34. The ESMPs should explicitly discuss how incremental DERs can be used by the EDCs to alleviate grid issues.

Adopted. Please see:

- *Exh. ES-ESMP-1, at Sections 6.5, 6.7 and 9.3;*
- *Exh. NG-ESMP-1, at Sections 6.3, 6.4, and 9.3;*
- *Exh. UN-ESMP-1, at Sections 6.4, and 9.3.*

R-35. The EDCs should consider and discuss additional ways to optimize DER integration to minimize the costs associated with DER integration while maximizing system benefits. Maximizing the benefits of DER integration will likely include locational analysis and geographically targeted deployments of DER, utilization of grid services and capacity benefits from DG, and other approaches and considerations.

Adopted. Please see:

- *Exh. ES-ESMP-1, at Sections 6.1, 6.3, 9.4, and 9.5;*
- *Exh. NG-ESMP-1, at Sections 6.4 and 9.3;*
- *Exh. UN-ESMP-1, at Sections 6.4 and 9.3.*

R-36. The EDCs should identify the expected process and timelines for implementing the Grid Service Study and the Grid Compensation Fund, as well as the potential cost range for the fund and how the cost range was determined.

Adopted, as modified. The EDCs are working with MassCEC on the Grid Service Study in parallel with this ESMP process. National Grid and Eversource will not fund the Study through the ESMP, while Unitil has proposed to fund the study through the ESMP. The intent is for the Study to occur imminently in 2024, such that the results of the study would inform the EDCs' locational grid services offerings through the Grid Services Compensation Fund as soon as 2025. The EDCs are using different methodologies to develop process, timelines, and cost range for the Grid Services Compensation Fund. For Eversource and Unitil, an outcome of the Grid Service Study is to develop process and timelines for the Grid Compensation Fund. Additional information has been incorporated into their respective discussions of the Grid Service Study and their Grid Services Compensation Funds. National Grid provides additional information on its Grid Services Compensation Fund, including costs, how costs were determined, process, and timelines, in Section 6.4.2.4, and has added additional information on the Grid Service Study to Section 6.11.2.5.

- *Exhibit ES-ESMP-1, at Section 6.9.2;*
- *Exhibit NG-ESMP-1, at Section 6.4.2.5, Section 6.11.2.5;*
- *Exhibit UN-ESMP-1, at Section 6.3.2.*

R-37. The ESMPs should map alternative investment options more closely to projections and forecasts to show how the EDCs can help reduce capital investment or increase DER adoption.

Adopted, but modified. The EDCs have expanded their respective ESMPs to address investment alternatives to incremental ESMP investments and the assumptions used by the EDCs with respect to such alternatives. Please see:

- *Exh. ES-ESMP-1, at Sections 6.5, 6.7, 9.1, and 9.3;*
- *Exh. NG-ESMP-1, at Sections 6.4 and 9.3;*
- *Exh. UN-ESMP-1, at Sections 6.4 and 9.3.*

R-38. The ESMPs should identify how distribution system planning will evolve based on climate impacts and describe and integrate climate change impacts into the near-term planning solutions.

Adopted. Please see:

- *Exh. ES-ESMP-1, at Section 10.5;*
- *Exh. NG-ESMP-1, at Section 6.4.2;*
- *Exh. UN-ESMP-1, at Section 6.2.*

The EDCs note that this topic is also addressed in Section 10 of the ESMPs.

R-39. With regards to time-varying rate (TVR) design, the ESMPs should provide the following:

a. Consideration of default, opt-out TVR for basic service customers, as well as consideration of TVR options for all distribution customers, and a review of experiences in states that have implemented opt-out TVR for basic service.

b. A specific timeline for the implementation of TVR (excluded in Eversource's ESMP) and how the TVRs will maximize customers' opportunities to control as much of their energy bill as possible, including distribution, transmission, energy, and capacity.

Adopted, but modified. Please refer the EDCs response to GMAC Recommendation-10.

R-40. The ESMPs should discuss the implementation timeline for advanced metering infrastructure (AMI) and how the EDCs are working toward the development of a statewide uniform data access protocol and platform. Understanding when and how the data for AMI meters will be available to customers and their retail suppliers will be important and the ESMPs should provide information related to data sharing and meter access for AMI. At a minimum, the protocol should consider the granularity in which customer bills will be settled, how bulk transfers of AMI data will be completed, and how real-time access to data will be implemented to enable demand response participation.

Adopted, but modified. The EDCs accept the first portion of the recommendation regarding the implementation timeline for Advanced Metering Infrastructure ("AMI"). Please see:

- *Exh. ES-ESMP-1, at Section 6.3.1.9;*
- *Exh. NG-ESMP-1, at Section 6.3.2;*
- *Exh. UN-ESMP-1, at Section 6.3.1.*

For the second portion of the recommendation regarding AMI data sharing and data portal in the ESMP, this issue is currently scheduled for discussion at the AMI stakeholder working group, which will be followed by a summary report filing to the Department, and potential Department guidance on the topic. Any implementation plans offered by the EDCs at this juncture would be premature and deficient for lack of stakeholder input.

R-41. The ESMPs should provide a more complete description of their current and proposed NWA criteria and propose how the criteria will specifically enable the contribution of NWA to the investment solution sets. The ESMPs should describe how system peak demand and/or feeder or circuit-level peaks can be managed through NWAs. NWAs may be achieved through a variety of different DERs and interventions, including DG, demand response, managed charging, and rate design. NWAs may have either EDC or third-party ownership.

Adopted, but modified, insofar as the first two sentences provide a recommendation to the EDCs, whereas the last two sentences provide general statements about NWAs.

The EDCs accept the first clause of the first sentence recommending the ESMPs include a more complete assessment of current NWA criteria but decline to propose new NWA criteria or how the criteria will specifically enable the contribution of NWAs to the investment solution sets, as recommended in the second clause of the first sentence. The EDCs have not applied NWA criteria to every proposal included in their incremental ESMP investments. Indeed, it would be contorted to apply NWA criteria to technological and communications investments that are necessary for developing future capabilities, including the future implementation of NWAs. The EDCs accept the second sentence and will describe how NWAs can manage peak system demand and/or feeder or circuit-level peaks. For descriptions of NWAs in the ESMPs, please see:

- *Exh. ES-ESMP-1, at Section 9.3;*
- *Exh. NG-ESMP-1, at Section 6.4 and 9.3;*
- *Exh. UN-ESMP-1, at Section 6.4 and 9.3.*

R-42. The EDCs should provide a more complete assessment of their current and proposed NWA criteria and propose how the criteria will specifically enable the contribution of NWAs to the investment solution sets.

Adopted, but modified. The EDCs accept the first clause of the first sentence recommending the ESMPs include a more complete assessment of current NWA criteria but decline to propose new NWA criteria or how the criteria will specifically enable the contribution of NWAs to the investment solution sets, as recommended in the second clause of the first sentence. The EDCs have not applied NWA criteria to

every proposal included in their incremental ESMP investments. Indeed, it would be contorted to apply NWA criteria to technological and communications investments that are necessary for developing future capabilities, including the future implementation of NWAs.

- *Exh. ES-ESMP-1, at Section 9.3;*
- *Exh. NG-ESMP-1, at Sections 6.4 and 9.3;*
- *Exh. UN-ESMP-1, at Section 9.3.*

R-43. The ESMPs should clarify how stakeholder engagement and community feedback will occur for all solutions presented.

Adopted. The EDCs will use the Community Engagement Stakeholder Advisory Group process for large distribution (and transmission) infrastructure projects which need siting approval, whereas the EDCs' equity frameworks will be applied to other project types, including in-flight and previously approved projects. Please see:

- *Exh. ES-ESMP-1, at Section 3;*
- *Exh. NG-ESMP-1, at Section 3.5;*
- *Exh. UN-ESMP-1, at Section 3.*

R-44. Investments in and load impacts on the distribution system unavoidably have an impact on the transmission system. The ESMPs should clarify whether there are any transmission system upgrades included in the plans and, if so, should include timelines and cost estimates for those investments. For any transmission system upgrades that require additional analysis to identify specific upgrades or cost estimates, the ESMPs should provide a description of the analysis that the EDCs will conduct, the process which the EDC or Transmission Owner will seek approval for such upgrades, and the timeline for the analysis through construction and approval process. The ESMPs should describe how the EDCs have coordinated with ISO-NE and Transmission Owners to identify transmission system upgrades associated with ESMP capital investments and propose a plan for future coordination. To maintain affordability, the ESMPs should encourage greater coordination with ISO-NE and Transmission Owners to identify mechanisms for deferring or avoiding new transmission spending, including using strategically located distributed energy resources, demand response, and other ratemaking mechanisms.

Adopted, but modified. The EDCs will include in their respective ESMPs discussion of transmission level upgrades and costs where identifiable; however, the EDCs are not positioned to provide similar information. For example, Eversource is able to identify transmission upgrades and high-level costs associated with its approved and pending CIP solutions previously filed with the Department, but Unitil neither has a CIP project nor owns any transmission for which it could independently develop estimates of transmission level costs. National Grid notes that the associated transmission system investments will be made by the Company's transmission affiliate and operator, New England Power Company (NEP), and descriptions of the associated transmission components for its ESMP investments are included where applicable. Moreover, transmission level costs for the majority of the investments proposed by the EDCs

have simply not yet been identified given the stage of development of these projects. The Clean Energy Transmission Working Group (CETWG) December 2023 Report to the Legislature discusses how transmission is planned, how it is paid for, the benefits it provides to the electric grid and to the consumers that fund it, and impediments to transmission development. The Report recommends actions at the federal, regional, and state levels in connection with transmission infrastructure.

Please see:

- *Exh. ES-ESMP-1, at Section 6.7;*
- *Exh. NG-ESMP-1, at Section 6.4.2.7;*
- *Exh. UN-ESMP-1, at Section 6.4.*

R-45. When discussing the benefits of the ESMPs and of specific investments, the ESMPs should make clear the extent to which the delivery of such benefits depends upon and/or assumes the construction of associated transmission upgrades.

Adopted, but modified. Where incremental ESMP investments rely on transmission upgrades, this is noted in the net benefit assessment. For example, the ESMP investments will help ensure that customer adoption is not delayed or otherwise hindered by the ability of the distribution system to serve customers safely, reliably, and affordably during the Commonwealth's clean energy transition. While the ESMP investments in network upgrades and CIPs aim to alleviate capacity constraints for the future electrification of transportation and buildings, transmission upgrades may also be needed to support capacity upgrades. Please see:

- *Exh. ES-Net Benefits-1, and related exhibits referenced therein;*
- *Exh. NG-Net Benefits-1, and related exhibits referenced therein;*
- *Exh. UN-Net Benefits-1, and related exhibits referenced therein.*

R-46. The EDCs should strive to use consistent terminology, methods, assumptions, and presentation formats across all three ESMPs.

Adopted, but modified. The EDCs will consider this recommendation for ESMP Section 6 for implementation in the next ESMP cycle and will attempt to implement this recommendation to the extent feasible in the next ESMP. However, for the current ESMP there is insufficient time between receipt of this recommendation and filing with the Department to achieve the degree of coordination and refinement necessary for the three EDCs to present their 5- and 10-year solutions using the exact same format, methodology, and assumptions. The EDCs have achieved considerable alignment in Section 6 to date.

R-47. The ESMPs should clearly identify and describe which investments have been approved by the D.P.U., are pending before the D.P.U., or are newly proposed. For those investments that are not newly proposed, the ESMPs should identify which investments are already approved by the D.P.U., and which

investments (and in what quantity) are either under review in a current proceeding, or about to be under review in a forthcoming proceeding.

Adopted. Please see the EDCs' response to GMAC-Recommendation-2.

R-48. The ESMPs should propose a process to expand GMAC and general stakeholder participation to allow stakeholders to provide input before and during the development of the next ESMP, instead of providing input only after the ESMP is developed.

Adopted, but modified. The EDCs will consider this recommendation for ESMP Section 6 for implementation in the next ESMP cycle, as the proposed process should occur in the early stages of ESMP development. The EDCs note that this recommendation is in addition to existing commitments to improve stakeholder participation on individual projects.

Section 7: 5-Year Electric Sector Plan

Table 27. Summary of EDC Disposition to 5-Year Electric Sector Plan Recommendations

Recommendations	EDC Disposition	References
R-49. Direct Mapping of Proposed Investments to Benefits and Costs	Adopted, but modified	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 1 and 6 Exh. ES-Net Benefits-3; Exh. NG-Net Benefits-3; Exh. UN-Net Benefits-3.
R-50. Standardized Approaches	Adopted, but modified	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 1 and 7
R-51. Rigor in GHG Emission Reduction Benefits	Adopted	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 2 and 8 Exh. ES-Net Benefits-3; Exh. NG-Net Benefits-3; Exh. UN-Net Benefits-3
R-52. Standardized Process for Solution Prioritization and Selection	Rejected	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 9 and 44
R-53. Differentiate Near- from Long-Term Needs	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 10 and 45 Exh. ES-ESMP-1, at Sections 6.5.1, 6.6.1, 6.7.1, and 6.8.1 Exh. NG-ESMP-1, at Sections_6.4.2 and 7.1.1 Exh. UN-ESMP-1, at Section 7.1
R-54. Cost Recovery of Investments	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 10 and 46 Exh. ES-Bill Impacts-1; Exh. NG-ESMP-1, at Section 7.1; Exhs. UN-ESMP-1, at Section 7.1 and UN-Bill Impacts-1
R-55. Federal Grant Proposals and Awarded Funding	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 10 and 47 Exhs. ES-ESMP-1, NG-ESMP-1 and UN-ESMP-1 at Section 7.1.2

R-49. The EDCs should provide a direct mapping of the proposed investments to benefits and costs. The EDCs could consider including a table with columns on investment area, specified proposed investment/projects, costs of the projects, expected benefits, and a quantification of those benefits.

Adopted, but modified. The EDCs have incorporated a mapping of their proposed investments to net benefits and costs in the Net Benefits Analysis Report exhibit within their respective net benefits testimonies. Please see:

- *Exh. ES-Net Benefits-3;*
- *Exh. NG-Net Benefits-3;*
- *Exh. UN-Net Benefits-3.*

R-50. The EDCs should standardize approaches across utilities for presenting key elements of the ESMPs, such as quantitative and monetary projections of benefits, projections of revenue requirements (customer cost), projections of GHG emissions and compliance with emission targets, and acceptable levels of risk underlying the incremental, newly proposed investments, etc.

Adopted, but modified. The EDCs will consider this recommendation for ESMP Section 7 for implementation in the next ESMP cycle. Notwithstanding, the EDCs took a joint approach towards many aspects of this ESMP to drive more standardization in the way that information is presented within the filing, including the net benefits analysis. The EDCs hired West Monroe to drive a common approach to the net benefit analysis so that the Department of Public Utilities, GMAC participants, and all other reviewers with interests across the Commonwealth can review the net benefits associated with each Company's proposed investments similarly across all EDCs. While differences exist between the EDCs with respect to their proposed incremental ESMP investments, the outputs of the ESMP and the net benefits analysis have been standardized to the extent possible, and the EDCs will collectively work towards more standardization in future ESMP cycles.

R-51. The ESMPs should provide additional detail and rigor regarding GHG emission reduction benefits, including:

a. The incremental GHG impacts (in tons, by year) of the incremental investments, and

b. How those incremental GHG impacts will help the EDCs meet the EDC's GHG emissions reduction targets (in tons, by year).

Adopted.

a. The incremental GHG reduction by year as a result of the incremental ESMP investments are shown in:

- *Exh. ES-Net Benefits-3;*
- *Exh. NG-Net Benefits-3;*
- *Exh. UN-Net Benefits-3.*

b. The GHG emission reduction benefits are a significant part of the net benefits analysis, and a driving force behind the proposed incremental ESMP investments. The net benefits analysis contained within the Net Benefits testimony and associated exhibits provides details around GHG reduction benefits, which are primarily derived from enablement of electrification of heat and transportation, and the increase in hosting capacity to connect new solar. The net benefit analysis assumes customer adoption of clean energy solution following the implementation of incremental investments, in line with adoption rates.

R-52. The EDCs should propose a standardized process for solution prioritization, selection, and investment-deferral decisions. Further, the EDCs should develop and codify standardized processes for engaging with stakeholders throughout the investment decision-making process.

Rejected. The EDCs are different companies with different organizational structures and different decision-making methodologies. Notwithstanding, the EDCs are committed to engaging with stakeholders through their proposed CESAG and equity framework processes.

R-53. The ESMPs should clearly distinguish between investments proposed for near-term needs (load growth, DER growth, reliability/resilience) and investments proposed in anticipation of future needs. The nearer term the need, the more specific the data an ESMP should include to substantiate the need (location-specific load forecasts, DER forecasts, or historical reliability reporting metrics, as examples).

Adopted. Please see:

- *Exh. ES-ESMP-1, at Sections 6.5.1, 6.6.1, 6.7.1, and 6.8.1;*
- *Exh. NG-ESMP-1, at Sections_6.4.2 and 7.1.1;*
- *Exh. UN-ESMP-1, at Section 7.1.*

R-54. The EDCs should make updates to their investment summaries to improve clarity of and increase standardization across their investment proposals. The EDCs should clearly identify the investments in the 5-year plan that have been approved by the D.P.U., are pending before the D.P.U., or are newly proposed investments. For any investments that an EDC plans to seek cost recovery through a mechanism in an approved, pending, or forthcoming rate case, the EDC should clearly identify the mechanism through which the company plans to seek cost recovery. For any investments that an EDC plans to seek cost recovery through a mechanism in a pending or forthcoming proceeding other than a rate case or ESMP proceeding, the EDC should identify the proceeding and describe the mechanism.

Adopted. Please see the EDCs' response to GMAC-Recommendation-2.

For descriptions of proposed cost recovery, please also see:

- *Exh. ES-Bill Impacts-1;*
- *Exh. NG-ESMP-1, at Section 7.1;*
- *Exhs. UN-ESMP-1, at Section 7.1 and UN-Bill Impacts-1*

R-55. The ESMPs should clearly explain whether and how federal grant proposals and awarded federal funding will impact or offset proposed investments that would otherwise have been borne by ratepayers. The ESMPs should describe if the proposed federal funding projects are in addition or incremental to what would otherwise have been planned and/or needed through the ESMP.

Adopted. Please see:

- *Exh. ES-ESMP-1, at Section 7.1.2;*
- *Exh. NG-ESMP-1, at Section 7.1.2;*
- *Exh. UN-ESMP-1, at Section 7.1.2.*

Section 8: 2035–2050 Policy Drivers: Electric Demand Assessment

Table 28. Summary of EDC Disposition to Electric Demand Assessment Recommendations

Recommendations	EDC Disposition	References
R-56. Consistent Assumptions for Demand Assessment	Adopted, but modified	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 3 and 14 Exhs. ES-ESMP-1, at Section 8.1, and ES-Forecast-1; Exhs. NG-ESMP-1, at Sections 8.0 and 8.1, and NG-Forecast-1; Exhs. UN-ESMP-1, at Sections 8.1, 8.2, 8.3, and 8.4, and UN-Forecast-1.
R-57. Integration of 10-year and Long-Term Forecasts	Adopted	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 3 and 15 Exhs. ES-ESMP-1, at Sections 5.0 and 8.0, and ES-Forecast-1; Exhs. NG-ESMP-1, at Section 8.0, and NG-Forecast-1; Exhs. UN-ESMP-1, at Section 8.0, and UN-Forecast-1.
R-58. Long-Term Demand Assessment Sensitivities	Adopted, but modified	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 3 and 16 Exhs. ES-ESMP-1, at Sections 5.0, 8.0, 8.2, 8.3, 8.4, 9.2 and 9.4; and ES-Forecast-1; Exhs. NG-ESMP-1, at Sections 5.1, 8.0, 8.1, 8.2, 8.3, 8.4 and NG-Forecast-1; Exhs. UN-ESMP-1, at Sections 5.1, 8.0, 8.1, 8.2, 8.3, and 8.4; and UN-Forecast-1.
R-59. Accounting for Decarbonization Goals in Demand Assessment	Adopted, but modified	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 3 and 17 Exhs. ES-ESMP-1, at Section 8.1, and ES-Forecast-1; Exhs. NG-ESMP-1, at Sections 5.1, 8.0, 8.1 and NG-Forecast-1; Exhs. UN-ESMP-1, at Sections 5.0, 8.0, and 8.1; and UN-Forecast-1.
R-60. Information on Winter Peak Load Projections	Adopted	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 4 and 18 Exhs. ES-ESMP-1, at Sections 5.0, 5.1.8, 5.2.8, 5.3.8, 5.4.8, 5.5.8, 8.1, 8.2, 9.2, 9.4, and ES-Forecast-1; Exhs. NG-ESMP-1, at Section 8.0, and NG-Forecast-1; Exhs. UN-ESMP-1, at Sections 8.0, 8.1, 8.2, 8.3, and 8.4, and UN-Forecast-1.
R-61. Expand and Develop Demand Management Programs	Adopted	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 4 and 19 Exh. ES-ESMP-1, at Sections 8.2.4; Exh. NG-ESMP-1, at Section 8.2.4, 8.3.4, 6.4.2.5, 6.5.2 - 6.10.2, and 6.11.2; Exh. UN-ESMP-1, at Section 8.2.4.
R-62. Investments Informed by Long-Term Forecasts	Adopted	Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 4 and 20 Exhs. ES-ESMP-1, at Section 8.0, and ES-Forecast-1 Exhs. NG-ESMP-1, at Sections 8.0, 9.0 and NG-Forecast-1 Exhs. UN-ESMP-1, at Sections 8 and 9, and UN-Forecast-1

R-56. The three ESMPs should aim for standardization through use of consistent baseline data, assumptions, and methods for the long-term electric demand assessment, such as using the same benchmarks and scenarios set forth by the Clean Energy and Climate Plans.

Adopted, but modified. The EDCs already have extensive consistency in their assumptions and base line data where it concerns state policy objectives. The EDCs will consider expanding this consistency to other data sets based on this recommendation for the next ESMP. The EDCs will confer and assess how, to the extent feasible, they can further standardize these categories for the next ESMP. However, there are practical and reasonable reasons for differences in the EDCs' data, assumptions, and methodologies based on the differing regions they service. For a discussion of similarities and differences in data, assumptions and methodologies, please refer to the following:

- *Exhs. ES-ESMP-1, at Section 8.1, and ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Sections 8.0 and 8.1, and NG-Forecast-1;*
- *Exhs. UN-ESMP-1, at Sections 8.1, 8.2, 8.3, and 8.4, and UN-Forecast-1.*

R-57. The ESMPs should directly integrate their 10-year and long-term forecasts and demonstrate a continuity between the two, or otherwise explain any discontinuity. Forecasts should reflect expectations for how the system will change without unrealistic step changes while still meeting the Commonwealth's climate goals.

Adopted. National Grid and Unitil forecasts are continuous. Eversource differentiates between the 10-year forecast and the long-term assessment because the long-term assessment is not used to authorize capital projects. Given this, the long-term demand assessment allows for a wide variety of different scenarios based on adoption speeds and technologies to be considered. However, this is not the case for the 10-year forecast since Eversource must execute capacity deficiencies immediately to ensure timely completion. The long-term assessment can, on the other hand, be used to evaluate the impact of policy decisions and technology choices on the long-term load peak. With these different objectives of each forecast, the underlying methodologies and data sets are specifically geared and developed to achieve the best results. Please refer to the following for an explanation of those different purposes:

- *Exhs. ES-ESMP-1, at Sections 5.0 and 8.0, and ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Section 8.0, and NG-Forecast-1;*
- *Exhs. UN-ESMP-1, at Section 8.0, and UN-Forecast-1.*

R-58. The ESMPs should include long-term demand assessment sensitivities, consistent with the sensitivities recommended above for the 5- and 10-year forecasts. All assumptions used in these sensitivities should be clearly explained, and scenarios with more ambitious levels of incremental DERs to mitigate load growth should be evaluated.

Adopted, but modified. The ESMPs provide long-term data assessment sensitivities, but do not include short-term sensitivities. Please refer to the following:

- *Exhs. ES-ESMP-1, at Sections 5.0, 8.0, 8.2, 8.3, 8.4, 9.2 and 9.4; and ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Sections 5.1, 8.0, 8.1, 8.2, 8.3, 8.4 and NG-Forecast-1;*
- *Exhs. UN-ESMP-1, at Sections 5.1, 8.0, 8.1, 8.2, 8.3, and 8.4; and UN-Forecast-1.*

Please also refer to the EDCs' response to GMAC Recommendation 57.

R-59. The ESMPs should clarify and quantify how state decarbonization goals are accounted for in the long-term demand assessment and to what extent in each EDC territory and demonstrate that across all service territories the goals are accounted for in full. The ESMPs should explain how the EDCs will collaborate to achieve the Commonwealth's 2050 targets.

Adopted, but modified. The ESMPs describe how the Commonwealth decarbonization goals are accounted for in the long-term demand assessments and how the ESMPs support those goals. Further, the Net Benefits testimony and Net Benefits Analysis Report for each EDC discusses the ESMPs in relation to the Commonwealth's climate goals. Please refer to the following for a description of how decarbonization goals are accounted for in the long-term demand assessments:

- *Exhs. ES-ESMP-1, at Section 8.1, and ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Sections 5.1, 8.0, 8.1 and NG-Forecast-1;*
- *Exhs. UN-ESMP-1, at Sections 5.0, 8.0, and 8.1; and UN-Forecast-1.*

R-60. The ESMPs should include information on winter peak load projections and how to consider them. Achieving the Commonwealth's emissions reduction goals once the grid has shifted to a winter peak will require a granular look at our grid emissions on the coldest nights, when heat pumps are running the hardest, and at their lowest efficiency. The impacts of DERs could have more importance than otherwise expected when focusing on these winter cold peak events.

Adopted. The ESMPs describe the winter peak load projections and considerations. All EDCs expect to be fully winter peaking by the time the 2050 objectives are achieved, and all models show, in detail, the impact of air sourced heat pumps on the grid during the coldest of days. Grid emissions as a whole are a function of the ISO-NE bulk fleet at the time, and include achievement of decarbonization goals across all of the New England states and cannot be addressed in the ESMP above the EDCs' role in enabling the targeted DER capacities, which all EDCs have shown.

Please refer to the following:

- *Exhs. ES-ESMP-1, at Sections 5.0 and 8.1 for achieving emissions reduction by following the state objectives and Sections 5.1.8, 5.2.8, 5.3.8, 5.4.8, 5.5.8, 8.2, and 9.2 and 9.4 for impacts of heating electrification; and ES-Forecast-1;*
- *Exhs. NG-ESMP-1, at Section 8.0, and NG-Forecast-1;*
- *Exhs. UN-ESMP-1, at Sections 8.0, 8.1, 8.2, 8.3, and 8.4, and UN-Forecast-1.*

R-61. The ESMPs should explicitly state the detailed steps and timeline to expand and develop demand management programs to reduce peak load.

Adopted. As described in additional detail in the ESMPs, the EDCs already have robust demand management programs under the Mass Save program. The Mass Save Program Administrators are continually revising and improving those programs, including adding measures and refining dispatch strategies to maximize grid benefits. The EDCs anticipate continuing to leverage the Mass Save programs to support grid needs. The EDCs account for the load-reducing impact of energy efficiency and demand response programs in the electric load forecasts that they use to plan necessary infrastructure upgrades. This has helped offset investment because the EDCs already rely upon significant load reductions from those programs. For a description of the demand management programs, please refer to the following:

- *Exh. ES-ESMP-1, at Sections 8.2.4;*
- *Exh. NG-ESMP-1, at Section 8.2.4, 8.3.4, 6.4.2.5, 6.5.2 - 6.10.2, and 6.11.2;*
- *Exh. UN-ESMP-1, at Section 8.2.4.*

R-62. The ESMPs should clearly articulate how the long-term load forecasts inform the need for investments in both the short and long term.

Adopted. The EDCs added additional detail on how the long-term forecasts inform the need for investments in both the short and long term. Please refer to the following:

- *Exhs. ES-ESMP-1, at Section 8.0, and ES-Forecast-1*
- *Exhs. NG-ESMP-1, at Sections 8.0, 9.0 and NG-Forecast-1*
- *Exhs. UN-ESMP-1, at Sections 8 and 9, and UN-Forecast-1*

Section 9: 2035–2050 Solution Set – Building a Decarbonized Future

Table 29. Summary of EDC Disposition to Building a Decarbonized Future Recommendations

Recommendations	EDC Disposition	References
R-63. DER Effectiveness on Winter Peaking Days	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 10 and 48 Exh. ES-ESMP-1, at Section 9.4 Exh. NG-ESMP-1, at Section 9.1.1 Exh. UN-ESMP-1, at Section 9.1
R-64. Alternative Options	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 11 and 49 Exh. ES-ESMP-1, at Section 9.5 Exh. NG-ESMP-1, at Sections 9.5 and 7.1.2 Exh. UN-ESMP-1, at Sections 9.2 and 9.3

R-63. Given that the EDCs predict that they will switch to winter peaking, the ESMPs should identify and emphasize DERs that are most effective at reducing winter peak demands on the coldest days.

Adopted. The EDCs incorporated additional discussion of the switch to winter peaking electric distribution systems and identify and emphasize DERs that are most effective at reducing winter peak demands on the coldest days in their ESMP Section 9 narratives. The EDCs discuss how infrastructure need can be minimized by different technologies that may be incentivized for use.

Please see:

- *Exh. ES-ESMP-1, at Section 9.4;*
- *Exh. NG-ESMP-1, at Section 9.1.1;*
- *Exh. UN-ESMP-1, at Section 9.1.*

R-64. The ESMPs should consider alternative options to long-term capital spending similar to the consideration of options for the 5- and 10-year planning solutions. This should include EDC investment in and support of incremental DERs.

Adopted. The EDCs will incorporate additional discussion of alternative options to long-term capital spending into their ESMP Section 9 narratives on 2035-2050 solution sets, including investment in and support of incremental DERs. Please see:

- *Exh. ES-ESMP-1, at Section 9.5;*
- *Exh. NG-ESMP-1, at Sections 9.5 and 7.1.2;*
- *Exh. UN-ESMP-1, at Sections 9.2 and 9.3.*

Section 10: Reliable and Resilient Distribution System

Table 30. Summary of EDC Disposition to Reliable and Resilience Distribution System Recommendations

Recommendations	EDC Disposition	References
R-65. Publicize Climate Vulnerability Assessments	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 11 and 50 Exh. ES-ESMP-1, at Section 10.1 Exh. NG-ESMP-1, at Sections 10.2, 10.4, and 10.5 Exh. UN-ESMP-1, at Section 10.4
R-66. Standardize Climate Change Risk and Planning Tools and Forecasting	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 11 and 51
R-67. Resilience Priorities and Measures	Adopted	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, page 11 and 52 Exh. ES-ESMP-1, at Sections 10.3 and 10.5 Exh. UN-ESMP-1, at Section 10.3
R-68. Quantitative Justification for Reliability and Resilience Investments	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 11 and 53 Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 2 and 9 Exhs. ES-ESMP-1 and UN-ESMP-1, at Section 10.3 Exhibits ES-Net Benefits-1, NG-Net Benefits-1, UN-Net-Benefits-1, and related exhibits referenced therein
R-69. Incorporation of Heat Island Modeling into Plans	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 11 and 54

R-65. The EDCs should make their climate vulnerability assessments public. If the climate vulnerability assessments are not complete, the ESMPs should describe the expected timeline, date of completion, and method by which they will notify stakeholders of the finished assessments.

Adopted. The EDCs will make their climate vulnerability assessments public when they are completed, and the EDCs will incorporate into their ESMP Section 10 narratives additional discussion of the expected timeline for completion, date of completion, and method by which the EDCs will notify stakeholders of the finished assessments. Please see:

- *Exh. ES-ESMP-1, at Section 10.1;*
- *Exh. NG-ESMP-1, at Sections 10.2, 10.4, and 10.5;*
- *Exh. UN-ESMP-1, at Section 10.4.*

D.P.U. 24-10 Addendum: Eversource provides additional discussion of and maps from their climate vulnerability assessment in ESMP Section 10.4. Eversource will provide an update to the GMAC when its climate vulnerability assessment becomes public.

D.P.U. 24-11 Addendum: National Grid notes that its climate vulnerability assessment is under development and expects it will be completed by the end of 2024.

D.P.U. 24-12 Addendum: Unitil provides additional discussion from their climate vulnerability assessment work in ESMP Section 10.4. The work completed by Unitil to date is the first step in a detailed process for evaluating the effect climate change may have on the electric system. The Company is still evaluating the resources and timeframe required to address all aspects of a climate vulnerability plan. The Company provides public information on its climate vulnerability assessment in its annual sustainability report.

R-66. The EDCs should standardize their climate change risk and planning tools, as well as forecasting windows and parameters.

Adopted, but modified. The EDCs will consider this recommendation for ESMP Section 10 for implementation in the next ESMP cycle. It will not be feasible to standardize climate change risk and planning tools, as well as climate change forecasting windows and parameters, for this ESMP cycle. However, the EDCs will commit to considering this recommendation for the next ESMP cycle. The EDCs may establish a working group to further the discussion and coordination between the EDCs on the possibility of developing a standardized climate change risk methodology.

R-67. The ESMPs should include more details on their ongoing and proposed resilience priorities and climate adaptation measures, including the cost estimates of their resilience investments.

This recommendation for ESMP Section 10 has been adopted by Eversource and Unitil and rejected by National Grid. Eversource and Unitil incorporate additional discussion of their ongoing and proposed resilience priorities and climate adaptation measures into their ESMP Section 10 narrative. Please see:

- *Exh. ES-ESMP-1, at Sections 10.3 and 10.5;*
- *Exh. UN-ESMP-1, at Section 10.3.*

D.P.U. 24-11 Addendum: Rejected. National Grid has not requested incremental funding for resilience investments through its ESMP. Further, National Grid has already included substantial information in its ESMP Section 10 narrative regarding its ongoing and proposed resilience priorities and climate adaptation measures. If National Grid requests incremental funding for resilience investments through its ESMP in a future ESMP cycle, it will consider the need to provide additional detail and cost estimates for such proposed investments.

R-68. The ESMPs should justify incremental, newly proposed reliability and resilience investments using quantitative data such as improvements to SAIDI/SAIFI, as well as using benefit-cost analyses.25 The ESMPs should describe how the EDCs are coordinating their climate vulnerability assessments and their approaches for managing climate vulnerability.

Adopted, but modified. This recommendation for ESMP Section 10 has been accepted in part by Eversource, National Grid, and Unitil to different extents. Regarding the first part of the recommendation, Eversource and Unitil will incorporate discussion of their work to quantify impacts on reliability metrics across the suite of ESMP investments into their respective ESMP Section 10 narratives. Please see:

- *Exh. ES-ESMP-1, at Section 10.3;*
- *Exh. UN-ESMP-1, at Section 10.3.*

Quantitative net benefits resulting from reliability and resilience investments are captured as part of the net benefits analysis. Please see:

- *Exhibit ES-Net Benefits-1, and related exhibits referenced therein;*
- *Exhibit NG-Net Benefits-1, and related exhibits referenced therein;*
- *Exhibit UN-Net Benefits-1, and related exhibits referenced therein.*

Additionally, regarding the second part of the recommendation, Eversource, National Grid, and Unitil will coordinate on approaches to managing climate vulnerability. The EDCs expect this coordination may result in more consistent approaches to addressing climate vulnerability issues in the next ESMP cycle.

D.P.U. 24-11 Addendum: National Grid has not requested incremental funding for reliability and resilience investments through this ESMP, as those are considered core investments and are part of the recent rate case filing in D.P.U. 23-150. Further, National Grid is not able to quantify improvements to reliability metrics from individual investments.

R-69. The EDCs should incorporate local and regional heat island modeling into the plans and use this to inform near- and long-term action.

Adopted, but modified. The EDCs will consider this recommendation for ESMP Section 10 for implementation in the next ESMP cycle. For the current ESMP, there is insufficient time between receipt of this recommendation and filing with the Department to conduct heat island modeling and consider how it could be used to inform the plans.

D.P.U. 24-11 Addendum: While National Grid does not directly address heat islands in this ESMP, it does discuss forecasted temperature increase and subsequent impact on equipment ratings. National Grid would like to align with the other EDCs on the use of future ambient temperature increases in future load forecasting, and coordinate with the other EDCs on how heat island modeling may be implemented for future ESMP cycles. Pursuing alignment between the EDCs on this issue would be consistent with other GMAC recommendations suggesting consistency in methodology and presentation is important for the ESMPs.

Section 11: Integrated Gas-Electric Planning

Table 31. Summary of EDC Disposition to Integrated Gas-Electric Planning Recommendations

Recommendations	EDC Disposition	References
R-70. Transition Details	Rejected	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 12 and 55
R-71. Integrated Energy Planning Details	Rejected	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 12 and 56
R-72. Joint Utility Planning Working Group	Adopted, but modified	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 12 and 57
R-73. Gas Utility Rate Impacts on Electric Customers	Rejected	Exhibits ES-Bill Impacts-1_2, GMAC Recommendations, pages 2 and 8
R-74. Costs and Benefits to Gas Utility	Rejected	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 12 and 58 Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 2 and 10 Exhibits ES-Net Benefits-1, NG-Net Benefits-1, UN-Net-Benefits-1, and related exhibits referenced therein
R-75. Integrated Energy Planning Compliance with Climate Act and CECP	Rejected	Exhibits ES-Policy Solutions-1_2, GMAC Recommendations, pages 12 and 59 Exhibits ES-Forecast-1_2, GMAC Recommendations, pages 4 and 21
R-76. Reduction of GHG emissions from both the Electricity and Gas Industries Compliance with Climate Act	Adopted, but modified	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 2 and 11

R-70. The ESMPs should detail how the transition from gas to electric will be coordinated, detail how and where the systems overlap, and identify recommendations for how the transition should occur, ideally down to the street-by-street level.

Rejected. The Department has recently addressed coordinated planning between gas and electric utilities in its D.P.U. 20-80-B Order, addressing the role of gas local distribution companies ("LDCs") as the Commonwealth achieves its target 2050 climate goals. The Department noted that, going forward, evaluation of any proposed gas investments will have to take place in the context of joint electric and gas system planning. D.P.U. 20-80-B at 131. The Department emphasized that joint electric and gas utility planning must occur in a broad stakeholder context so that the LDCs and electric distribution companies exclusively are not defining the process and outcome. Id. Further, the Department stated that the LDCs and electric distribution companies should consult with stakeholders regarding such a joint planning process that, while it is not Department led, may lead to proposals for Department review. Id. at 131-132.

To this end, the electric distribution companies propose in Section 11 of their ESMPs to start a gas and electric coordinated planning working group with representatives from the different Commonwealth electric and gas utilities as well as key stakeholders. Moreover, Section 11 describes some of the scope and objectives for this working group, in alignment with the Department's directives described above.

Furthermore, Eversource is offering an initial proposal for a coordinated integrated energy planning approach for discussion with stakeholders over the coming months, both in its ESMP docket and forums to be proposed by Eversource related to the Department's guidance in D.P.U. 20-80-B. Please see Section 11 of Exhibit ES-ESMP-1 to review this proposal.

R-71. The ESMPs should provide more details regarding how integrated energy planning will be undertaken in the future.

Rejected. Please see the EDCs' response to GMAC Recommendation 70.

R-72. The Joint Utility Planning Working Group should focus on short- and long-term capital investment plans for both electric and gas utilities.

Adopted, but modified. Please see the EDCs' response to GMAC Recommendation 70. The Joint Utility Planning Working Group will focus on a broad set of issues associated with integrated planning, including, but not limited to, short- and long-term capital investment plans for electric and gas companies.

R-73. When estimating how proposed investments will impact rates, the ESMPs should account for the rate impacts on gas utility customers as well as electric customers, as gas utility impacts are inextricably linked to electric utility investments and rate impacts.

Rejected. The EDCs are providing traditional bill impact analyses with their ESMPs, focused on the bill impacts of their respective incremental ESMP investments on electric customers, holding other variables equal. Although gas utilities' bill impacts on their customers are an important consideration for gas utilities, they are outside the scope of the EDCs' ESMPs.

R-74. When estimating net benefits from proposed investments, the ESMPs should account for the costs and benefits to gas utility customers.

Rejected. The EDCs have presented their respective Net Benefits analyses here:

- *Exhibit ES-Net Benefits-1, and related exhibits referenced therein;*
- *Exhibit NG-Net Benefits-1, and related exhibits referenced therein;*
- *Exhibit UN-Net Benefits-1, and related exhibits referenced therein.*

The ESMPs are statutorily focused on proactive electric distribution (and, where applicable, transmission) investments. Over time, as integrated planning becomes more mature, the EDCs may be able to provide information grounded in practice and experience regarding the potential benefits of incremental ESMP investments on gas utility customers, but such information is not available for the 2025-2029 ESMP term.

R-75. The ESMPs should provide more detail on how integrated energy planning will be used to comply with the Climate Act and align with the forecasts in the Clean Energy and Climate Plan.

Rejected. Please see the EDCs' response to GMAC Recommendation 70.

R-76. The ESMPs should describe how the proposed ESMP investments will affect the reduction of GHG emissions from both the electricity and gas industries, and how these emission levels will meet the requirements of the Climate Act.

Adopted, but modified. As part of the EDCs' net benefits analyses, the EDCs' consultant discusses how ESMP investments are influencing the reduction of GHG emissions, specifically those that enable electric vehicles and electric heat pumps. The GHG emissions reduction benefits are captured as a monetized benefit via the societal cost of carbon, as well as non-monetized, quantified benefit with the net GHG emission reductions. The following exhibits address GHG emission reduction benefits that are associated with each EDC's proposed ESMP investments:

- *Exh. ES-Net Benefits-1, and related exhibits referenced therein;*
- *Exh. NG-Net Benefits-1, and related exhibits referenced therein;*
- *Exh. UN-Net Benefits-1, and related exhibits referenced therein.*

However, the EDCs are not calculating GHG emission reductions related to gas infrastructure. The ESMPs are statutorily focused on proactive electric distribution (and, where applicable, transmission) investments. Over time, as integrated planning becomes more mature, the EDCs may be able to provide information grounded in practice and experience regarding the potential GHG reduction benefits of incremental ESMP investments on gas utility customers, but such information is not available for the 2025-2029 ESMP term.

Section 12: Workforce, Economic, and Health Benefits

Table 32. Summary of EDC Disposition to Workforce, Economic, and Health Benefits Recommendations

Recommendations	EDC Disposition	References
R-77. Incremental Impacts on Workforce, Jobs, GHG Emissions, and Health	Adopted, but modified	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 2 and 12
R-78. Integrate Workforce Benefits and Jobs in Macroeconomic Benefits	Adopted	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 2 and 13 Exh. ES-ESMP-1, at Section 12.4; Exh. NG-ESMP-1, at Section 12.4; Exh. UN-ESMP-1, at Section 12.4
R-79. Net Macroeconomic Impacts	Rejected	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 3 and 14
R-80. Workforce Benefits	Adopted, but modified	Exhibits ES-Metrics-1_2, GMAC Recommendations, pages 1, 5, and 6 Exhibits ES-Stakeholder-1_2_3_4, GMAC Recommendations, pages 3, 16, and 17 Exhs. ES-ESMP-1, NG-ESMP-1, and UN-ESMP-1 at Section 12.2 Exh. ES-ESMP-1 at Sections 12.2 and 12.3 Exh. NG-ESMP-1 at Section 12.3 Exh. UN-ESMP-1 at Section 12.2

R-77. The EDCs should specifically present the incremental impacts of their proposals on workforce, jobs, GHG emissions, and health, as well as how such investments will help the EDCs meet the state's GHG emissions reduction targets. This requires, at least, presenting one scenario with the proposed investments and one without.

Adopted, but modified. As part of the net benefits analysis, the EDCs have presented net benefits analysis across these benefit categories, both quantitatively and qualitatively. However, the EDCs are not analyzing the net benefits of the scenario without the proposed investments, as the evaluation of the ESMP benefits should focus on the incremental benefits that are provided as part of the proposed portfolio of investments. If the Department accepts the portfolio of proposed ESMP investments, the EDCs estimate the associated net benefits. Conversely, if the ESMP investments are rejected, then there will be no associated net benefits to further the Commonwealth's climate goals. Please refer to:

- *Exh. ES-Net Benefits-1, and related exhibits referenced therein;*
- *Exh. NG-Net Benefits-1, and related exhibits referenced therein;*
- *Exh. UN-Net Benefits-1, and related exhibits referenced therein.*

R-78. The ESMPs should better integrate the discussion of workforce benefits with the estimates of job creation in the macroeconomic analysis.

Adopted. The EDCs attempted to better integrate workforce benefits with the estimates of job creation in the macroeconomic analysis. Please refer to:

- *Exh. ES-ESMP-1, at Section 12.4;*
- *Exh. NG-ESMP-1, at Section 12.4;*
- *Exh. UN-ESMP-1, at Section 12.4.*

R-79. The analysis of macroeconomic impacts in the ESMPs should be a net analysis that accounts for job losses as well as job gains. It should also account for the macroeconomic effects of changes to electric and gas utility rates.

Rejected. In the first draft of the ESMP, the EDCs utilized the U.S. Department of Commerce Bureau of Economic Analysis RIMS II tool to estimate the impacts of total ESMP planned capital spending for jobs in the region. The current ESMP includes the impacts on jobs from the total planned and the incremental ESMP spending. The EDCs will not be calculating job loss impacts as it is out of scope for the ESMP.

R-80. Regarding workforce benefits, the ESMPs should:

a. Include reporting metrics related to the training programs, ideally aligned with those produced by the Equity Working Group,

b. Identify specific strategies to address the lack of diversity in the energy sector, c. Specify which types of jobs are expected to grow because of the ESMP, as well as what existing workers will be supported to transition to new jobs,

c. Establish a unified approach to a statewide workforce plan,

d. Include a workforce organization chart in the ESMP, and

e. Leverage existing resources and infrastructure to integrate clean tech education, curriculum, and opportunities.

Adopted, but modified.

a. Please refer to the EDCs' response to GMAC Recommendation 8.

b. The EDCs adopt this recommendation.

Eversource will continue to address diversity in the energy sector with strategies highlighted in Exh. ES-ESMP-1 at Sections 12.2 and 12.3, which include developing a robust pipeline of electric distribution and clean energy workers.

National Grid will continue to progress the strategic workforce development efforts outlined in its ESMP to build a pipeline of diverse talent from underrepresented and historically marginalized communities. Please refer to Exh. NG-ESMP-1 at Section 12.3.

Unitil describes its strategies in Exh. UN-ESMP-1 at Section 12.3. Unitil's talent acquisition team continues to identify opportunities to improve the lack of diversity in our company.

c. The EDCs adopt this recommendation. Please refer to:

- *Exh. ES-ESMP-1 at Section 12.2;*
- *Exh. NG-ESMP-1 at Section 12.2;*
- *Exh. UN-ESMP-1 at Section 12.2.*

d. The EDCs will review this recommendation and will consider it for future ESMPs. However, the EDCs have their own respective workforce needs and constructs to their employment agreements, so a unified approach may not be feasible.

e. Rejected. Each EDC's organizational charts are extensive and not readily adaptable for inclusion in their respective ESMP. There is not a single organizational chart that can cover the individuals engaged in the ESMP or cover all aspects of the company from regulatory (filing and cost recovery), operations (construction, operations and maintenance), engineering (planning and design), accounting (cost records), procurement (equipment purchasing and contracting), information technology (cyber security, data and integration), customer relations (education and outreach), and human resources (recruiting, training and retention) to name a few.

f. The EDCs adopt this recommendation. Please refer to:

- *Exh. ES-ESMP-1 at Sections 12.2 and 12.3;*
- *Exh. NG-ESMP-1 at Section 12.3;*

- *Exh. UN-ESMP-1 at Section 12.2.*

Section 13: Conclusion

Table 33. Summary of EDC Disposition to Conclusion Recommendations

Recommendations	EDC Disposition	References
R-81. Additional Reporting Metrics	Adopted, but modified	Exhibits ES-Metrics-1_2, GMAC Recommendations, pages 2 and 7
R-82. Quantification Methods for Metrics	Adopted, but modified	Exhibits ES-Metrics-1_2, GMAC Recommendations, pages 2 and 8
R-83. Measurement of Incremental Impacts	Adopted, but modified	Exhibits ES-Metrics-1_2, GMAC Recommendations, pages 2 and 9
R-84. Detailed Reporting Metrics	Adopted, but modified	Exhibits ES-Metrics-1_2, GMAC Recommendations, pages 2 and 10
R-85. Net Benefits	Rejected (ad); Adopted, but modified (e, f)	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 3, 15, and 16
R-86. Rate-Impact Analysis	Adopted, but modified	Exhibits ES-Bill Impacts-1_2, GMAC Recommendations, pages 3 and 9
R-87. Benefits for LMI and EJC Customers	Adopted	Exhibits ES-Net Benefits-1_2_3_5, GMAC Recommendations, pages 3 and 17 Exhibit ES-ESMP-1, at Section 7.1.4.3; Exhibit NG-ESMP-1, at Section 7.1.4.3; Exhibit UN-ESMP-1, at Section 7.1.4.3.
R-88. Appendix for Reporting Metrics	Adopted, but modified	Exhibits ES-Metrics-1_2, GMAC Recommendations, pages 2 and 11

R-81. The ESMPs should include additional reporting metrics that are tied to the ESMP proposals, such as achievement dates, improvements to reliability reporting metrics such as SAIDI and SAIFI, increase in DER hosting capacity, GHG emissions reductions, power quality, smart inverter controls, and the use of distributed energy resource management systems (DERMS).

Adopted, but modified. With regard to metrics, the 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act, contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, the review of metrics would be very difficult for the EDCs to develop and for the Department to review and adjudicate in the time period allowed by statute.

However, the EDCs accept the purpose of the recommendation, and propose to work with interested stakeholders to address metrics relating to the EDCs' respective incremental ESMP investments in a future phase of the ESMP dockets. The EDCs have proposed metrics associated with their incremental ESMP investments, as addressed in:

- *Exh. ES-Metrics-1;*
- *Exh. NG-Metrics-1;*
- *Exh. UN-Metrics-1.*

R-82. The reporting metrics proposed in the ESMPs should include specific metrics and quantification methods for determining the incremental impact of proposed investments. For example, the ESMPs should explain in detail how resilience will be measured, how the EDCs will identify which customers benefit, and how GHG emission reductions will be determined.

Adopted, but modified. Please see the EDCs' response to GMAC Recommendation 81.

R-83. The reporting metrics proposed in the ESMPs should identify the incremental impacts of the proposed EDC investments, and should describe how the EDCs will measure those incremental impacts.

Adopted, but modified. Please see the EDCs' response to GMAC Recommendation 81.

R-84. The reporting metrics proposed in the ESMPs should include sufficient detail to enable review and implementation, including definitions. For example, the ESMPs should clearly define "major ESMP infrastructure projects," including the categories in which such investments fall.

Adopted, but modified. Please see the EDCs' response to GMAC Recommendation 81.

R-85. As the EDCs are assessing net benefits for their filing with the D.P.U.:

a. The types of costs and benefits to be included in the net benefits analysis (i.e., the cost-effectiveness "test") should be identified up front. The EDCs should begin with the cost-effectiveness tests used in Massachusetts for energy efficiency, but should also include safety, security, reliability of service, affordability, equity, and reductions in GHG emissions.

b. All benefits and costs should be compared with a reference case that includes all the EDC investments that have already been installed or are in the process of being installed.

c. Alternative cases should be designed to evaluate the net benefits of incremental, newly proposed investment projects, relative to the reference case, and each incremental, newly proposed project should ideally be evaluated and justified on its own merits. These incremental projects should be compared against alternative options, including incremental DERs and NWAs. If it is not practical to evaluate each incremental project, then some projects should be bundled into logical groupings of interrelated projects.

d. The benefits should seek to identify the locational benefits of different siting options within each service territory.

e. Uncertainty can be addressed in benefit-cost analyses (BCAs) by applying sensitivities to those assumptions that are most uncertain and affect the results the most.

f. The ESMPs should identify a discount rate for calculating present-value dollars. The GMAC recommends using a low-risk discount rate, as used for energy efficiency programs in Massachusetts.

Rejected (a- d); Adopted, but modified (e, f).

The EDCs have provided net benefits analysis specific to their incremental ESMP investments here:

- *Exh. ES-Net Benefits-1, and related exhibits referenced therein;*
- *Exh. NG-Net Benefits-1, and related exhibits referenced therein;*
- *Exh. UN-Net Benefits-1, and related exhibits referenced therein.*

The EDCs collectively hired West Monroe to provide a consistent methodology and approach for analyzing the net benefits of their respective incremental ESMP investments. Due to the unique nature of the ESMPs, West Monroe and the EDCs worked diligently to determine the most reasonable and supportable net benefits analysis approach for this ESMP and leveraged industry best practices from several applicable sources for these types of electric utility investments, including the National Standard Practice Manual ("NSPM") and United States Department of Energy's ("DOE") Modern Distribution Grid to build the relevant regulatory cost tests that apply to this proceeding. There have been several recent Department filings in the Commonwealth where the EDCs had prepared and filed cost-benefit models and analyses, such as the grid modernization and AMI implementation plan (D.P.U. 21-81) and 2022-2024 Three-Year Energy Efficiency Plan filings (D.P.U. 21-120 through D.P.U 21-129), as well as many recent grid modernization filings that have been completed in jurisdictions across the country, such as Michigan utilities five-year distribution system plans (U-20147) and the Dominion Energy Virginia grid transformation plan (PUR-2023-00051). To the extent possible, West Monroe performed sensitivities to determine conservative input values and net benefits capture methods that have been utilized, scrutinized, and accepted in past proceedings by the Department, and are shown in the Net Benefits Analysis Report for each EDC:

- *Exhibit ES-Net Benefits-3;*
- *Exhibit NG-Net Benefits-3;*
- *Exhibit UN-Net Benefits-3.*

R-86. The ESMPs should conduct a comprehensive rate-impact analysis to assess how the ESMPs will minimize or mitigate rate impacts. The rate-impact analysis should:

a. Account for incremental costs of infrastructure investments, reduced sales from DERs that reduce electricity load, and increased sales from DERs that increase electricity load,

b. Follow the same structure as the BCA in terms of the definition of the reference case and alternative cases,

c. Follow the same structure of the BCA in terms of alternative cases and incremental investment projects, and

d. Inform decisions on which investments to make and when.

Adopted, but modified. The EDCs have presented their respective bill impact analyses here:

- *Exhibit ES-Bill Impacts-1, and related exhibits referenced therein;*
- *Exhibit NG-Bill Impacts-1, and related exhibits referenced therein;*
- *Exhibit UN-Bill Impacts-1, and related exhibits referenced therein.*

These bill impact analyses address the Department's directive for the EDCs to provide bill impacts across a 1-year, 3-year and 5-year horizon, using traditional Department bill impact methodologies.

R-87. The ESMPs should articulate how benefits will be experienced by LMI and EJC customers relative to other customers.

Adopted. The EDCs have commented on specific EJC and LMI benefits attributable to the EDCs' respective incremental ESMP investments, here:

- *Exhibit ES-ESMP-1, at Section 7.1.4.3;*
- *Exhibit NG-ESMP-1, at Section 7.1.4.3;*
- *Exhibit UN-ESMP-1, at Section 7.1.4.3.*

R-88. The ESMPs should present all reporting metrics in an appendix, including all the equity reporting metrics and all the other ESMP reporting metrics.

Adopted, but modified. Please see the EDCs' response to GMAC Recommendation 81.

Section 14: Equity Working Group Recommendations

Table 34. Summary of EDC Disposition to Equity Working Group Recommendations

Recommendations	EDC Disposition	References
EWG-1. EJ and Equity Metrics	Adopted, but modified	Exhibits ES-Metrics-1_2, GMAC Recommendations, pages 2 and 12 Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, pages 4 and 18
EWG-2. Plainspoken Public-Facing Materials	Adopted, but modified	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, pages 4 and 19 Exh. ES-ESMP-1, at Section 3.5 Exh. NG-ESMP-1, at Section 3.4 Exh. UN-ESMP-1, at Section 3.4
EWG-3. Consolidate Overlapping Stakeholder Engagement Efforts	Adopted, but modified	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 4 and 20
EWG-4. Early Stakeholder Engagement	Adopted, but modified	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 4 and 21 Exhs. ES-ESMP-1, at Section 3; ES-Stakeholder-1; Exhs. NG-ESMP-1, at Section 3; NG-Stakeholder-1; Exhs. UN-ESMP-1, at Section 3; UN-Stakeholder-1.
EWG-5. Community-Based Organization Representation	Adopted	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 4 and 22 Exhs. ES-ESMP-1, at Section 3.5; ES-Stakeholder-1; Exhs. NG-ESMP-1, at Section 3.5; NG-Stakeholder-1; Exhs. UN-ESMP-1, at Section 3.5; UN-Stakeholder-1.
EWG-6. Equity-Related Data Tracking and Reporting	Adopted, but modified	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 4 and 23
EWG-7. Including EJ Communities in Workforce Development Plans	Adopted, but modified	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 4 and 24 NG-ESMP-1 Section 12.3 ES-ESMP-1 Section 12.2 and Section 12.3 UN-ESMP-1 Sections 12.2 and 12.3
EWG-8. Grid Mod Planning and Environmental Burdens and Benefits	Adopted, but modified	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 5 and 25
EWG-9. Community Benefits Agreements	Adopted, but modified	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 5 and 26 Exhs. ES-ESMP-1, at Section 3.5; ES-Stakeholder-1; Exhs. NG-ESMP-1, at Section 3.5; NG-Stakeholder-1; Exhs. UN-ESMP-1, at Section 3.5; UN-Stakeholder-1.
EWG-10. Rates, Incentives, and Benefits for Customers	Adopted, but modified	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 5 and 27
EWG-11. Priority Access for EJ Communities	Rejected	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 5 and 28
EWG-12. Rectify Differences in Service Quality	Rejected	Exhibits ES-Stakeholders-1_2_3_4, GMAC Recommendations, page 5 and 29

EWG-1. Procedural: Environmental justice and equity metrics should reflect the impact of the work, not just efforts. For example, the utilities offered to track attendance and the number of community

engagement meetings. Metrics should also include how the EDCs responded to customer concerns and which suggestions were implemented.

Adopted, but modified. With regard to metrics, the 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, the review of metrics, would be very difficult for the Department to review and adjudicate in the time period allowed by statute.

However, the EDCs accept the purpose of the recommendation, and propose to work with interested stakeholders to address metrics relating to the EDCs' respective incremental ESMP investments in a future phase of the ESMP dockets. The EDCs have proposed metrics associated with their incremental ESMP investments, as addressed in:

- *Exhibit ES-Metrics-1*
- *Exhibit NG-Metrics-1*
- *Exhibit UN-Metrics-1*

EWG-2. Procedural: All public-facing materials should be reviewed for plainspoken language, visualizations, clarity, transparency, and completeness.

Adopted, but modified. Although the EDCs will strive to review public-facing materials addressing the qualities noted in the recommendation, it is not feasible for all public-facing materials to be reviewed for plainspoken language. Moreover, clarity, transparency and completeness are qualities that are subjective. The EDCs will endeavor to elicit stakeholder feedback regarding specific recommendations improving the breadth of understanding of their respective public-facing ESMP-related materials, in an effort to expand the public's receptivity to the information provided in such materials. This is also one of the objectives of the CESAG.

Please refer to:

- *Exh. ES-ESMP-1, at Section 3.5*
- *Exh. NG-ESMP-1, at Section 3.4*
- *Exh. UN-ESMP-1, at Section 3.4*

EWG-3. Procedural: The EDCs should work to consolidate overlapping stakeholder engagement efforts to maximize the use of participants' time.

Adopted, but modified. The EDCs will work to consolidate stakeholder engagement where such engagement is intended to exchange information that is not specific to any individual EDC. The EDCs will

need to continue to engage stakeholders on a company-specific basis where the effort is intended to engage stakeholders on a company-specific proposal or issue. The CESAG will allow for a structured opportunity for the EDCs and community-based organizations to co-develop a single statewide comprehensive stakeholder engagement framework. This will enable the execution of one cohesive approach to enhanced community outreach.

EWG-4. Procedural: Stakeholder engagement should begin at the very earliest planning stages for all project types that will have impacts on consumers, including, but not limited to, rate impacts, service reliability, construction, disruptions, etc. Specific stakeholder engagement requirements within the ESMP process, including but not limited to adequate community notification, community compensation, and awareness can be referenced in the Advanced Energy Group Grid Modernization Task Force Recommendations.

Adopted, but modified. The EDCs will begin stakeholder engagement earlier in the planning process for specific projects pursued based on Department approval of their respective 2025-2029 ESMP. This engagement will be informed by the CESAG and community-based experts as the EDCs and community-based organizations develop a Community Engagement Framework. Please refer to the following for a discussion on stakeholder engagement:

- *Exhs. ES-ESMP-1, at Section 3; ES-Stakeholder-1;*
- *Exhs. NG-ESMP-1, at Section 3; NG-Stakeholder-1;*
- *Exhs. UN-ESMP-1, at Section 3; UN-Stakeholder-1.*

EWG-5. Procedural: Community-based organizations and community leaders should have representation and leadership within working groups created by the ESMPs (e.g., CESAG).

Adopted. Community-based organizations will have majority representation and co-leadership at CESAG. Please refer to the following for a discussion on CESAG:

- *Exhs. ES-ESMP-1, at Section 3.5; ES-Stakeholder-1;*
- *Exhs. NG-ESMP-1, at Section 3.5; NG-Stakeholder-1;*
- *Exhs. UN-ESMP-1, at Section 3.5; UN-Stakeholder-1.*

EWG-6. Procedural: The EDCs should track and publish baseline equity-related data and continue to provide regular progress updates.

Adopted, but modified. This recommendation is related to metrics. With regard to metrics, the 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act contemplates consideration by the Department of several issues that, standing alone, might require far longer than

seven months to review. As such, the review of metrics would be very difficult for the EDCs to develop and for the Department to review and adjudicate in the time period allowed by statute.

However, the EDCs accept the purpose of the recommendation, and propose to work with interested stakeholders to address metrics relating to equity in a future phase of the ESMP dockets. The EDCs have proposed metrics associated with their incremental ESMP investments, as addressed in:

- *Exhibit ES-Metrics-1*
- *Exhibit NG-Metrics-1*
- *Exhibit UN-Metrics-1*

EWG-7. Recognition: The ESMPs should provide detailed workforce development plans to recruit, hire, train, and retain people from disadvantaged communities and EJCs.

Adopted, but modified.

National Grid provided a workforce development strategy in Section 12.3 of the ESMP.

Eversource provides comprehensive workforce and training strategies in Section 12.2 and Section 12.3 of its ESMP.

Unitil provides information on workforce development in ESMP Sections 12.2 and 12.3.

EWG-8. Recognition: The EDCs should publicize linkages between grid modernization planning and overall environmental burdens and benefits, particularly related to environmental impacts that have historically disproportionately affected EJCs and disadvantaged communities. Benefits of grid modernization should include reduced greenhouse gas emissions, improved air quality, improved health outcomes, and reduced excess mortality

Adopted, but modified. The EDCs take all of these factors into account when creating their respective ESMPs. The benefits of grid modernization are included in the net benefits analysis. Please refer to the following:

- *Exh. ES-Net Benefits-1*
- *Exh. NG-Net Benefits-1*
- *Exh. UN-Net Benefits-1*

EWG-9. Recognition: The EDCs should work with local organizations in communities hosting distribution infrastructure to develop the community benefits agreements referenced in the ESMPs. Local collaboration can help ensure the agreements recognize and respond to community concerns.

Adopted, but modified. To ensure that communities that host clean energy infrastructure directly benefit from the infrastructure that is built in their community, a connection between the clean energy infrastructure and specific benefits received for hosting that infrastructure is necessary. Such community

benefits agreements (CBA) can take shape as individual EDCs work with a clean energy host community to develop a community benefits agreement specific to that community. No two communities are created equal. CBAs will be developed and executed on an individual host community basis. As CBAs are developed with host communities, the EDCs will take feedback and lessons learned from that process back to the CESAG to further ensure all EDCs and community-based organizations continue to re-think and formulate new methods and approaches to drive benefits of this just transition across the Commonwealth. Please refer to the following for a discussion of community benefits agreements:

- *Exhs. ES-ESMP-1, at Section 3.5; ES-Stakeholder-1;*
- *Exhs. NG-ESMP-1, at Section 3.5; NG-Stakeholder-1;*
- *Exhs. UN-ESMP-1, at Section 3.5; UN-Stakeholder-1.*

EWG-10. Distributive: Rates, incentives, and benefits associated with grid modernization should be clearly spelled out for consumers along with how to access assistance for customers in arrears. The benefits and requirements for programs which will provide an opportunity for consumers to participate on the grid must also be transparently explained. The ESMPs need to include the net benefits for customers after considering the anticipated costs of grid upgrades to help the GMAC, D.P.U., and other stakeholders determine what is fair and reasonable. The ESMPs should also include distributional equity analysis plans to understand the impacts and keep energy burdens at a manageable level for customers across all income groups, regardless of whether net benefits are provided

Adopted, but modified. With respect rate redesign and cost allocation methodologies for proactive investments, the 2022 Climate Act requires an extensive amount of information to be included in an ESMP, but limits the Department's review to seven months from the date an ESMP is filed. Moreover, each EDC is required to submit their ESMP on the same date, further complicating the Department's review of these comprehensive plans in such a limited timeframe. In addition, the 2022 Climate Act contemplates consideration by the Department of several issues that, standing alone, might require far longer than seven months to review. As such, a full analysis of rate redesign options, even if able to be developed by the EDCs in time for consideration by the Department in the present ESMP dockets, would be very difficult to review and adjudicate in the time period allowed by statute. The EDCs support addressing rate redesign options and customer energy burdens with stakeholders and the Department in a generic proceeding. Additionally, the EDCs look forward to participating in D.P.U. 24-15, recently opened by the Department. However, the Net Benefit Analysis does include the benefits associated with grid modernization for the proposed ESMP investments. Please see Exhibits ES-Net Benefits-1, NG-Net Benefits-1, and UN-Net Benefits-1 for the net benefit analysis testimony.

EWG-11. Distributive: Disadvantaged communities, EJCs, and LMI customers should have priority access to innovative financing, technology, energy-efficiency upgrades, building weatherization, and electrification adoption

Rejected. Recommendation-EWG-11 is better suited for the Energy Efficiency Advisory Council and the respective three-year energy efficiency plans of the Massachusetts Program Administrators.

EWG-12. Distributive: The EDCs should work to rectify any existing differences in service quality by working with disadvantaged communities and EJCs. The EDCs should also work to rectify anticipated future differences in service quality in communities whose infrastructure is vulnerable to climate change impacts, as identified by the EDCs' climate vulnerability assessments.

Rejected. The EDCs disagree with the premise of this recommendation. Service quality is system-wide and reviewed in separate service quality proceedings. On average, EJCs do not experience worse reliability performance than non-EJCs in the EDCs' service territory.