Creating A Clean, Affordable, Equitable and Resilient Energy Future For the Commonwealth

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENERGY RESOURCES

Grid Modernization Advisory Council

February 28, 2024

DOER
Massachusetts Department of Energy Resources

Agenda

Item	Time
Welcome, Agenda, Roll Call	1:00 – 1:05
Public Comment Period	1:05 – 1:20
Meeting Minutes Review and Voting Executive Committee Appointment 2024 GMAC Meeting Schedule NECEC/MassCEC Event Series GMAC Operating Budget Proposal	1:20 – 1:50
GMAC Comments to DPU	1:50 – 2:25
10-minute Break	*2:25 – 2:35*
Consultant Presentation on ESMP Filings	2:35 – 3:55
Close	3:55 – 4:00

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Public Comment

- 15-minute period for public comment
- Speakers will have up to **3 minutes** to speak on any topics of interest related to the GMAC. Once everyone who has pre-registered has provided comment, others may speak, as time allows.
- Please state your name and affiliation before delivering your comment.

Meeting Minutes

- Calling for vote to finalize:
  - December 14th, 2023 GMAC minutes
  - February 15th, 2024 Executive Committee minutes

- *Motion to approve the December 14th minutes [as distributed/as corrected]?*
- *Motion to approve the February 15th ExCom minutes [as distributed/as corrected]?*

Executive Committee Appointment

- Calling for vote to appoint Digaunto Chatterjee to the GMAC Executive Committee as a non-voting member.

- *Motion to approve appoint Digaunto Chatterjee to the Executive Committee?*

- Thank you, Carol Sedewitz, for your work on GMAC! Wishing you a wonderful retirement.

2024 GMAC Meeting Schedule

GMAC Meeting Schedule

- **February 28, 2024**
  - DPU procedural recommendations discussion
  - Consultant presentation on initial ESMP filings
- **June/July 2024**
  - Consultant update on the ESMP docket process
- **September 2024**
  - GMAC meeting after DPU ESMP Order
  - Discuss next steps for GMAC

- The Executive Committee will meet about three weeks ahead of each GMAC meeting.
- The Equity Working Group is planning to meet on March 5th, and then will discuss a future meeting cadence.
- DOER will send out polls for scheduling the July and late September GMAC meetings in the next few days.

Procedural Schedule for D.P.U. 24-10, 24-11, and 24-12	
Date	**Action**
1/29/2024	ESMP filings submitted to DPU
1/30/2024	Discovery (General Track) begins
2/20/2024	Pre-hearing statements (General Track) due
3/1/2024	EDCs' first discovery logs due
3/5/2024	Intervenor testimony due
3/5/2024 at 2:00 p.m.	Public Information Session on ESMPs
3/7/2024, at 7:00 p.m. **3/12/2024, at 2:00 p.m.**	Virtual Public Hearings
3/12/2024	Written public comments due
3/8/2024 **3/11/2024** **3/13/2024** **(All 10:00 a.m. – 5:00 p.m.)**	Reserved for technical sessions
3/25/2024	Deadline to issue discovery
4/1/2024	EDC's updated discovery logs due
4/8/2024 – 4/26/2024	Evidentiary hearings
TBD	Briefing
8/29/2024	DPU Order deadline

Any questions or comments?

NECEC/MassCEC Event Series

- **Event series**: “Transition to the Future Grid in MA”
- **Purpose**:
  - Multi-stakeholder conversation about implementation
  - Parallel to the GMAC and ESMP process (independent of either formal process)
- **Who:**
  - Broad stakeholder group, includes grid technology and innovation community
  - GMAC member participation would be valuable at the event

- Please send any questions or suggestions to Sarah Cullinan

GMAC Operating Budget Proposal (1/2)

- The DPU approved **$50,000** for the GMAC for operational expenses in 2024. This can be used for unanticipated activities that arise in the first iteration of the GMAC's review of the ESMPs.
- **Potential spend options include:**
  - Additional distribution system planning related studies
  - Technical support
  - Stakeholder engagement opportunities
  - Public facing materials (i.e. video)

- To make use this money in 2024, the use for these funds must be determined by **May** at the latest.

- *Proposals on following slide*

GMAC Operating Budget Proposal (2/2)

Proposals for Funds:

- **Option #1: Fall 2024 In-Person Stakeholder Session:** The GMAC could hold a facilitated in-person stakeholder workshop in the fall of 2024 (post DPU Order) that may include review of the Order, discussion of distribution system planning in Massachusetts, and strategic planning for future ESMP processes. The funds may support pre-event planning, meeting space rentals, facilitation services, event organizing, and post-event materials.
  - *The event's scope and audience need to be considered.*

- **Option #2: Publishing Public Facing Materials in Fall 2024:** The GMAC could use the funds to develop public-facing and educational materials on grid planning and grid readiness based on the outcome of the DPU Order.

Feedback and ideas from GMAC members welcome.

Future ESMP Process Recommendations

- History
  - At the December 14, 2023 GMAC meeting, Kate Tohme presented and discussed proposed recommendations on future ESMP processes.
  - The goal was to have the recommendations submitted to the DPU as public comments in the D.P.U. 24-10/D.P.U. 24-11/D.P.U. 24-12 dockets.
  - Kate Tohme prepared initial procedural recommendations that GMAC members were invited to submit redline edits and/or comments.
  - The comments were compiled to a single document that is available on the GMAC website.
- Today
  - Written public comments in the ESMP dockets are due **March 12th**
  - To meet this deadline, the GMAC must discuss the document, propose any amendments, and vote on these recommendations at this meeting.
  - If approved, the recommendations will be submitted as public comments of the GMAC in the ESMP proceedings.

- *See Compiled DPU Comments Document*

Future ESMP Process Recommendations (Cont.)

- **To Discuss:**
  - Are there any comments or questions on the scope and timing of the public comments?
  - Are there any comments or questions on proposed recommendations?
  - Do GMAC members have any additions or redactions?

Future ESMP Process Recommendations Vote

- Calling for vote on the ESMP procedural recommendations to be submitted to the DPU as public comments.

- *Motion to approve the ESMP procedural recommendations [as distributed/as amended]?*

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Break

Please be ready to start again in ~10 minutes

Wired Group

GREENER U

Synapse
Energy Economics, Inc.

Massachusetts Electric Sector Modernization Plans

GMAC Consultant Comments on the 2024 ESMPs

Synapse Energy Economics
Wired Group
GreenerU

February 28, 2024

Outline of Presentation

1. Department Interlocutory Order (10 mins)
2. EDC responses to GMAC recommendations (5 mins)
3. Load forecasts and drivers (20 mins)
4. Reliability and resilience (5 mins)
5. ESMP and non-ESMP investment proposals (10)
6. Benefit-cost analysis (20 mins)
7. Bill impact analysis (10 mins)
8. Review and recovery of investments (5 mins)
9. Summary of consultant comments (5 mins)

Please ask clarifying questions at any time. We will pause after each section for Q&A.

Note that all the information included in this presentation is from the GMAC Consultant Comments on the Massachusetts ESMPs, February 22, 2024.

Department Interlocutory Order on Scope of ESMP Proceedings (10 mins)

Department Interlocutory Order on Scope (DPU 24-10/11/12)

The Department will review the ESMPs using a strategic plan approach (pages 14-15)

- Review the ESMPs as long-term, strategic plans that endeavor to meet the objectives of the Climate Act.
- Short-term investment proposals are separate and distinct from the strategic plans.
- This is consistent with the approach used in the recent grid modernization proceedings.

The standards of review include, but are not limited to, the following (page 16)

- The forecast methods relied upon by the EDCs.
- Whether each plan provides net benefits.
- Whether each plan complies with the requirements of the Climate Act.

The current ESMP dockets will not address the following (page 23)

- The EDC's budget pre-approval requests, including for newly proposed CIPs.
- Cost allocation proposals.
- Rate design or rate redesign proposals.

The DPU will review the appropriate cost recovery framework for ESMP investments (page 18)

- The parameters for cost recovery mechanisms will be addressed in a separate phase of these proceedings.

Consultant Comments: Department Interlocutory Order

The specific amounts of budget pre-approval requests require less attention than was expected before the order.

- Nonetheless, the type and general magnitude of proposed investments are relevant for determining whether the strategic plans are reasonable and reviewing the net benefits.

The long-term load forecasts and long-term budget requests require more attention than was expected before the order.

- The ESMPs provide little information regarding the costs from 2030 to 2034, and no information on costs after 2034.
- The ESMPs provide no quantitative information regarding the benefits after 2029.
- The BCA and bill impact analyses do not cover any costs or benefits after 2029.

The Department will review the appropriate framework for cost recovery of ESMP and non-ESMP investments.

Do GMAC members have questions or issues to discuss?

EDC Responses to GMAC Recommendations (5 mins)

EDC Response 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

Consultant Comments: EDC Responses to GMAC Recommendations

The GMAC recommendations that were rejected:

- Five recommendations on integrated gas-electric planning
- Two recommendations from the Equity Work Group
- Stakeholder engagement
- The 5-year plan
- Macroeconomic benefits

Do GMAC members have questions or issues to discuss?

Many GMAC recommendations were “accepted but modified,” but some of those did not adopt the substance of the GMC recommendations. For example:

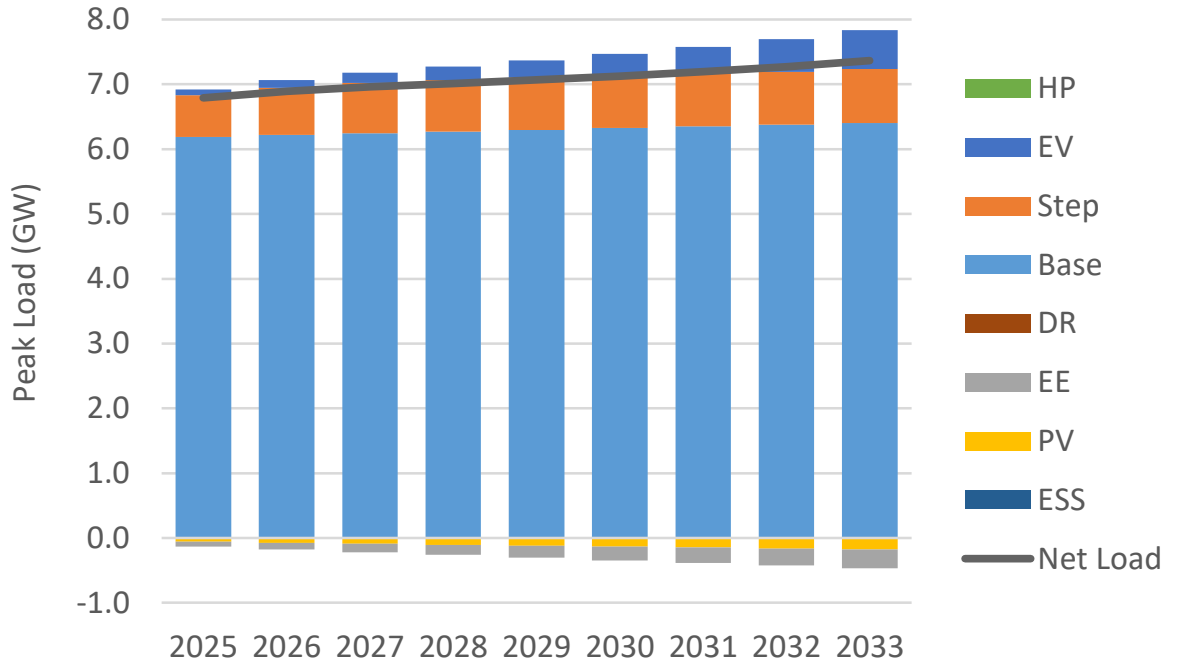
- The recommendation that the ESMPs be the central distribution planning document.
- The recommendation that the EDCs should be more transparent about the short-term and long-term load forecasts.

Load Forecasts and Load Drivers

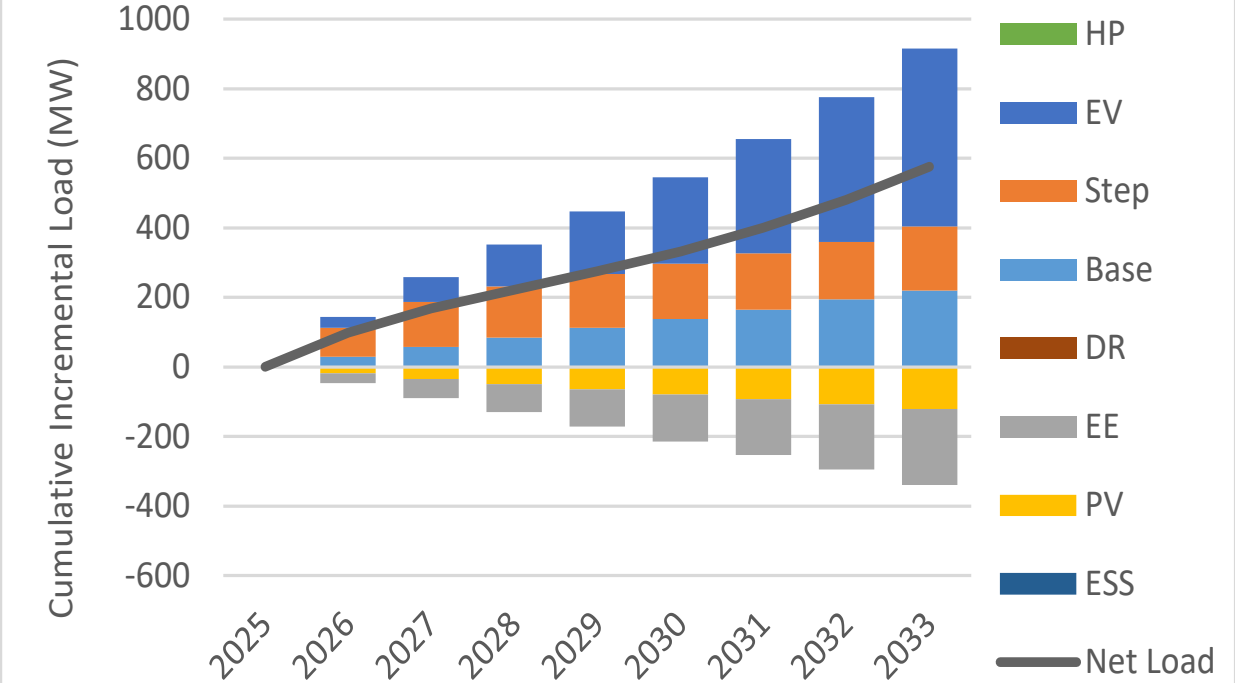
Short-Term Peak Forecast: Eversource

- EVs and heat pumps are referred to in the ESMPs as “electrification” loads.
- EVs are assumed to have a large impact. The EV forecasts do not account for managed charging.
- Heat pumps are assumed to have no impact because short-term forecast is summer peaking.
- Includes “step” loads due to large new customers.

Total Peak



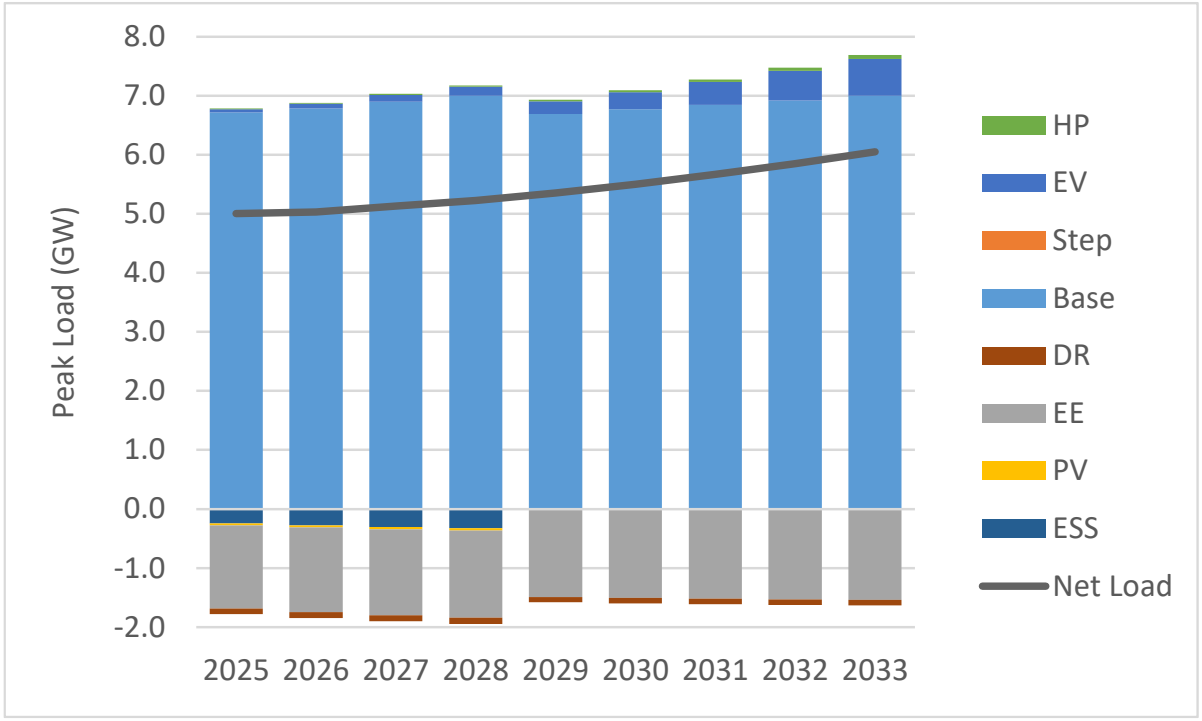
Cumulative Incremental Peak



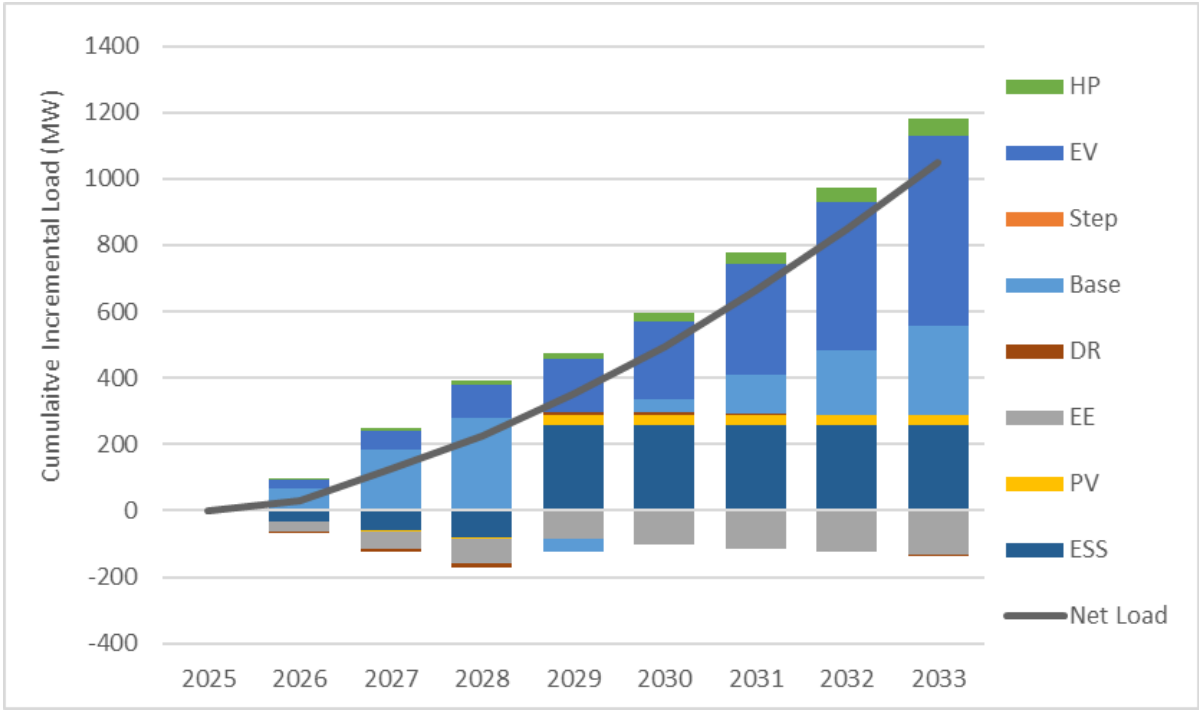
Short-Term Peak Forecast: National Grid

- EVs and heat pumps are referred to in the ESMPs as “electrification” loads.
- EVs are assumed to have a large impact. The EV forecasts do not account for managed charging.
- Heat pumps are assumed to have no impact because short-term forecast is summer peaking.
- Storage (ESS) plays a large role. It is not clear why storage is assumed to increase peak demand in some years.

Total Peak



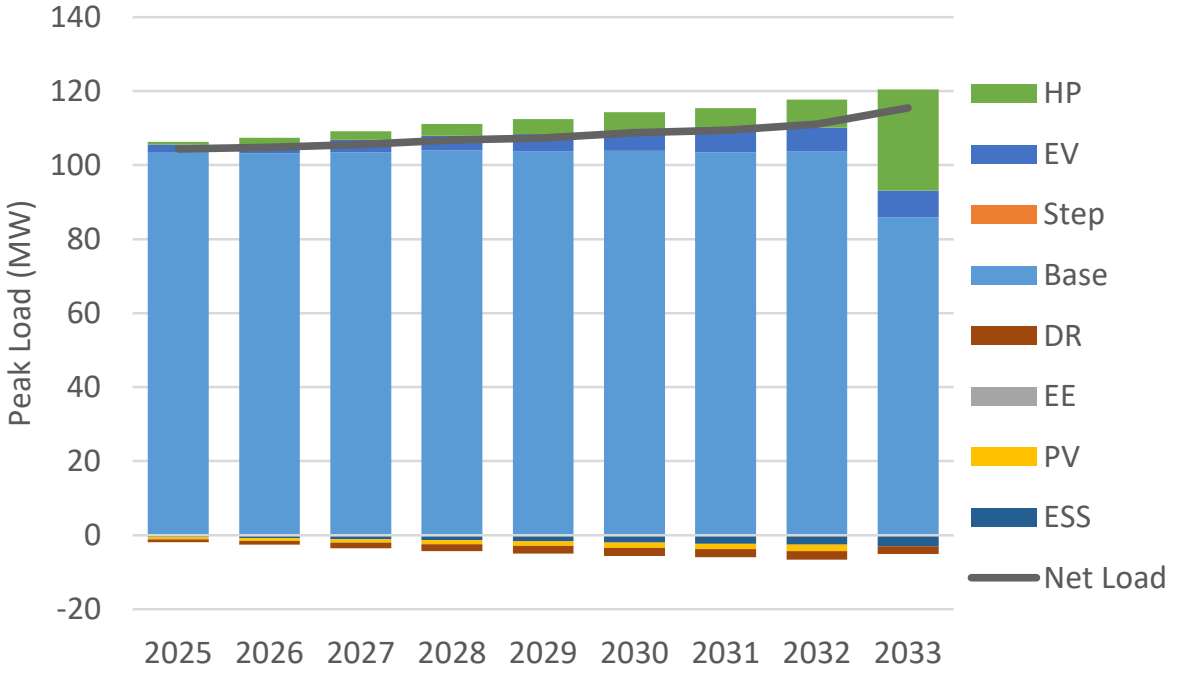
Cumulative Incremental Peak



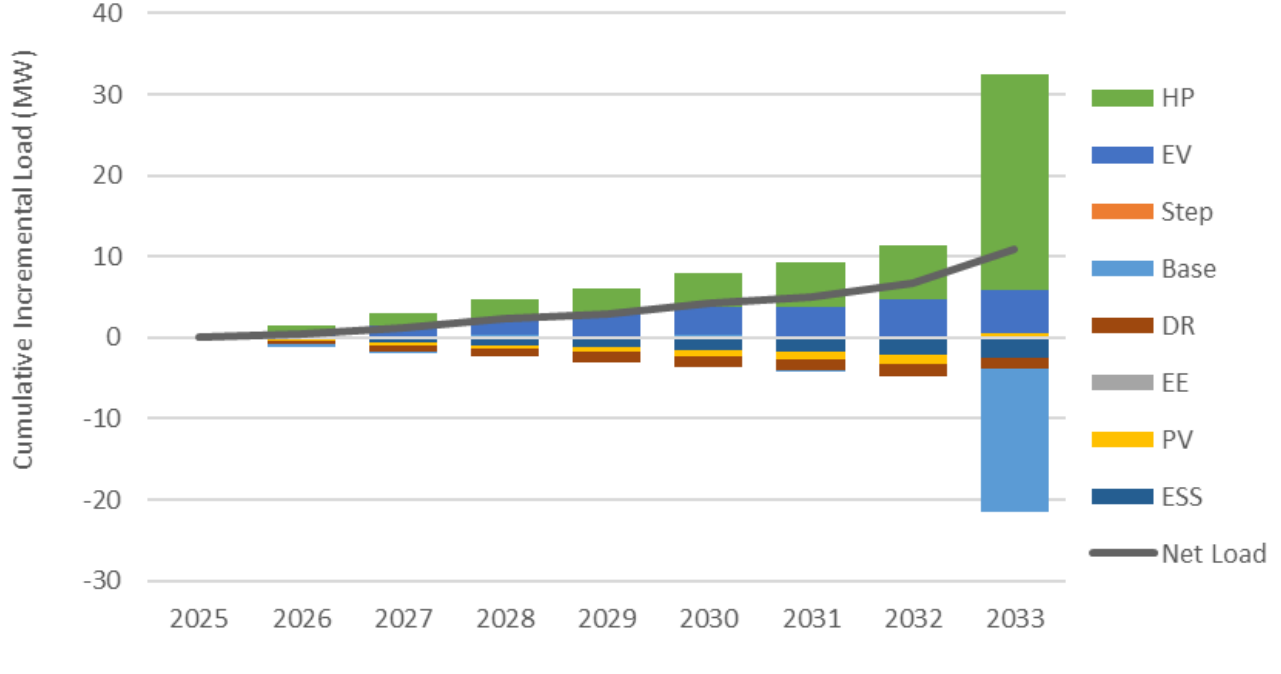
Short-Term Peak Forecast: Unitil

- EVs and heat pumps are referred to in the ESMPs as “electrification” loads.
- EVs are assumed to have a large impact. The EV forecasts do not account for managed charging.
- Heat pumps are assumed to have a large impact when the system becomes winter peaking.
- The “base” load in 2033 is negative because the winter base load is less than the summer base load.

Total Peak

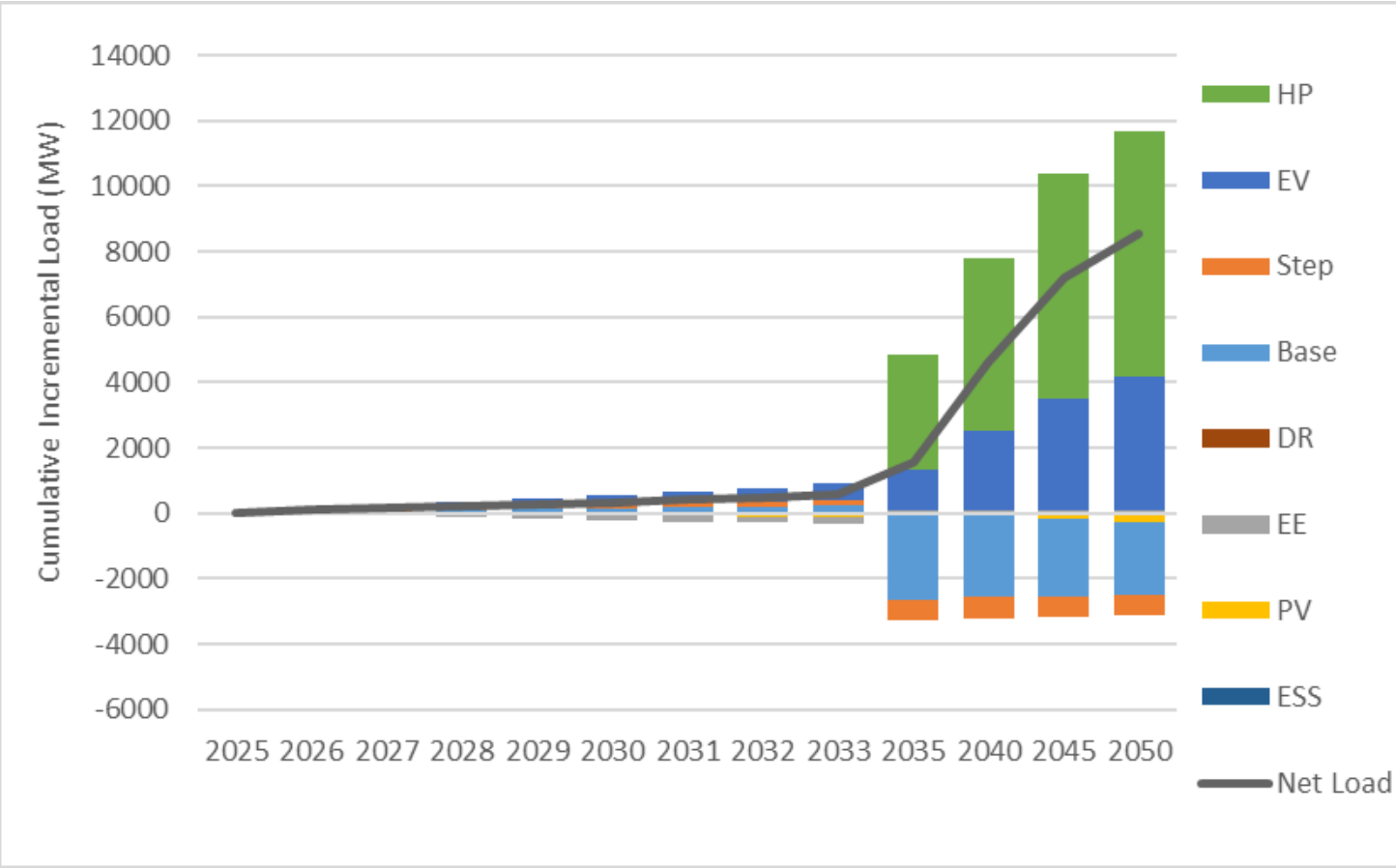


Cumulative Incremental Peak



Long-Term Peak Forecast: Eversource

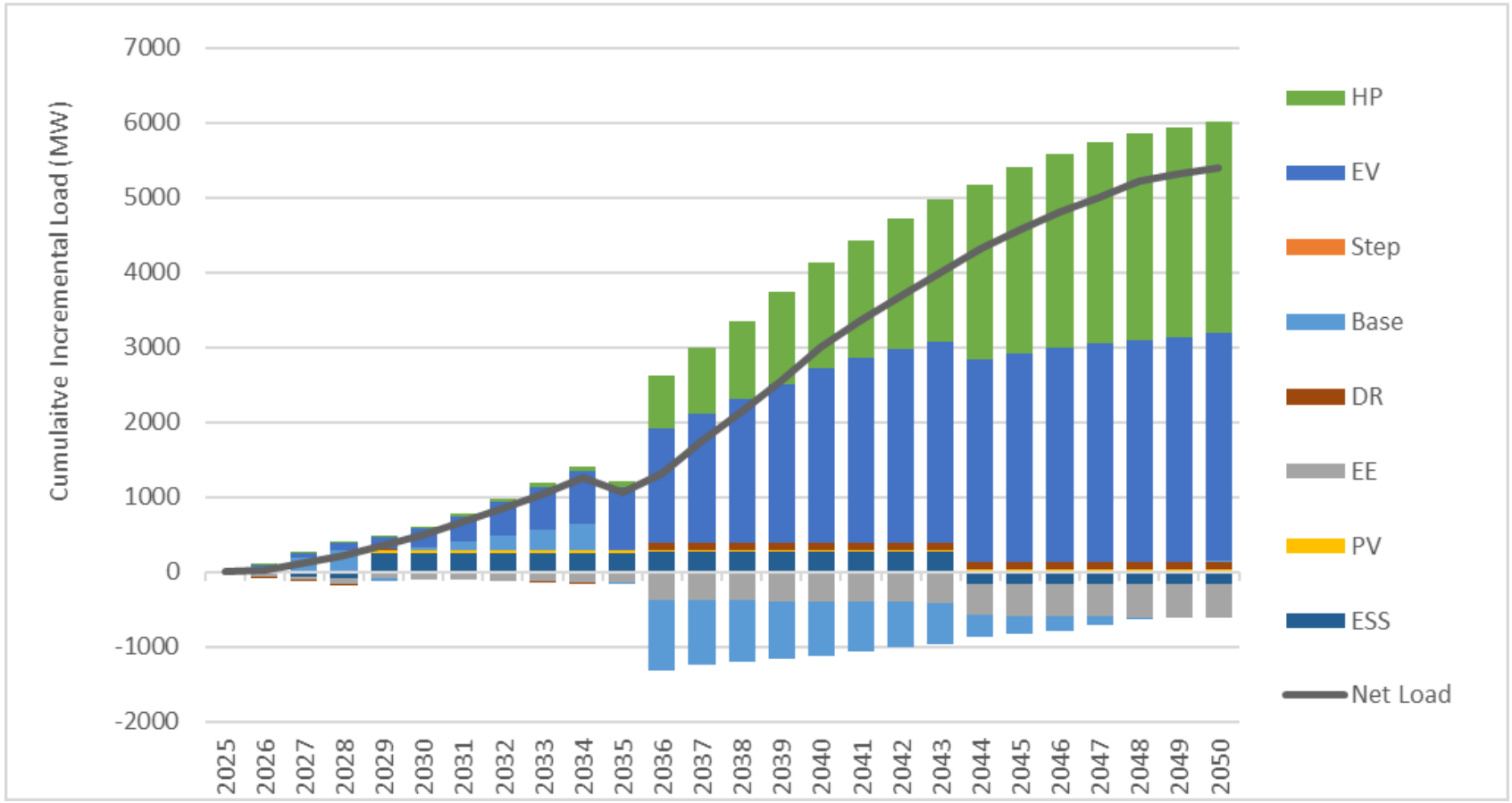
Cumulative Incremental Peak



Heat pumps and EVs are assumed to dominate the peak demand growth after 2033.

Long-Term Peak Forecast: National Grid

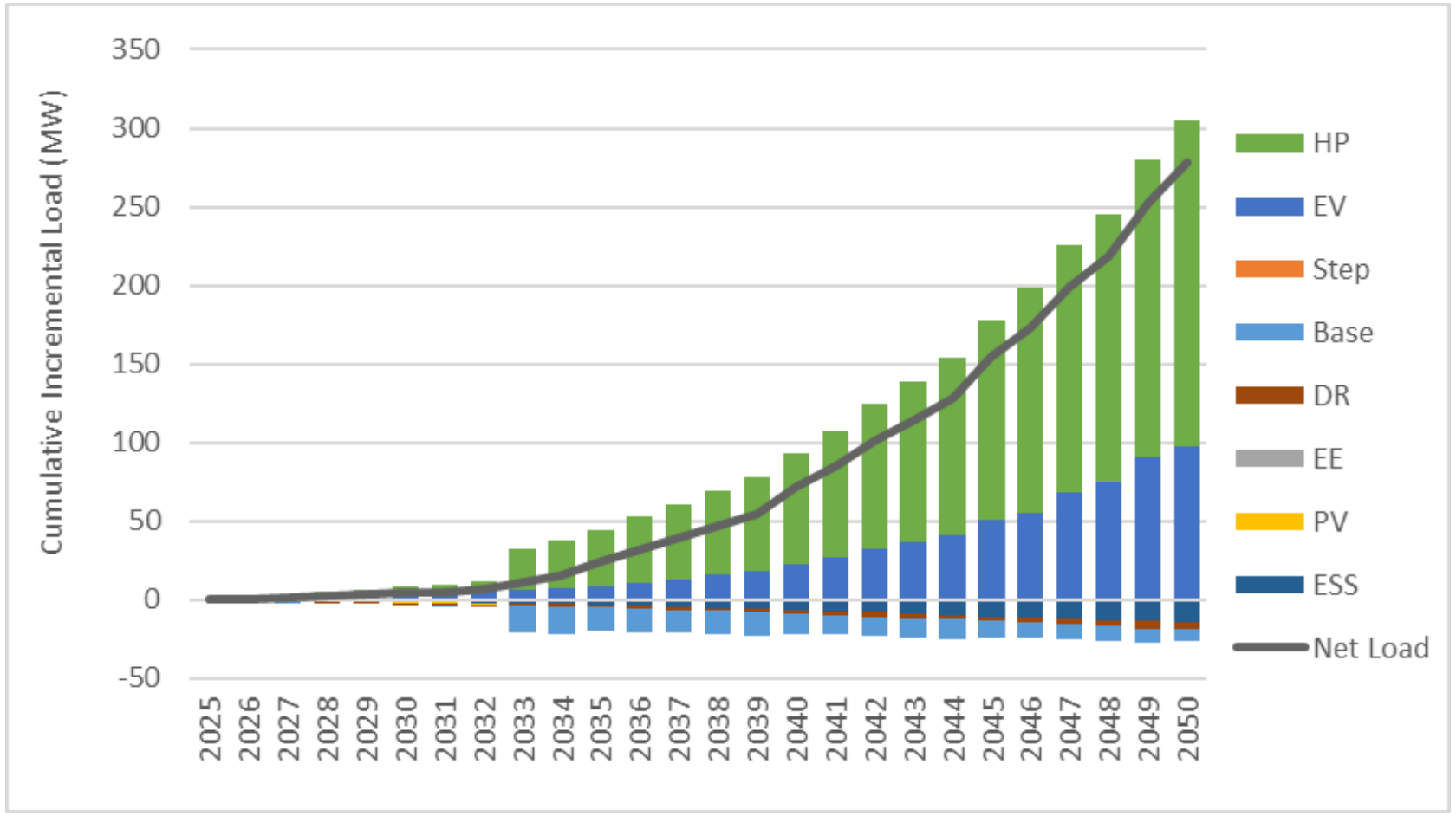
Cumulative Incremental Peak



Heat pumps and EVs are assumed to dominate the peak demand growth after 2033.

Long-Term Peak Forecast: Unitil

Cumulative Incremental Peak



Heat pumps and EVs are assumed to dominate the peak demand growth after 2033.

ESMP vs. CECP Peak Demand Forecasts: Scenarios

The Massachusetts 2050 Decarbonization Roadmap *All Options* scenario optimized the least-cost scenario to achieving decarbonization and assumes a high level of electrification and building efficiency.

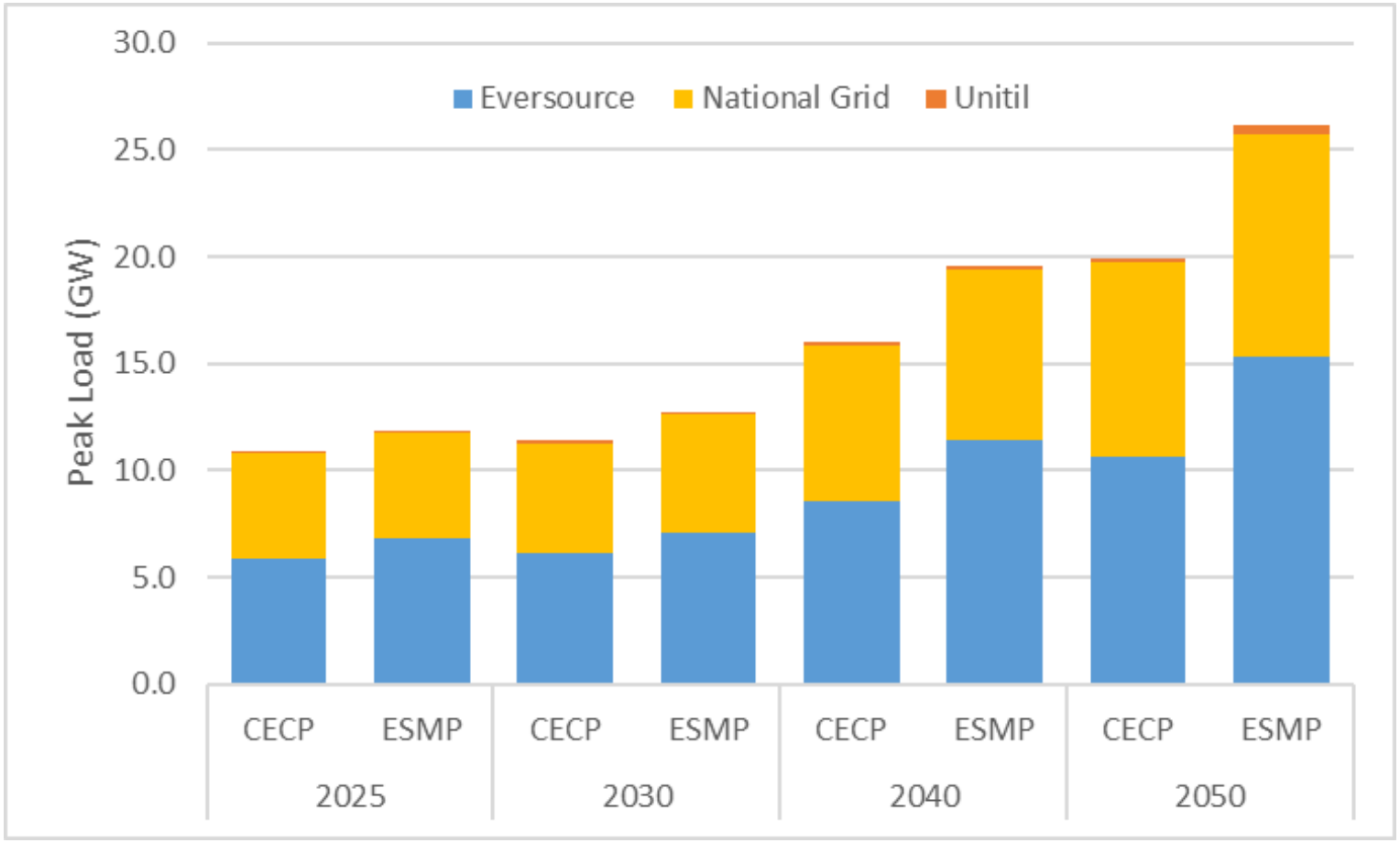
The CECP includes several planning scenarios:

- *Full Electrification*: Maximum adoption of whole-home heat-pumps. No use of fuels in buildings in 2050. This is the only scenario that is consistent with DPU Order 20-80.
- *High Electrification*: Rapid adoption whole-home heat pumps. Most like the "All Options" pathway from the 2050 Roadmap Study, which the EDCs used to inform their forecasts.
- *Phased*: Rapid adoption of both partial- and whole-home heat pump systems but allows for hybrid systems in the 2020s and whole home retrofits thereafter. Some use of clean fuels in 2050. This scenario was used to set the 2025 and 2023 GHG sublimits in the CECPs.
- *Hybrid:* Rapid adoption of hybrid heat pumps by 2030. Assumes moderate clean fuel demand in 2050.
- *Clean Fuels:* Assumes today's trend of customers switching to gas heating continues, with extensive reliance on clean fuels in 2050.

The ESMP peak demand forecasts rely on several planning scenarios

- Eversource: *All Options* pathway, *Phased* scenario, *High Electrification* scenario.
- National Grid: *All Options* pathway and *Phased* scenario.
- Unitil: *All Options* pathway.

ESMP vs. CECP Peak Demand Forecasts

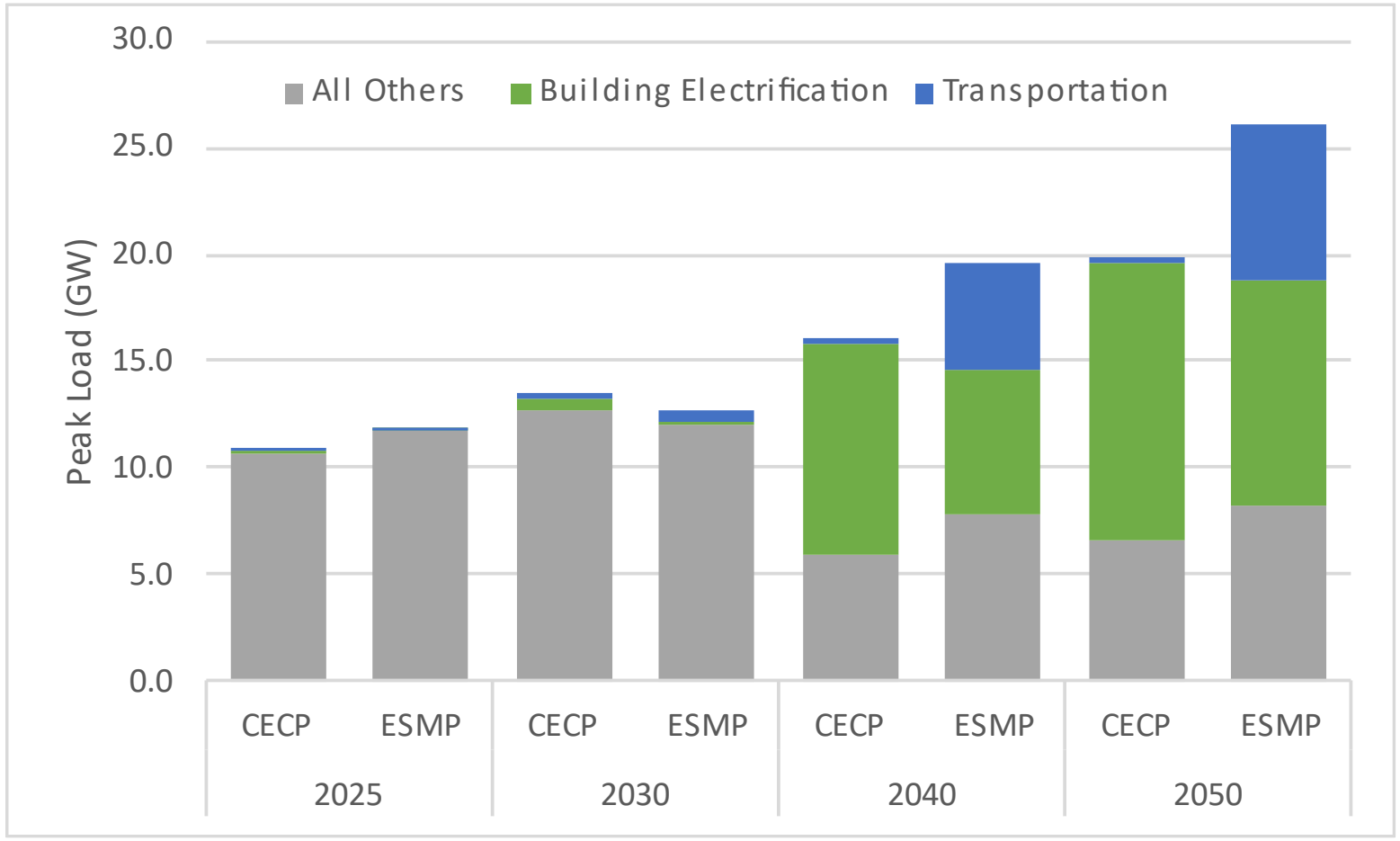


CECP peak forecast is from the *Phased Scenario.*

In 2040 and 2050 the ESMP peak forecasts are much higher than the CECP forecasts.

Compared with other CECP scenarios, the ESMP forecasts are closer or lower.

ESMP vs. CECP Peak Demand Forecasts

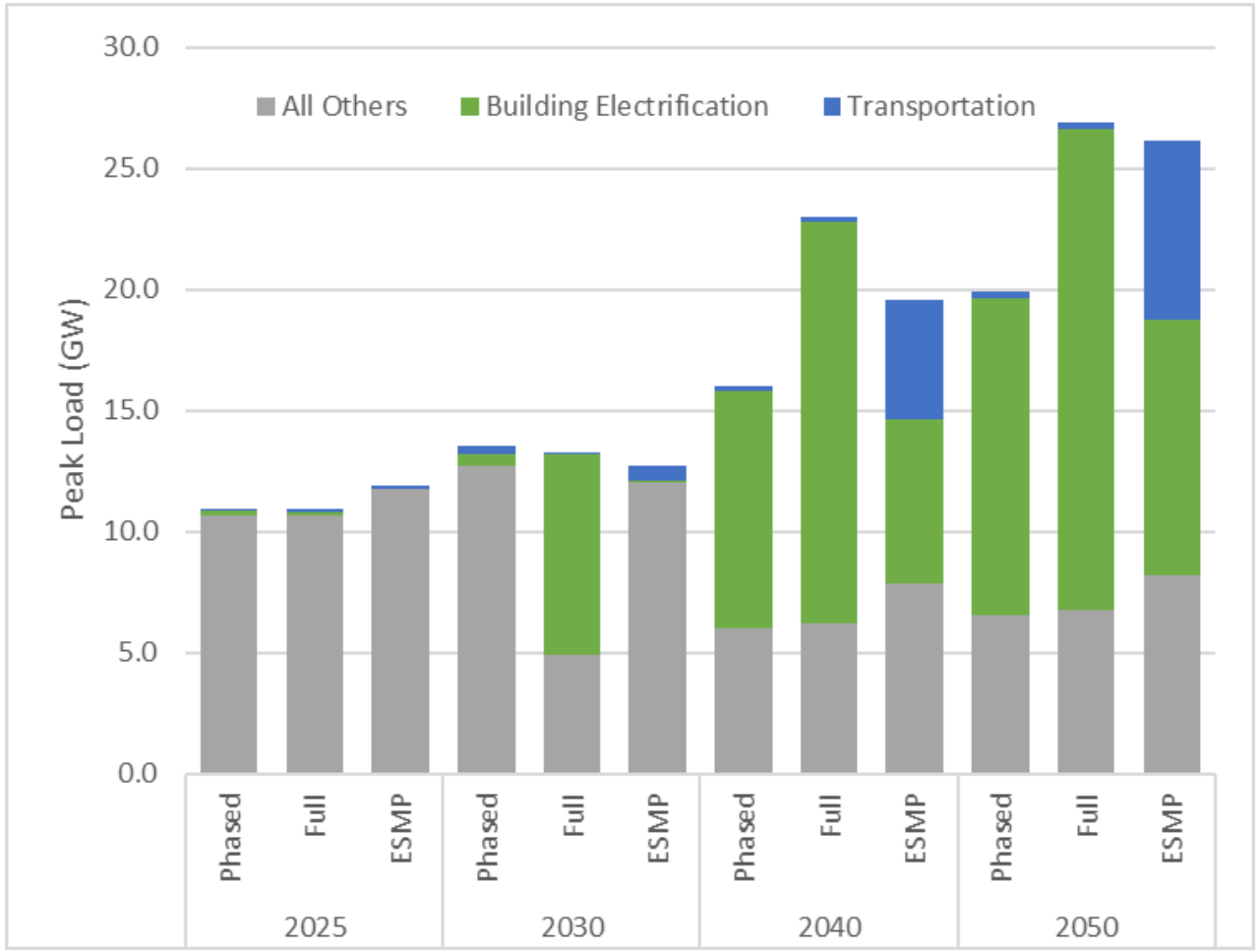


CECP peak forecast is from the *Phased Scenario*

ESMPs assume:

- Higher base peak growth.
- Much higher EV growth. This is probably because ESMPs do not account for managed charging.
- Much lower HP growth.

ESMP vs. CECP Peak Demand Forecasts: Two CECP Scenarios



ESMP peak demands are

- Much lower than the *Full Electrification Scenario*
- Much higher than the *Phased Scenario*

ESMP HP assumptions are

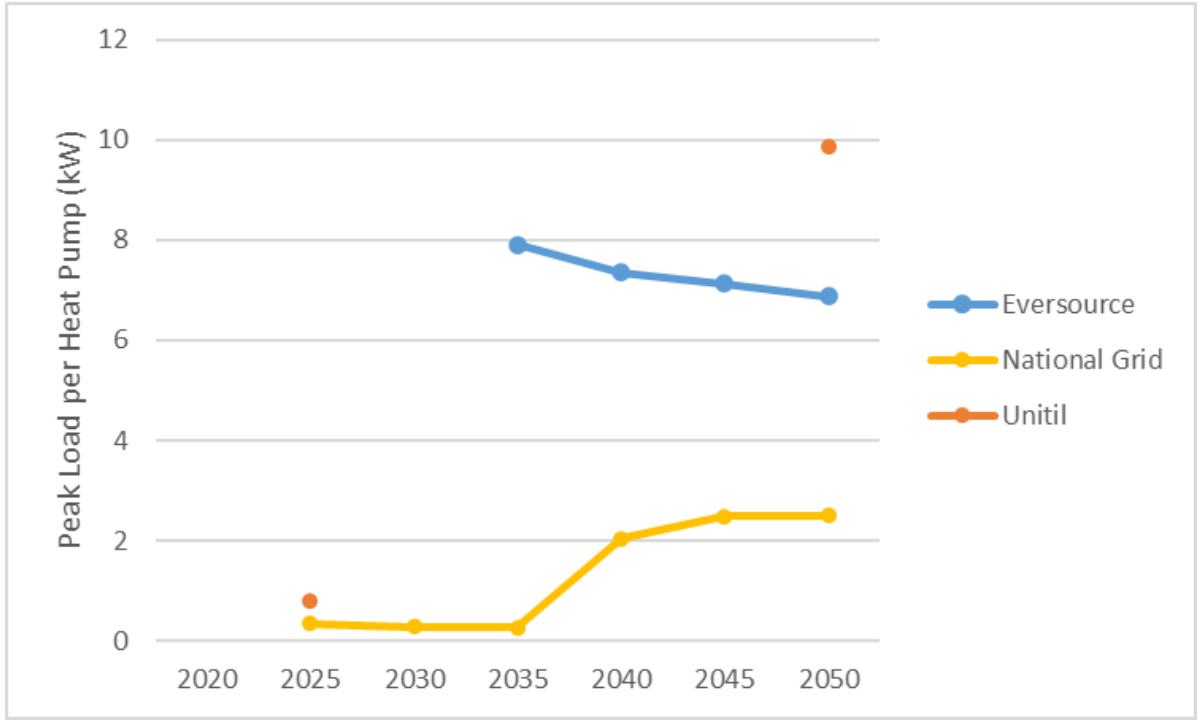
- Lower than both scenarios

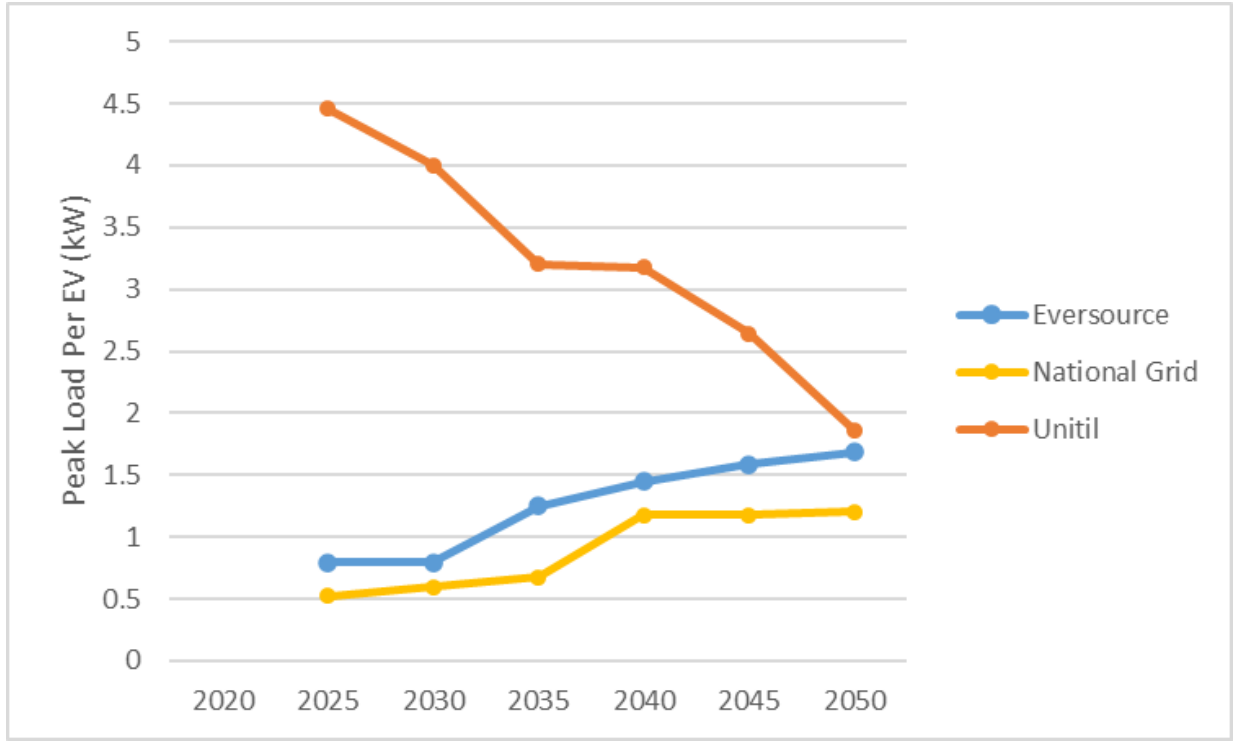
ESMP EV assumptions are

- Much higher than both scenarios. This is probably because ESMPs do not account for managed charging.

Assumptions for HP and EV Impacts on Peak Demand

- Each EDC uses very different assumptions.
- These different assumptions will lead to very different forecasts of electrification needs.





Comparison of CECP Benchmarks with ESMP: PV and Storage

ESMP PV capacity assumptions:

- Are aligned with the Roadmap *All Options* pathway in 2030 and 2050.
- Are lower than Phased Scenario in 2030 and 2050.

ESMP storage assumptions:

- 2030 energy storage capacity assumptions are not provided in ESMPs.
- 2050 storage assumptions are lower than Roadmap *All Options* pathway.
- 2050 storage assumptions are slightly higher than the *Phased Scenario*.

	PV Capacity (MW)		Energy Storage Capacity (MW)	
	2030	**2050**	**2030**	**2050**
Eversource ESMP	2,500	9,700	480	2,600
National Grid ESMP	3,155	10,400	N/A	2,500
Unitil ESMP	13	250	N/A	60
All EDCs ESMP	**5,668**	**23,050**	**N/A**	**5,160**
Decarbonization Roadmap (*All Options Scenario*)	5,600	23,200	1,800	3,000
MA 2050 CECP (*Phased Scenario*)	8,360	26,930	2,900	5,790

Consultant Comments: Load Forecasts and Load Drivers

EV assumptions result in them making a very large contribution to new loads relative to CECP forecasts, but the EDCs do not account for managed charging, which significantly overstates new loads.

HP assumptions result in them making a smaller contribution to new loads than CECP, which might understate new loads.

PV assumptions are lower than the CECP *Phased* scenario.

Storage assumptions are mostly aligned with CECP scenarios.

Do GMAC members have questions or issues to discuss?

The EDC's use different CECP scenarios for load forecasts.

- None of the scenarios are consistent with CECP *Full Electrification*, which is the only scenario consistent with the DPU gas planning order.
- The ESMP forecasts are higher than the Phased and lower than the Full Electrification scenario.

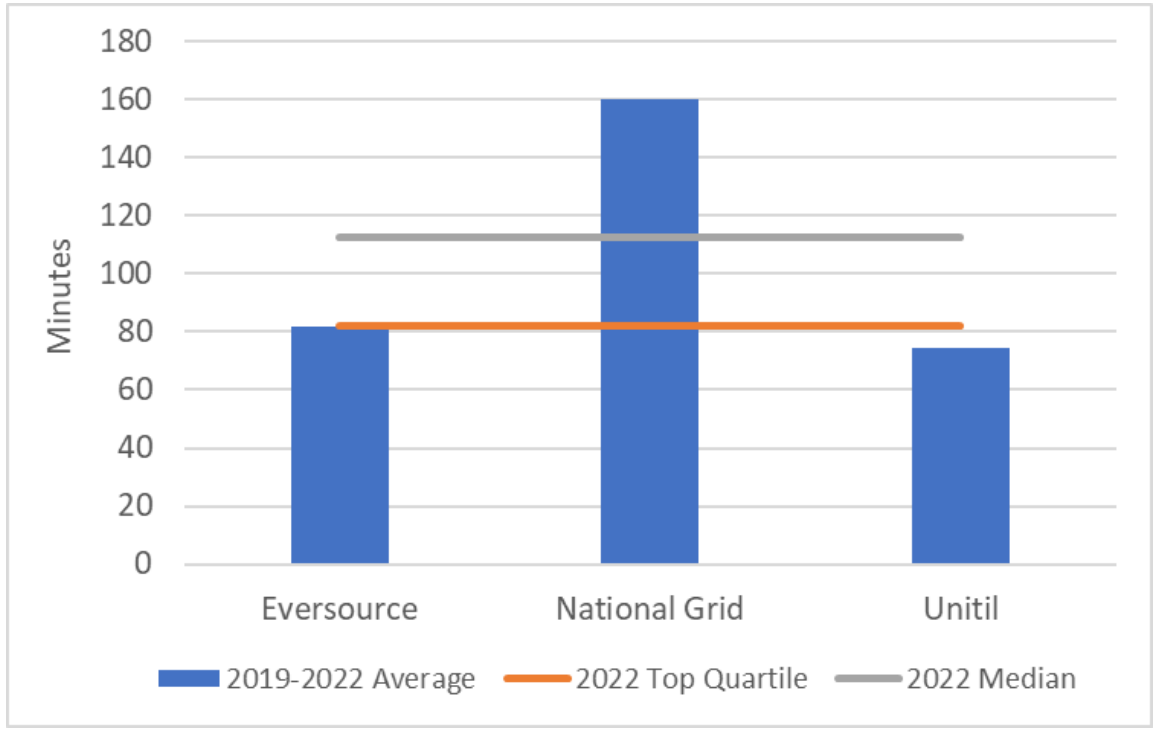
In general, we do not have much confidence in the load forecasts.

Reliability and Resilience

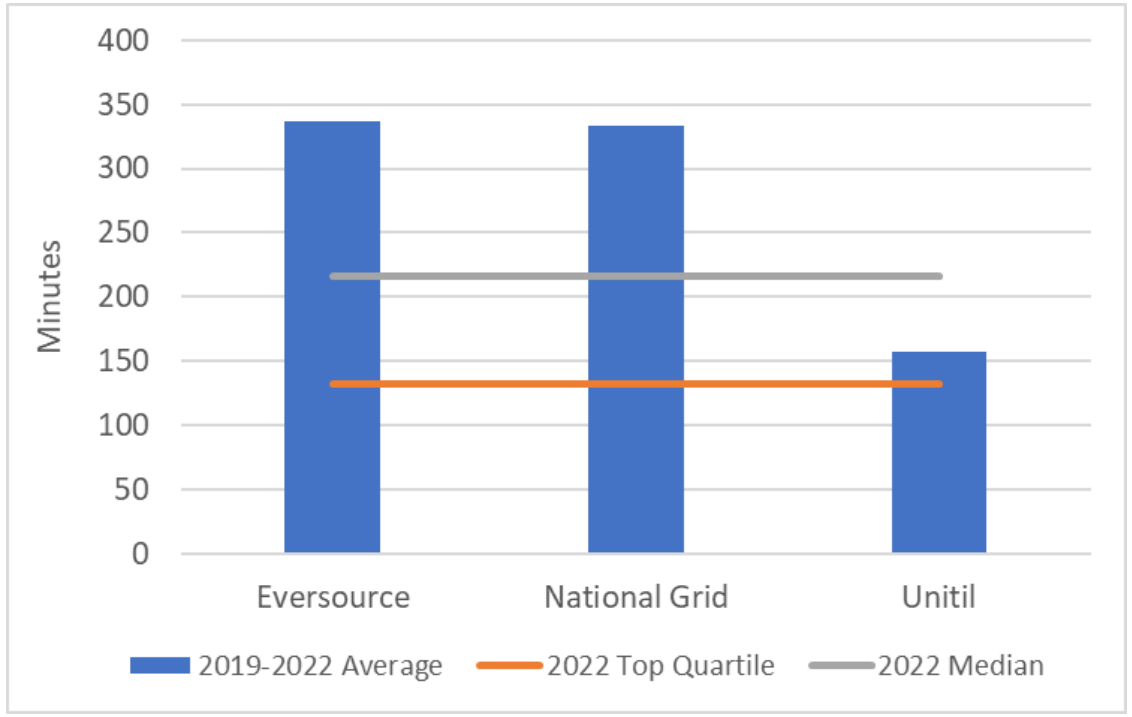
Reliability and Resilience in Recent Years

- Reliability: Eversource and Unitil have performed better other utilities. National Grid has not.
- Resilience: Eversource and Unitil have preformed worse than others, Unitil less so.
- Needs will vary by local conditions.

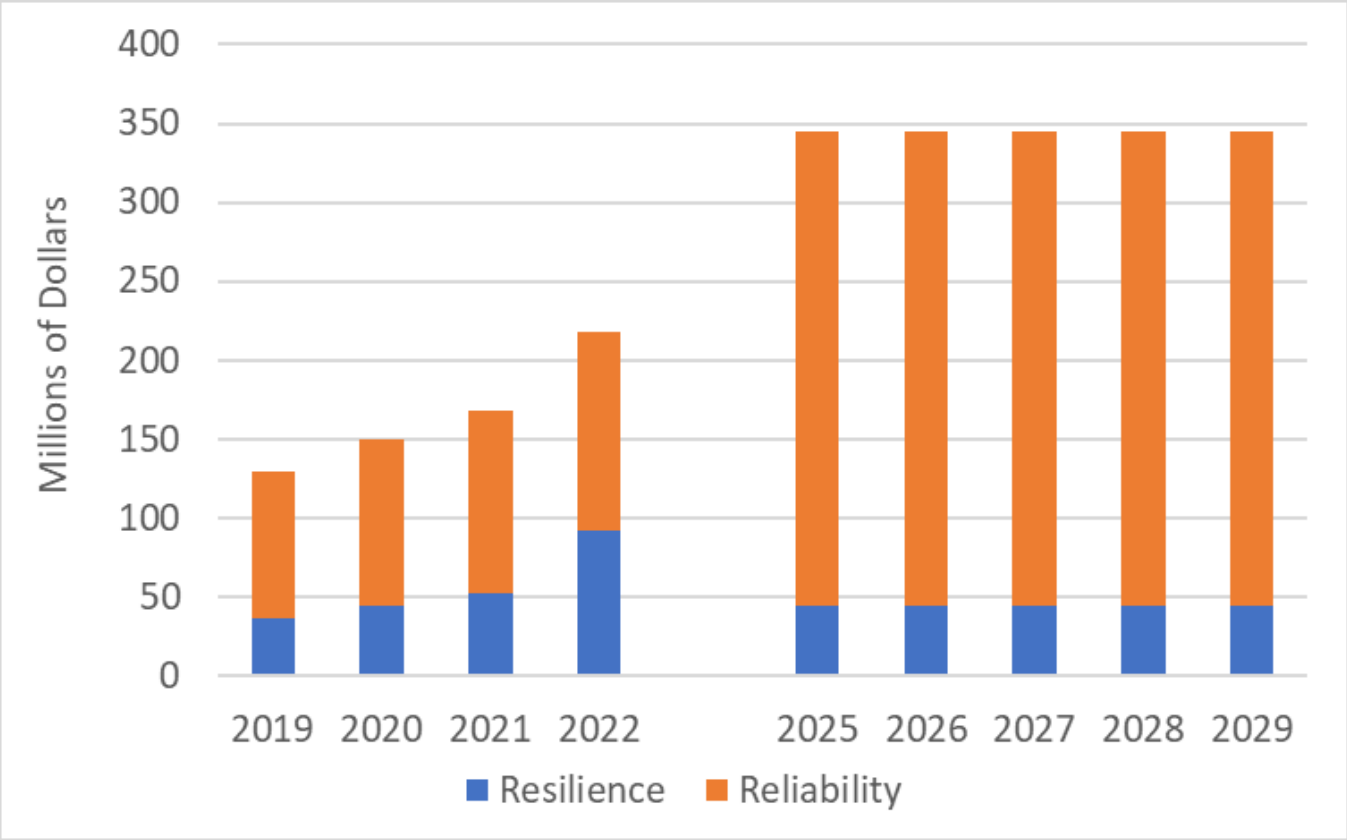
Outage durations during blue sky days



Outage durations accounting for storms and major events



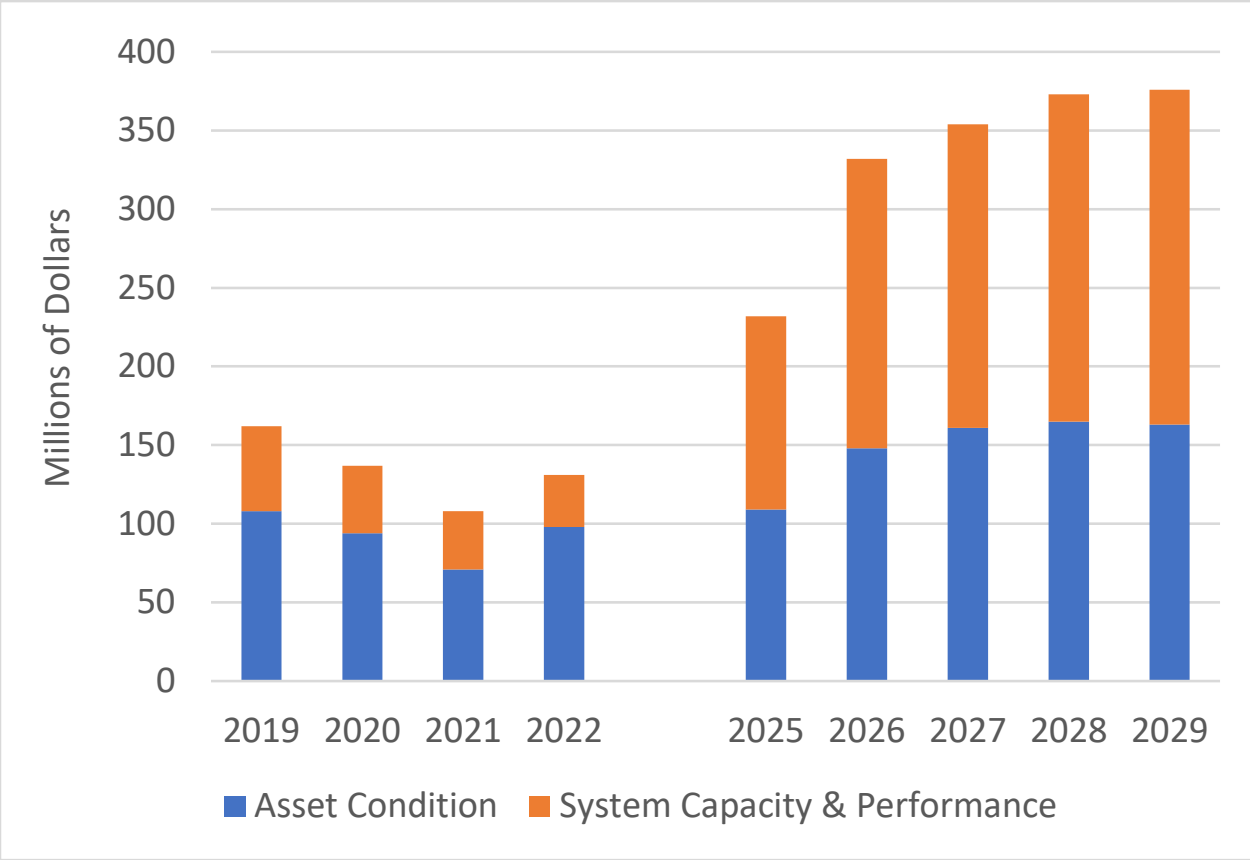
Reliability and Resilience Capital Spending: Eversource



Much of the reliability spending appears to be due to replacement of aging infrastructure.

The resilience spending relies on relatively costly prioritization of options.

Reliability Capital Spending: National Grid



Much of the asset condition spending appears to be due to replacement of aging infrastructure.

Few details are provided regarding the mix of spending on resilience.

Consultant Comments: Reliability and Resilience

Recent metrics on outage data indicate that

- The EDCs might be able to spend a lot less on reliability.
- The EDCs might need to spend more on resilience.

A lot of future spending on reliability and resilience appears to be due to replacing aging infrastructure, but these investments do not appear to be justified.

- Substation Equipment:
  - Routinely inspected and tested; no need to replace if aging equipment is passing tests
  - Substation equipment is backed up as part of EDC capacity planning guidelines; failure rarely results in outages
- Overhead distribution line equipment:
  - Routinely inspected to identify poles and overhead equipment that should be addressed
  - Can reduce long duration outages, but is very costly and should serve as last-resort approach
- Underground cable replacement:
  - Replacement before equipment failure offers low improvements to reliability, resulting in low benefits per dollar spent
  - Not impacted by storms. Replacement would not improve resilience

Consultant Comments: Reliability and Resilience

EDCs propose a large portion of 2025-2029 capital spending for replacing aging infrastructure.

But the need for and costs of replacing aging infrastructure appear to be overstated.

- Substation Equipment
  - Not impacted by storms, and therefore would mainly be targeted to improve reliability, not resilience
  - Substation equipment is backed up as part of EDC capacity planning guidelines; failure almost never results in outages
  - Routinely inspected and tested; no need to replace if equipment is passing tests
- Underground cable replacement
  - Not impacted by storms. Replacement would not improve resilience
  - Replacement before equipment failure offers low improvements to reliability resulting in low benefits per dollar spent
- Overhead distribution line equipment
  - Routinely inspected to identify poles and overhead equipment that should be addressed
  - Can reduce long duration outages, but is very costly and should serve as last-resort approach

Do GMAC members have questions or issues to discuss?

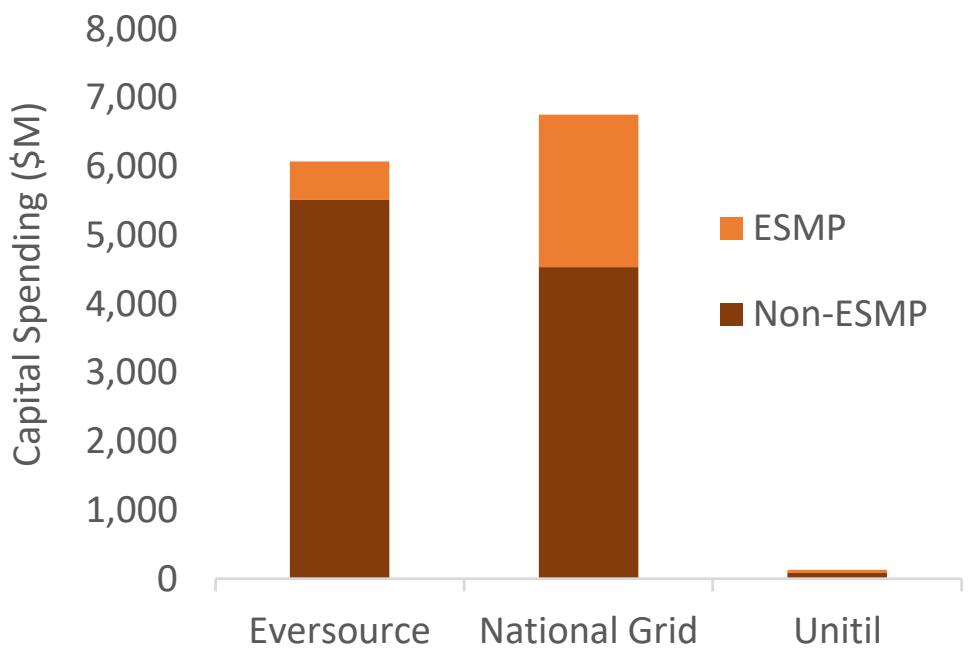
Proposed Investments

Short-Term: 2025-2029

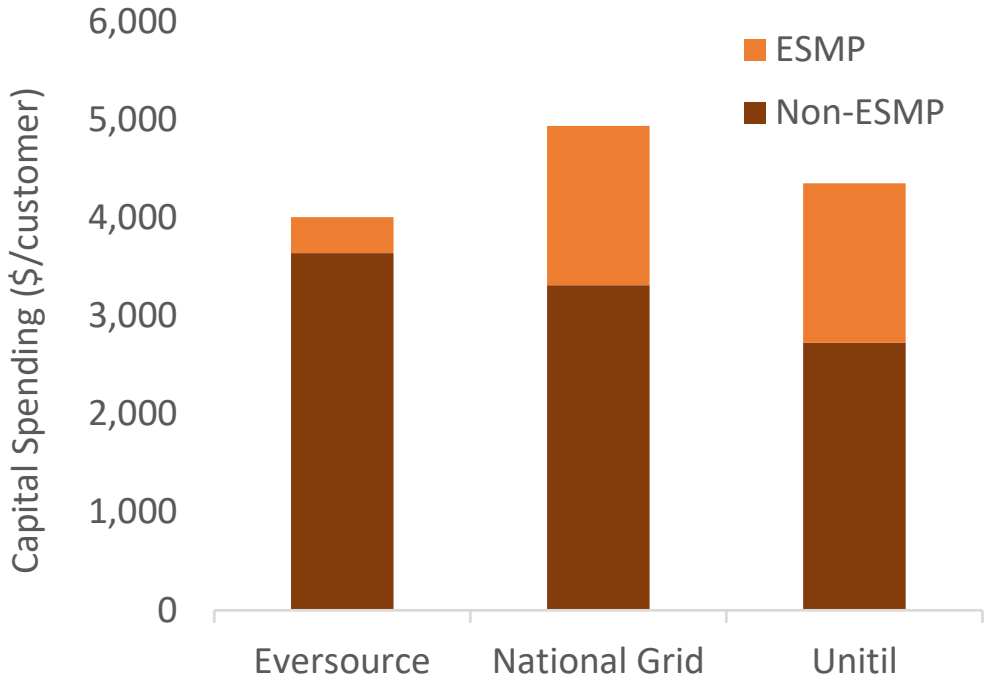
Proposed Capital Spending ESMP vs. Non-ESMP

Eversource has chosen to put much less of its future capital spending into ESMP categories.
This means that less spending is at issue in the ESMP dockets and more will be at issue in future rate cases.

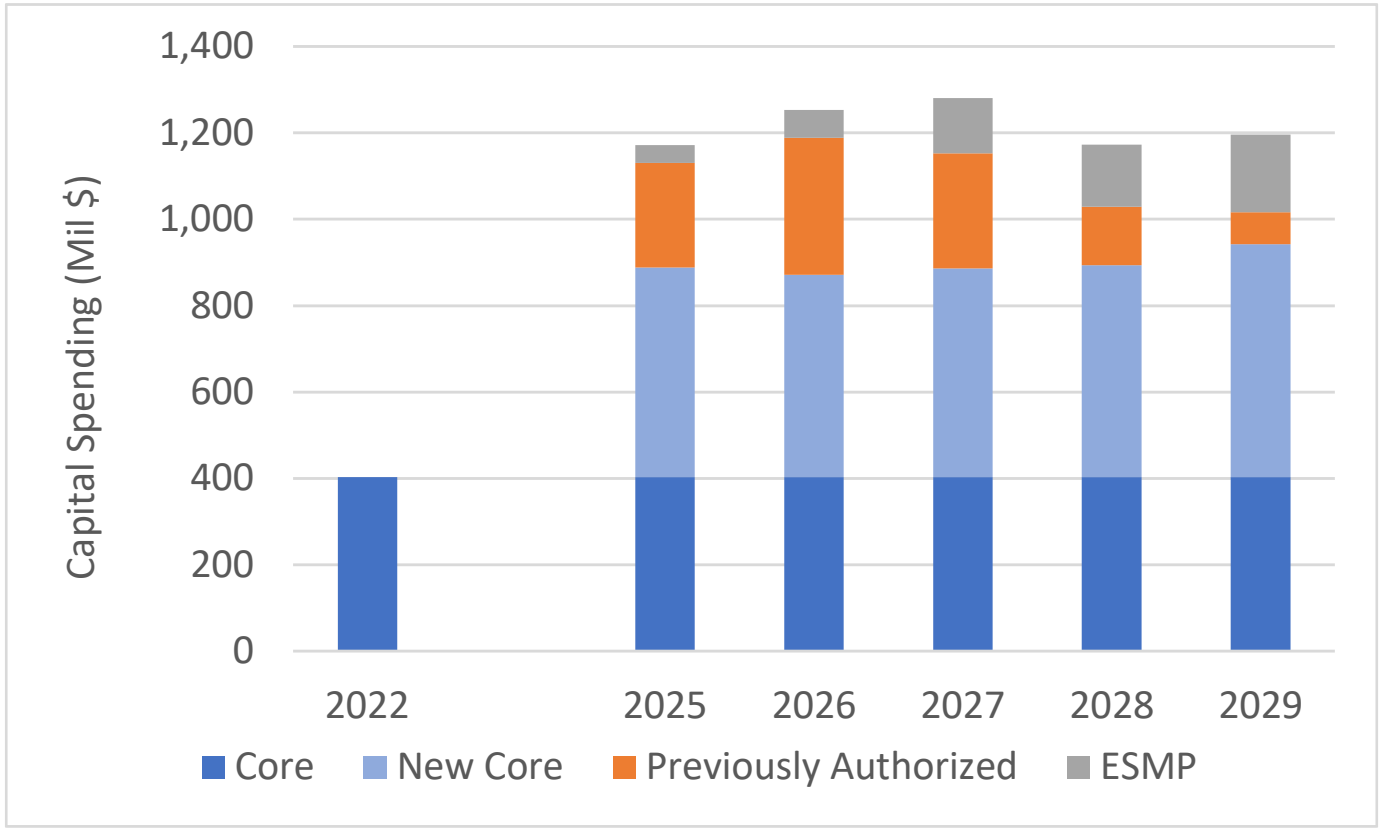
Total Capital Spending ($M)



Capital Spending per Customer ($/customer)



Proposed Capital Spending: Eversource



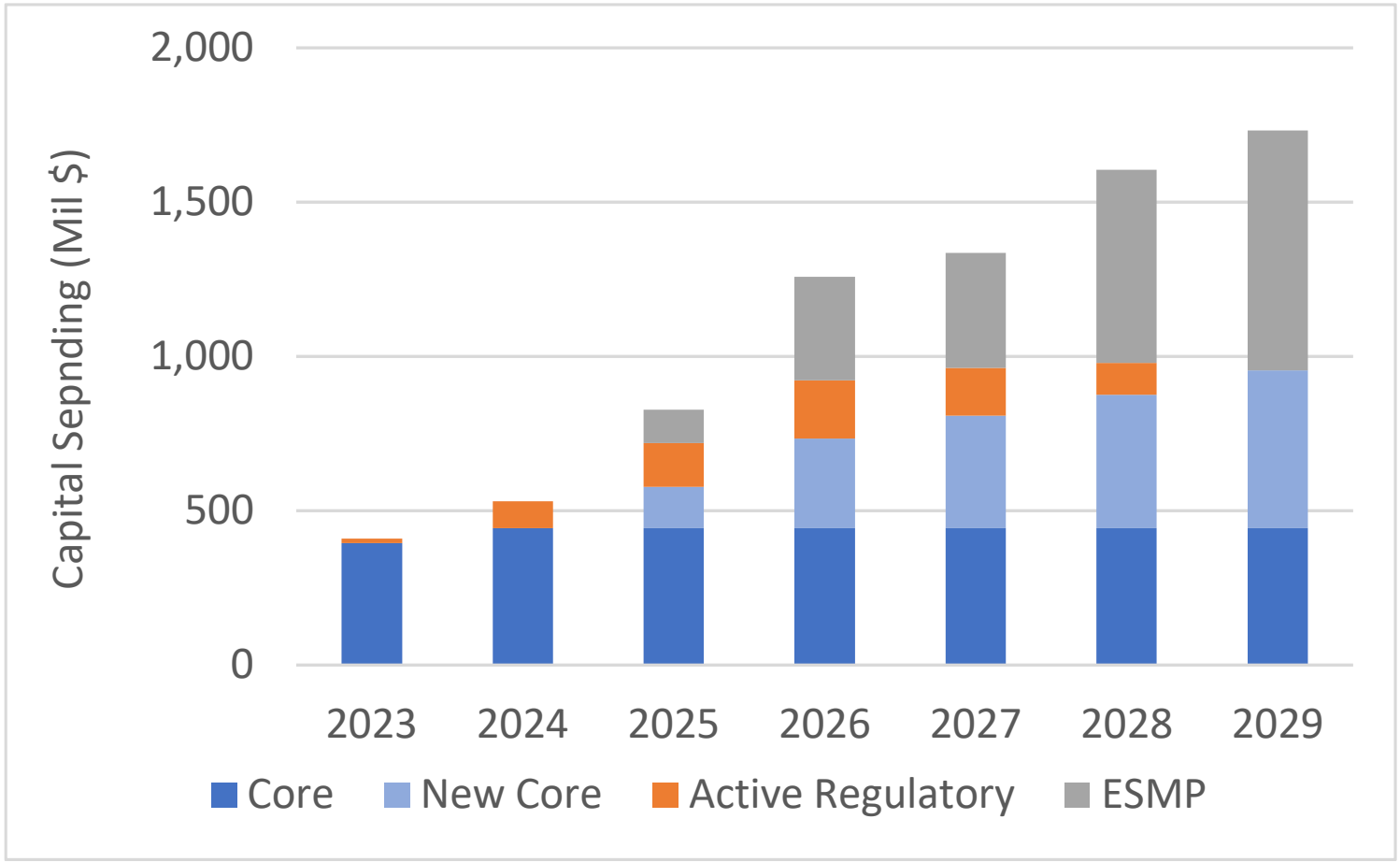
2022 values are from FERC Form 1.

The capital spending jumps roughly three-fold from 2022 to 2025.

Review and recovery of costs:

- New Core investments in future rate cases.
- Previously Authorized investments through existing rider mechanisms.
- ESMP investments through existing rider mechanisms.

Proposed Capital Spending: National Grid

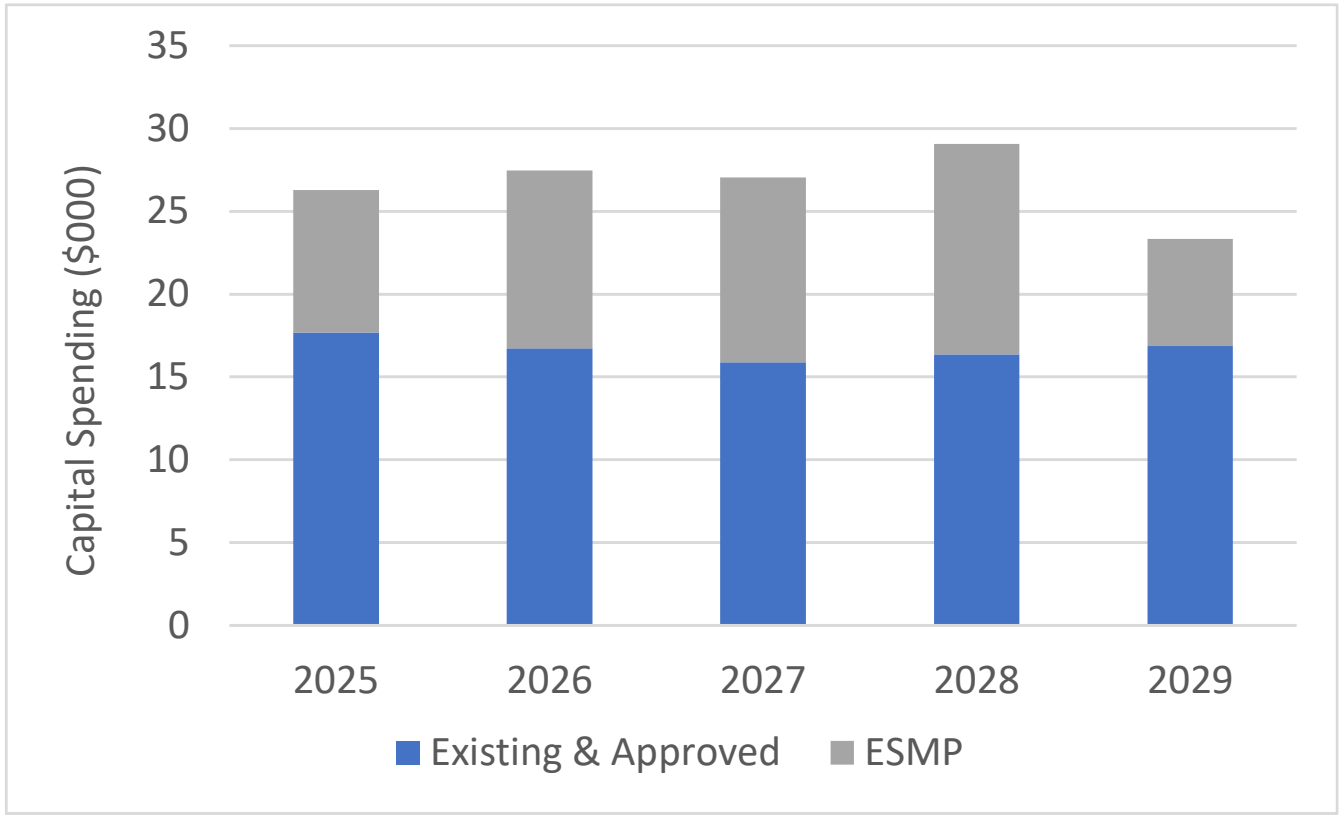


The capital spending increases roughly four–fold from 2023 to 2029.

Review and recovery of costs:

- New Core investments in on-going and future rate cases through proposed ISRE.
- Active Regulatory investments through existing rider mechanisms.
- ESMP investments through proposed ISRE.

Proposed Capital Spending: Unitil

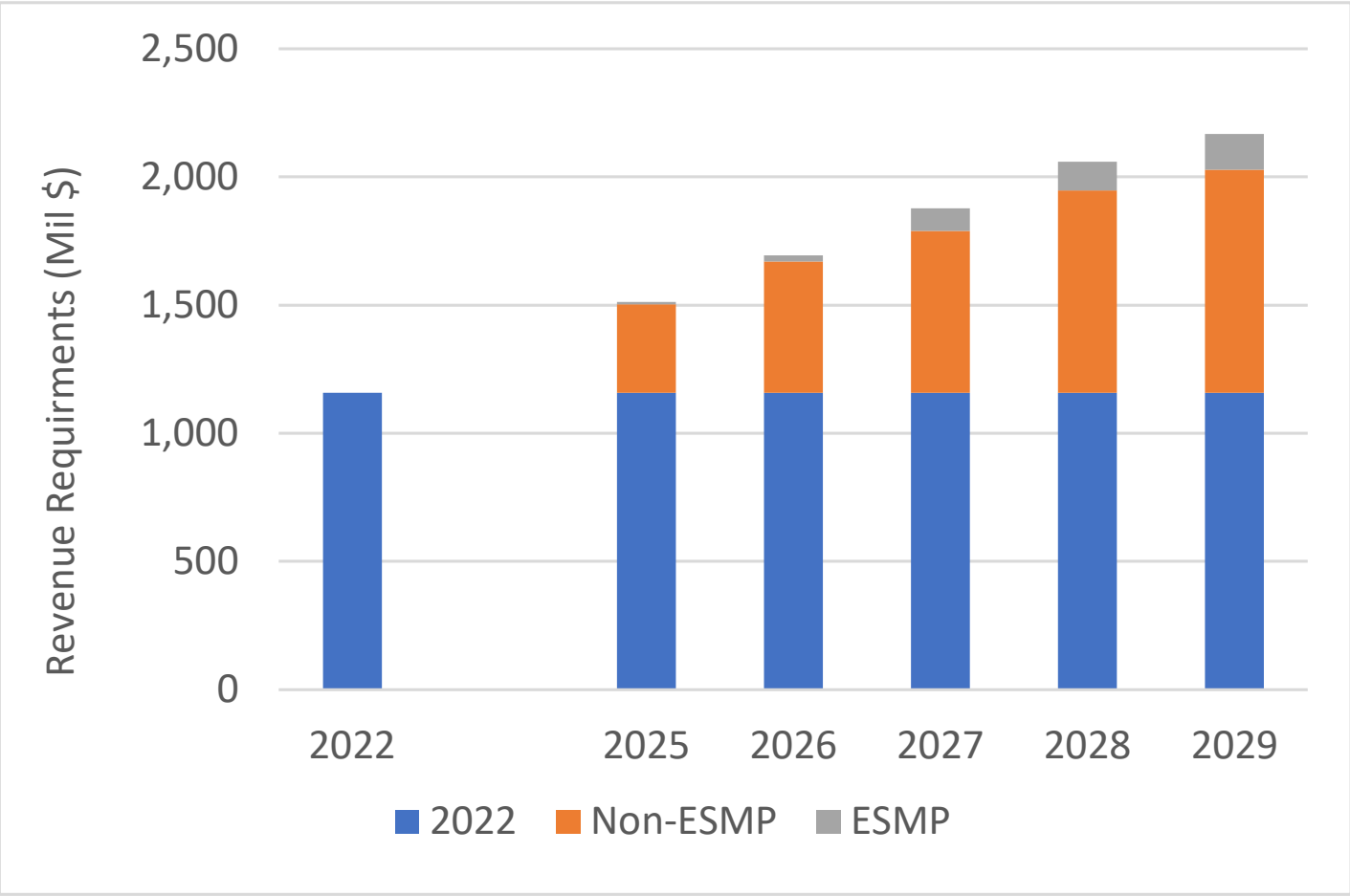


The proposed capital spending is generally flat from 2025 to 2029.

Review and recovery of costs:

- New Core investments in future rate cases.
- Active Regulatory investments through existing rider mechanisms.
- ESMP investments through existing grid mod mechanism.

Revenue Requirements: Eversource

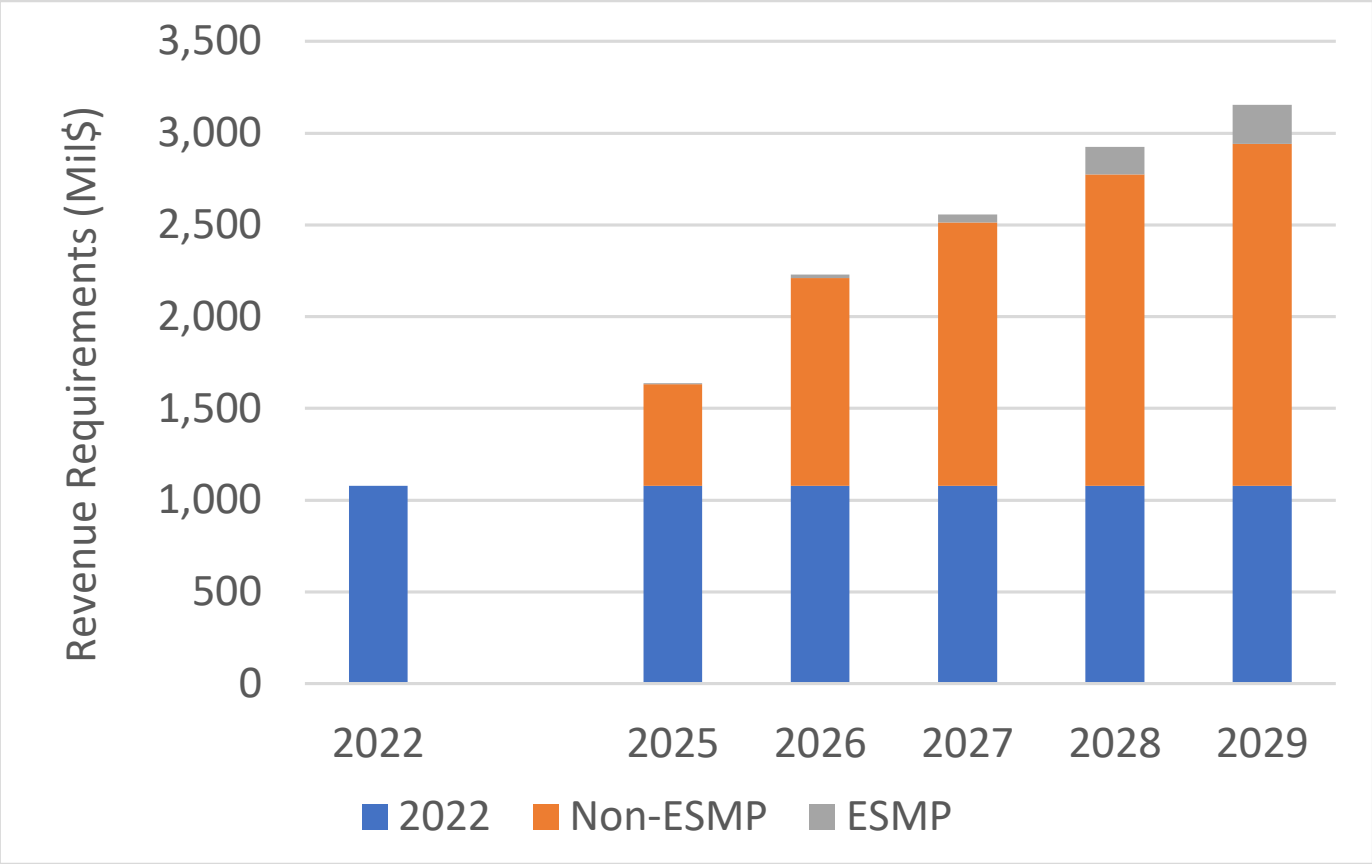


Revenue requirements are expected to increase roughly two-fold from 2022 to 2029.

Sources:

- 2020 from Eversource's recent rate case.
- ESMP investments are from the EDC bill impacts analyses.
- Non-ESMP investments are calculated by the GMAC consultants based on information from Eversource' recent rate case and ESMP.

Revenue Requirements: National Grid

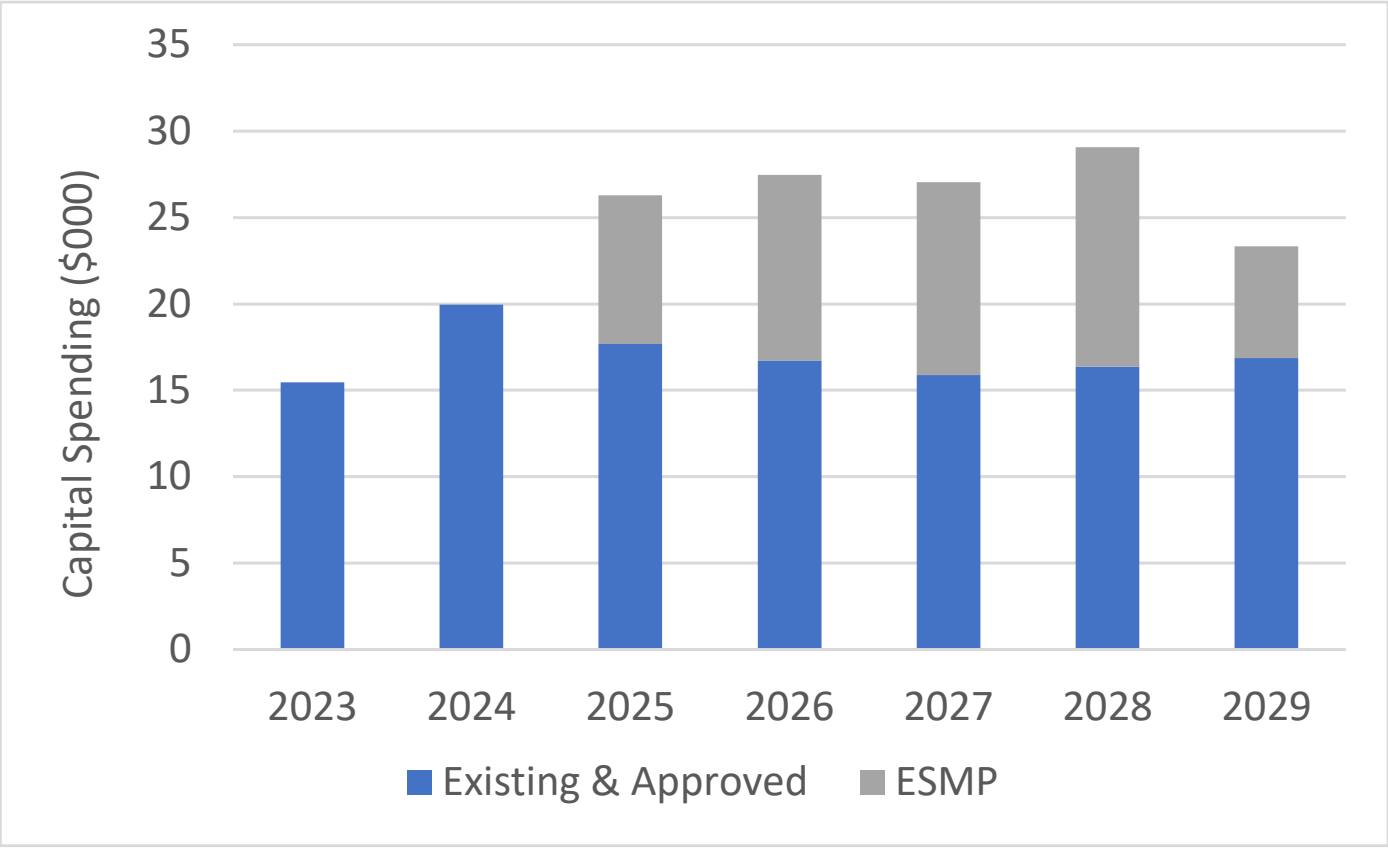


Revenue requirements are expected to increase roughly three-fold from 2022 to 2029.

Sources:

- 2020 from National Grid's on-going rate case.
- ESMP investments are from the EDC bill impacts analyses.
- Non-ESMP investments are calculated by the GMAC consultants based on information from National Grid's on-going rate case and ESMP.

Revenue Requirements: Unitil



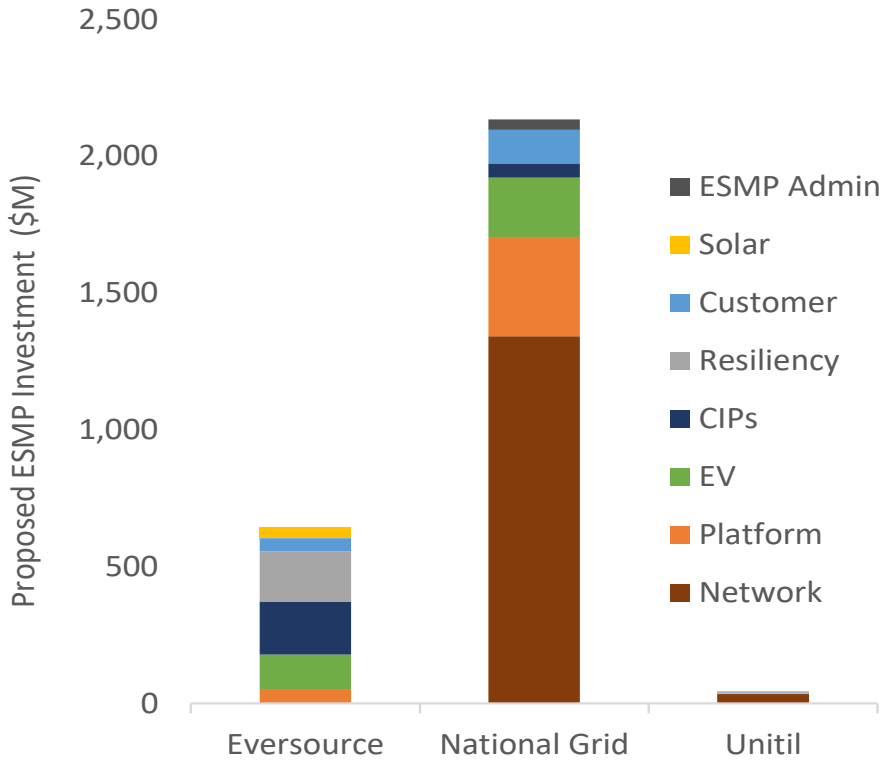
Revenue requirements are expected to increase nearly two-fold from 2023 to 2028.

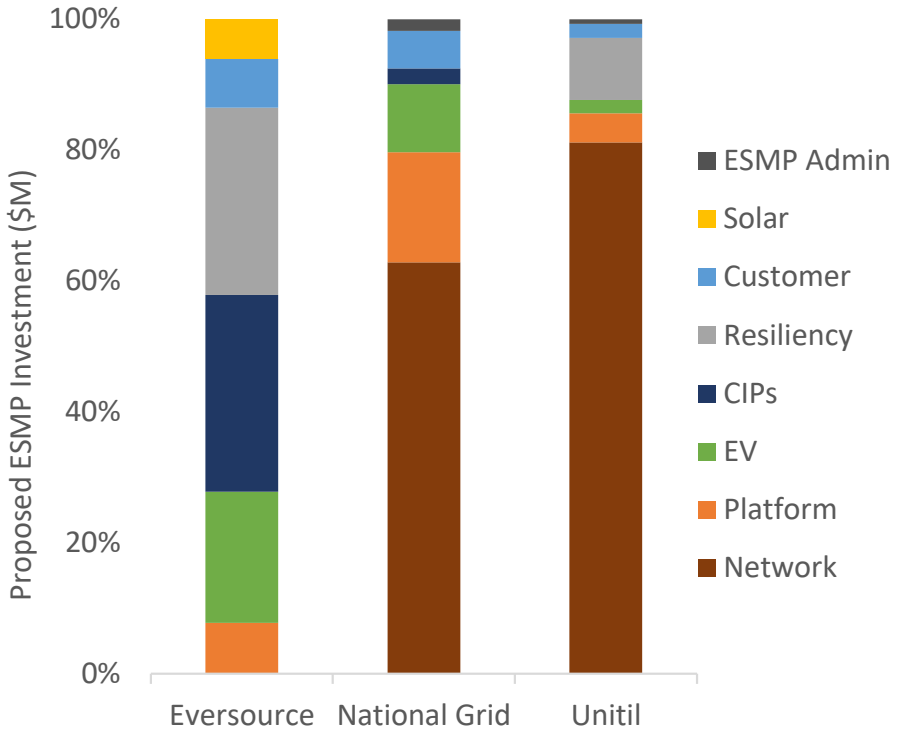
Sources:

- 2020 from Unitil's recent rate case.
- ESMP investments are from the EDC bill impacts analyses.
- Non-ESMP investments are calculated by the GMAC consultants based on information from Unitil's recent rate case and ESMP.

Proposed ESMP Investments: Capital Spending

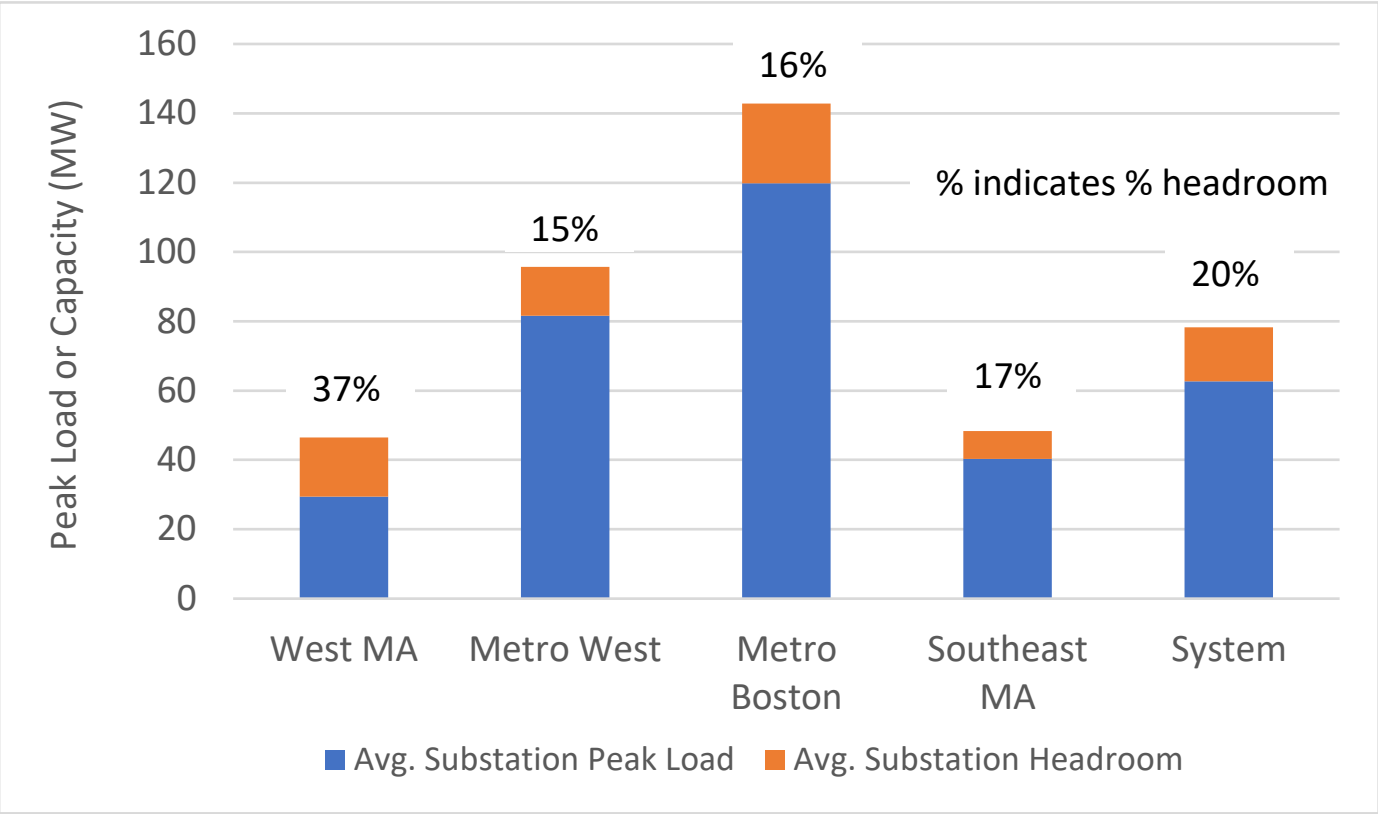
- *Network*: Eversource does not include any while these are the largest investments for the other EDCs.
- *CIP*: Eversource's are relatively large, while National Grid's are small.
- *Resilience*: Eversource's are relatively large, while National Grid has none.
- These differences appear to be due to the choice each EDC makes regarding how to categorize their investments.





This information is presented for each year in the appendix.

Current Headroom for Average Stations: Eversource



Headroom = capacity available to serve peak demand minus peak demand.

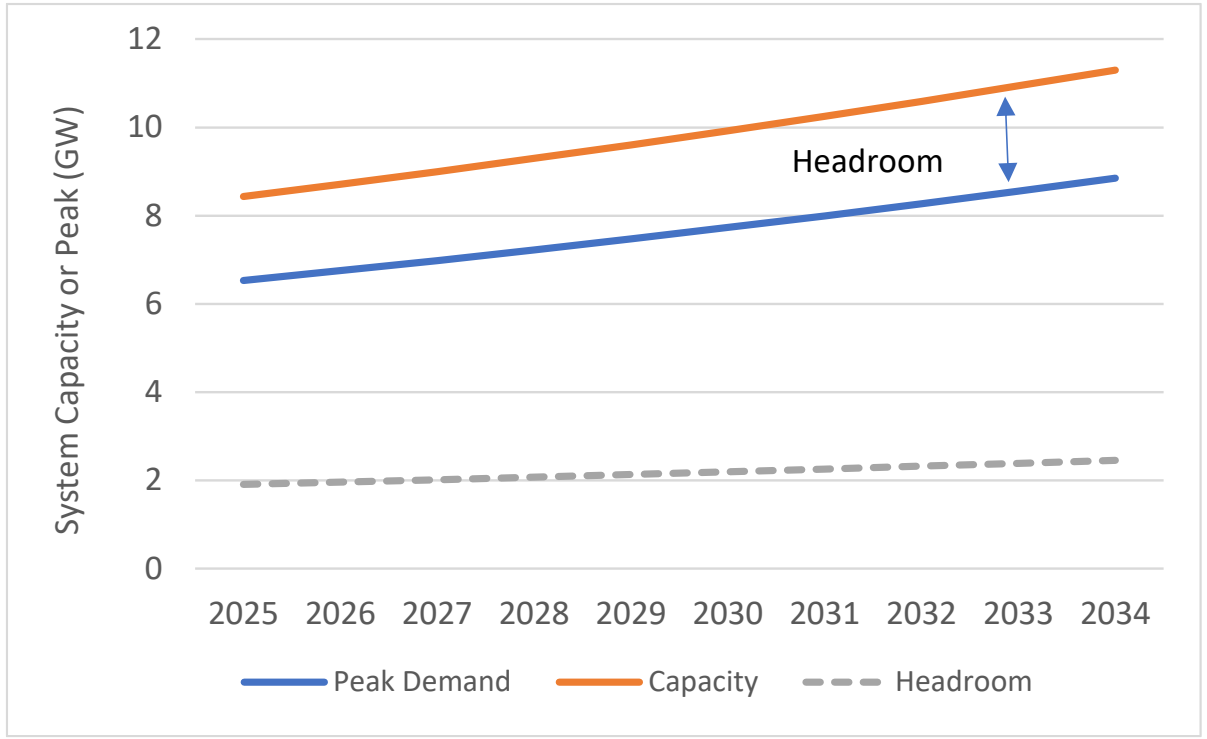
In percentage terms, the West MA region has by far the highest amount of headroom.

The ESMPs do not describe the target headroom that EDCs plan for.

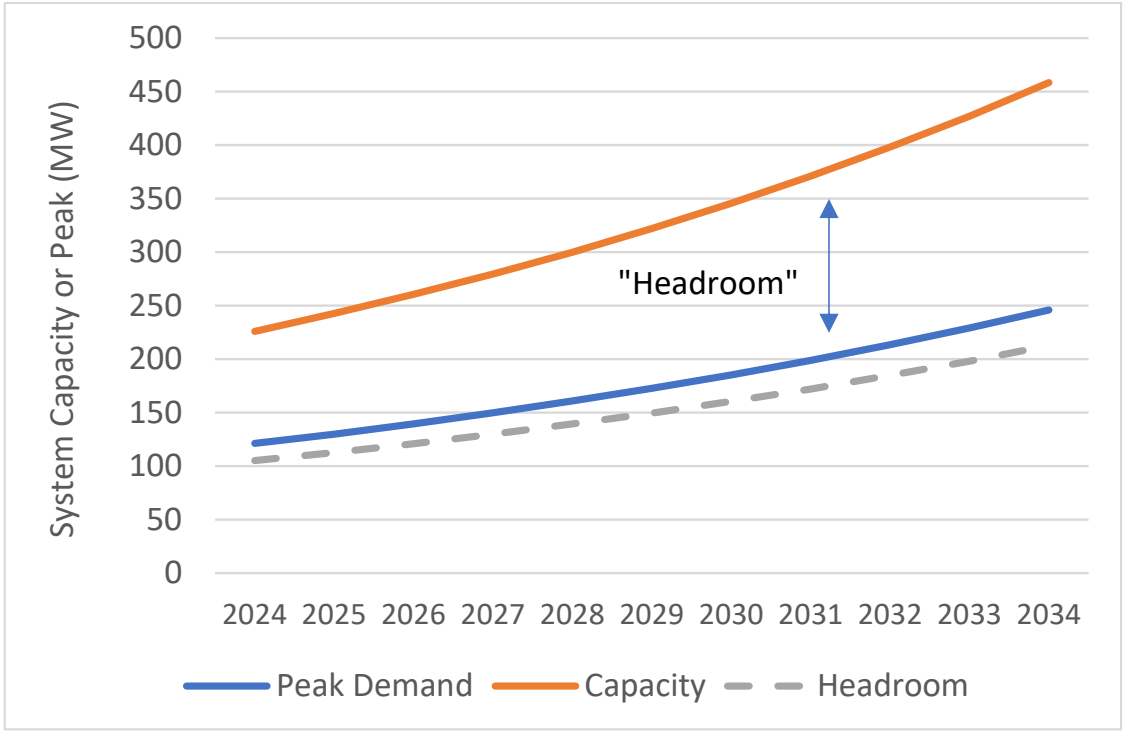
Forecasted System-Wide Headroom: Eversource and Unitil

- *Eversource*: Headroom is roughly 29% and remains at that level throughout.
- *Unitil*: Headroom is roughly 87% and remains at that level throughout.
- *National Grid*: Does not provide information to estimate headroom.
- These are simple estimates based on data provided for 2025 and 2034.
- These are system-wide. Headroom needs will vary by region and by substation.

Eversource



Unitil



Consultant Comments: Proposed Investments 2025-2029

All EDCs propose significant increases in capital and operating costs relative to today's levels.

- Eversource capital costs increase roughly three-fold and revenue requirements two-fold.
- National Grid capital costs increase four-fold and revenue requirements three-fold.
- Unitil revenue requirements increase roughly two-fold.

Do GMAC members have questions or issues to discuss?

The EDCs chose to put different types of investments in ESMP versus non-ESMP categories.

- This creates significant problems for the BCA and the bill impacts analysis (discussed below).

The ESMPs provide little information on headroom.

- This would be valuable information to assess infrastructure needs – even at a high level.
- The information provided by Eversource suggests it is building to more headroom than needed.
- Information provided by Unitil suggests it has and is building much more headroom than needed.
- National Grid did not provide information on headroom.

In sum, the magnitude of proposed investments indicates there will be huge rate and bill impacts but the justification for such large investments is weak.

Benefit-Cost Analyses and Bill Impact Analyses

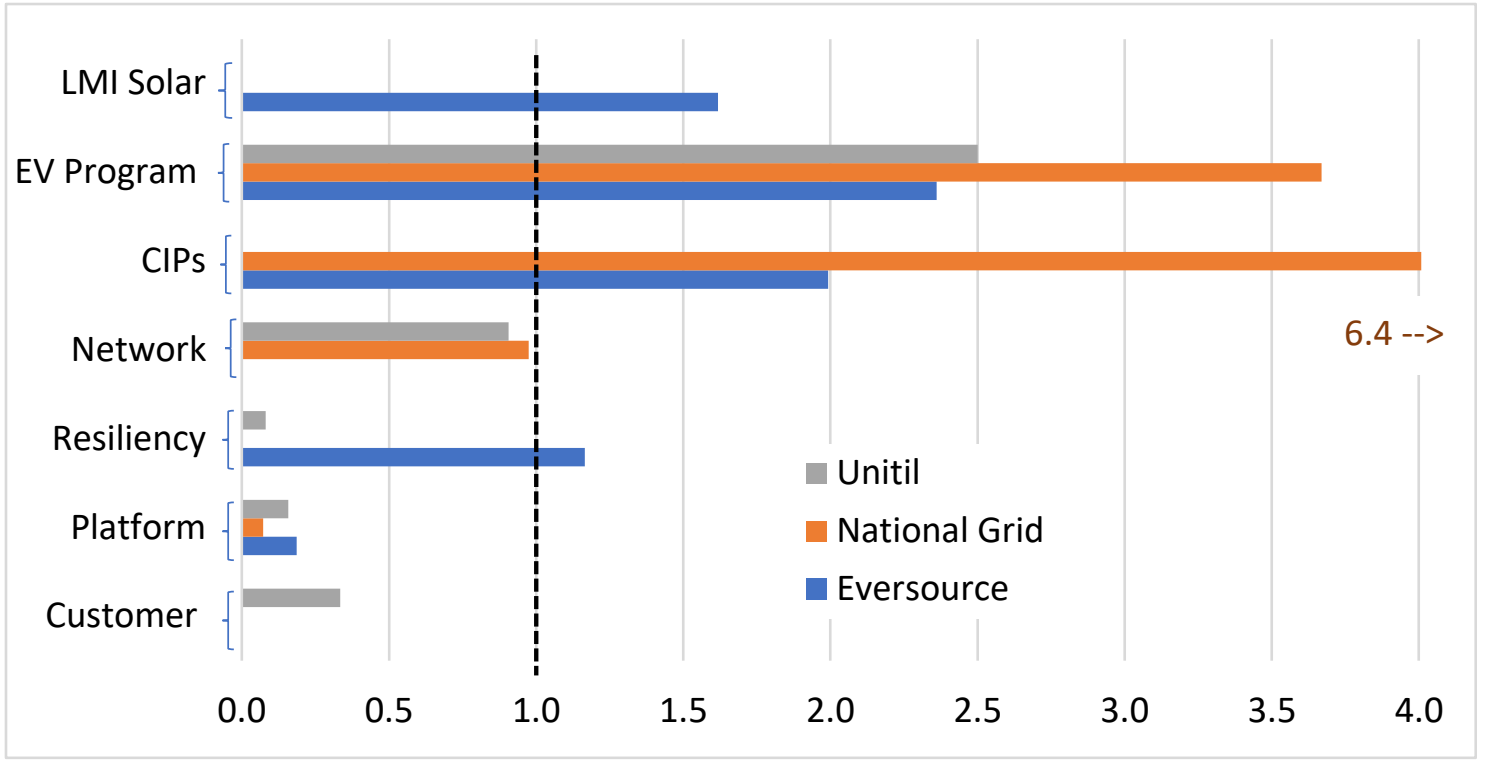
Benefit-Cost Ratios: All EDCs

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**

Aggregated results are greater than 1.0 for Eversource and National Grid, but less than 1.0 for Unitil.

Results by investment type vary by EDC and by type.



Overview of Costs and Benefits

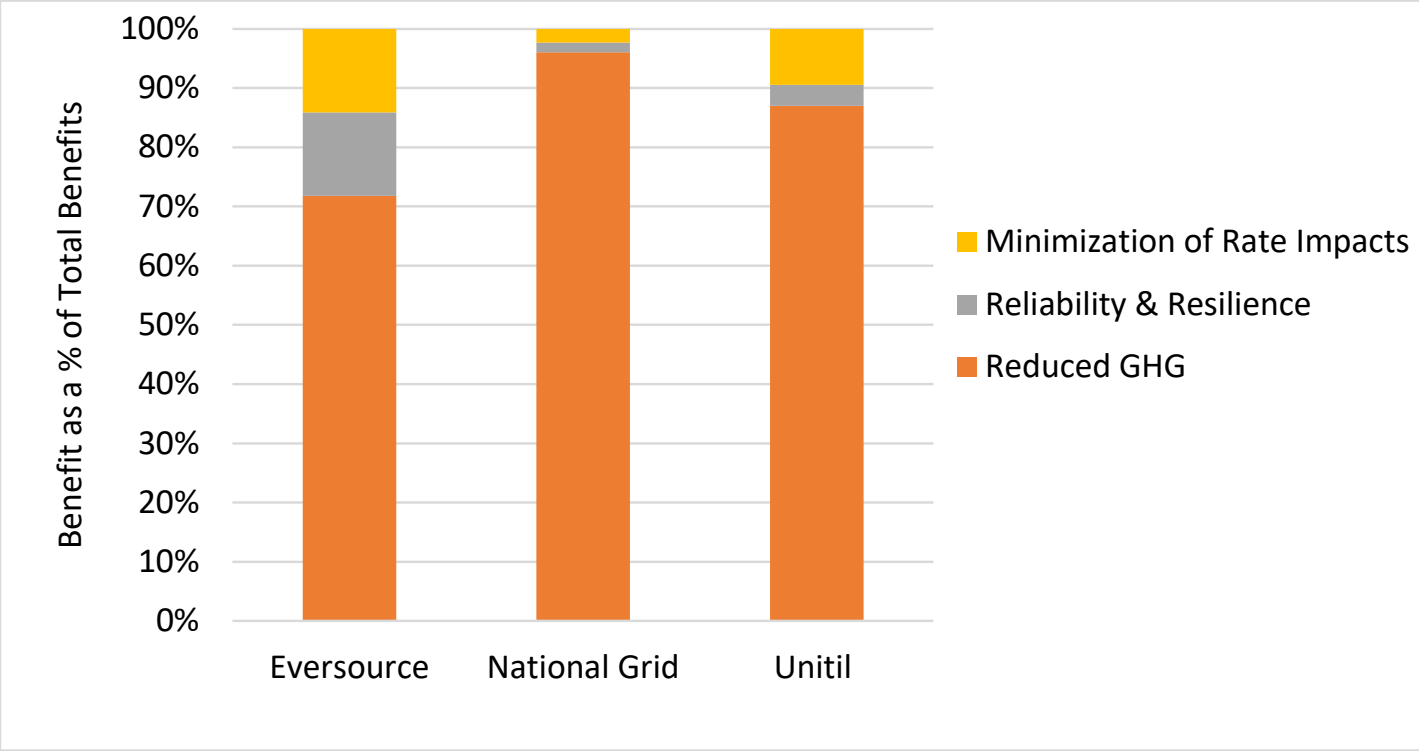
National Grid results are presented as an example

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.

BCA Benefits by Type

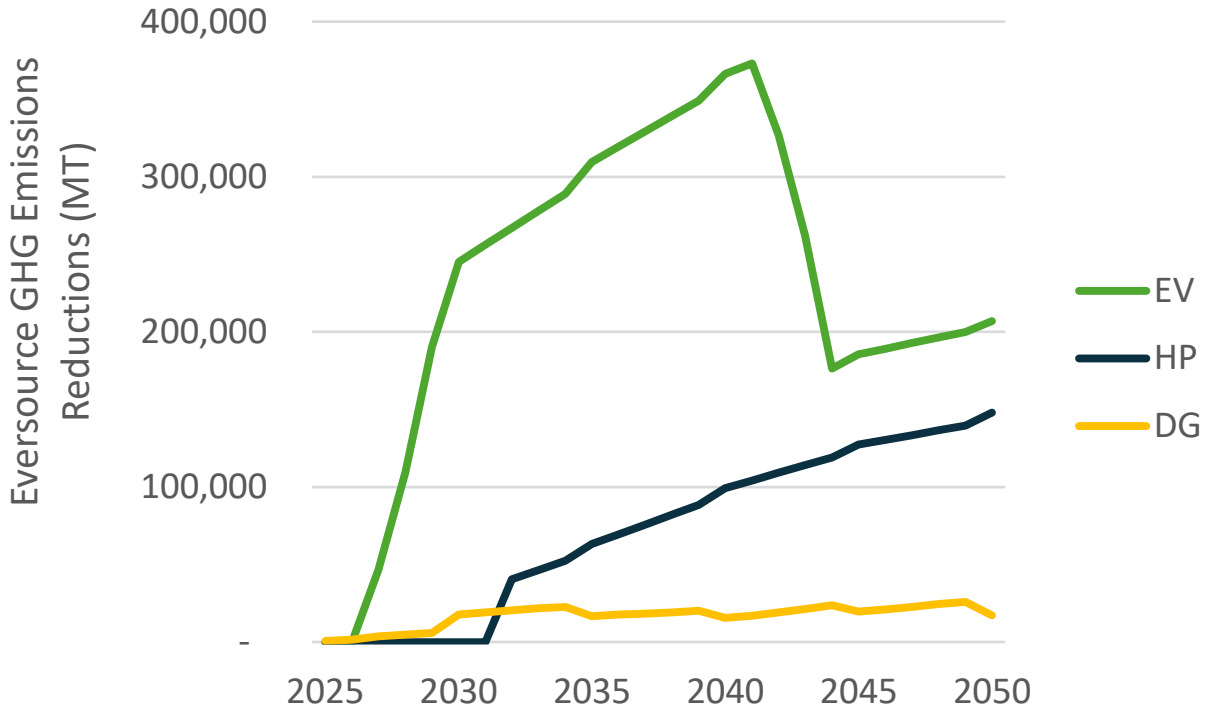


The vast majority of benefits are from the GHG emission reduction benefits.

Which are created by the new technologies (EVs, HPs, and DG).

Which are enabled by the ESMP investments.

Key Technologies Driving the GHG Reductions



EVs provide the greatest GHG redactions by far.

The EV reductions drop in 2045 because the technology is assumed to have a 15-year measure life.

This chart is for Eversource. National Grid's chart has a similar shape, but the total amounts are much greater.

Enabled Technologies Relative to CECP Goals

The information below does not include technologies installed to date or between now and 2025. Therefore, one would expect the ESMP values to be slightly below the CECP targets.

- Eversource is well below all the ESMP targets.
- National Grid is below the targets for DG and HPs.
- Unitil is well above all the targets.

	ESMP as % of CECP Targets			ESMP Technologies Enabled by 2030			2030 CECP Targets		
	DG (MW)	EVs (# units)	HPs (# units)	DG (MW)	EVs (# units)	HPs (# units)	DG (MW)	EVs (# units)	HPs (# units)
Eversource	**17%**	**27%**	**23%**	521	121,000	30,000	2,980	450,000	128,766
National Grid	**33%**	**98%**	**57%**	1,179	492,000	84,000	3,611	500,477	147,231
Unitil	**143%**	**358%**	**186%**	30	4,748	2,550	21	1,325	1,374

Consultant Comments: BCA

EDCs bifurcate investments into ESMP and non-ESMP.

- Not consistent with the Climate Act and does not allow for optimization across the two.

BCAs do not include a transparent or robust analysis of alternatives.

- Does not allow for optimization of either ESMP or non-ESMP investments.

Do GMAC members have questions or issues to discuss?

Treatment of costs not appropriate.

- Capital costs are input as annual expenditures but should be in the form of revenue requirements.

BCAs do not account for utility system impacts associated with the enabled technologies.

- Yet the primary benefit of the ESMP investments is the benefit from enabled technologies.

Macroeconomic impacts do not account for impacts of changes in electricity rates.

Interrelated functions.

- ESMPs focus on aggregated investments, but disaggregated results are useful as well.

Discount rate.

- EDC weighted average cost of capital is not an appropriate discount rate.

Taken together, these concerns mean that we have little confidence in the BCA results.

- Some concerns suggest that costs and benefits are too high, and some suggest the opposite.

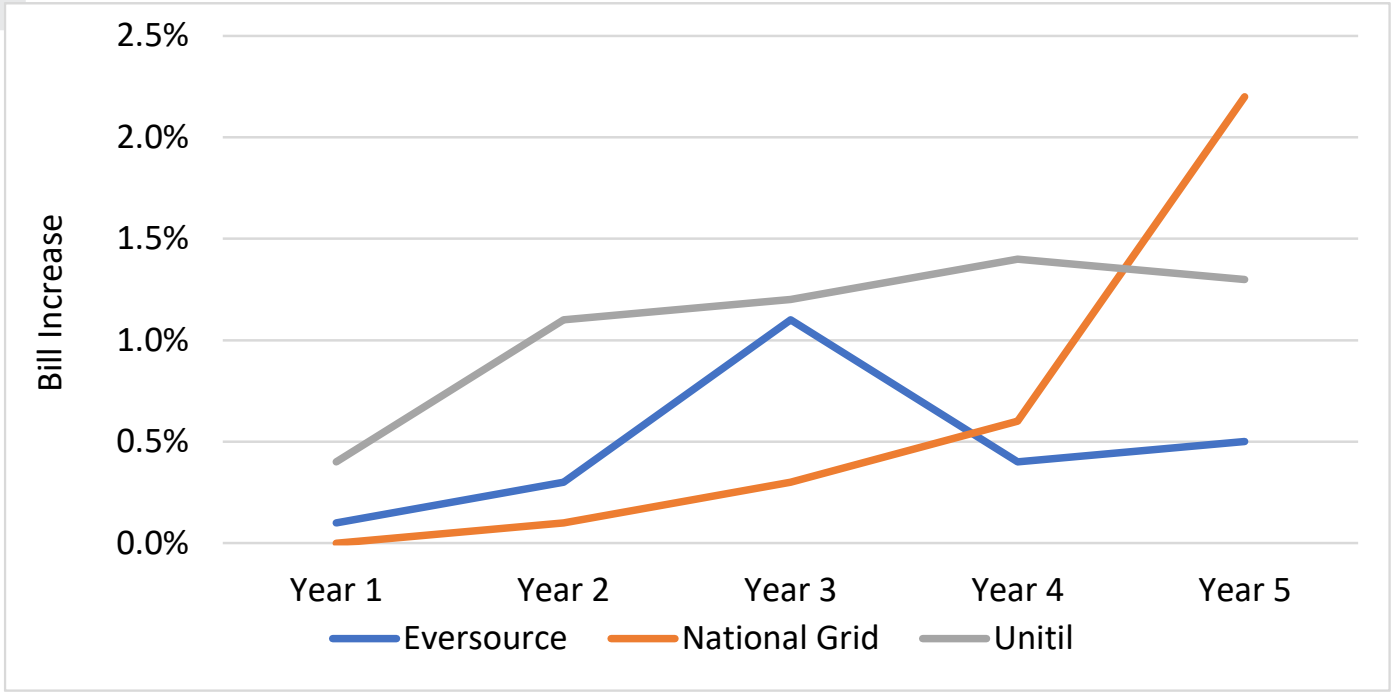
Bill Impact Analysis: Summary of Results

Utility	Year 1	Year 2	Year 3	Year 4	Year 5
Eversource	$0.27	$0.51	$2.12	$0.83	$0.91
	0.1%	0.3%	1.1%	0.4%	0.5%
National Grid	$0.00	$0.19	$0.67	$1.2	$4.79
	0.0%	0.1%	0.3%	0.6%	2.2%
Unitil	$1.03	$3.03	$3.12	$3.78	$3.48
	0.4%	1.1%	1.2%	1.4%	1.3%

Eversource: bill impacts are 1% or less

National Grid: bill impacts are 0.5% or less until year 5 when they exceed 2%

Unitil: bill impacts are roughly 0.5% to 1.5%



Consultant Comments: Bill Impact Analysis

Bifurcation of ESMP and non-ESMP investments does not give a complete picture of bill impacts

- Bill impact analysis shows only impact of ESMP investments, which make up a small portion of proposed spending (see chart at right).
- Does not allow for optimization of investments across the two types of investments.

Analysis does not consider alternative investments

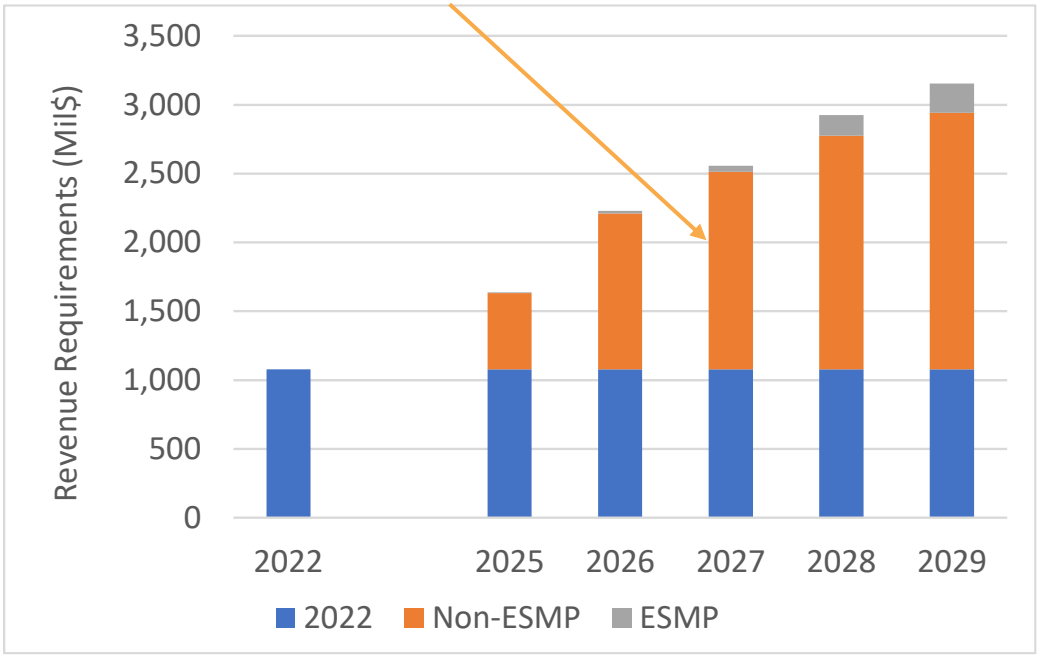
- Cannot determine if investments are optimized or if rate impacts are minimized

Changes in electricity sales on rates

- Eversource does not account for changes in sales.
- National Grid and Unitil use forecasts of sales, but it is not clear how much these account for changes in sales due to electrification or DERs.

Do GMAC members have questions or issues to discuss?

Non-ESMP investments are not addressed in the bill impact analyses.



National Grid revenue requirements, from slide 29

Review and Recovery of Proposed Investments

	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

Consultant Comments: Review and Recovery of Investments

All the EDCs are asking for Department pre-authorization of future investments.

- The ESMP investments would be preauthorized here.
- The Active/Planned investments would be pre-authorized in separate filings.
- The Core investments would be pre-authorized in on-going or future rate cases (at least for National Grid).

Do GMAC members have questions or issues to discuss?

Pre-authorization means that the Department "will not revisit whether the company should have proceeded with the investments as proposed."

Pre-authorization creates the risk that utilities will propose future spending that is greater, earlier, and less cost-effective than otherwise.

For this reason, it is essential that investments be pre-authorized only after they have been fully documented, justified, and shown to be reasonable and prudent.

This creates a very high standard of review for the ESMP investments.

Since the Consultant Comments report was prepared, the Department clarified that it will not review the ESMP investment proposals in the current dockets.

Consultant Comments: Summary

The Climate Law is clear that the ESMPs must demonstrate that they (a) provide net customer benefits, and (b) minimize or mitigate impacts on ratepayers.

Do GMAC members have questions or issues to discuss?

The ESMPs do not demonstrate that they will meet these goals:

- The load forecasts are used to justify new ESMP and non-ESMP investments.
  - But they are not consistent with some CECP scenarios or the scenario consistent with DPU 20-80.
- Reliability, resilience, and aging infrastructure are used to justify new ESMP and non-ESMP investments.
  - But reliability needs and aging infrastructure costs appear to be overstated.
- The ESMPs bifurcate ESMP and non-ESMP investments, making it difficult to assess whether they have optimized across ESMP and non-ESMP investments.
- The ESMPs do not include a robust or transparent consideration of alternatives, making it difficult to assess whether they have optimized investments within ESMP or non-ESMP investments.
- The BCAs contain several fundamental flaws that, together, mean we have little confidence in them.
- The bill impact analyses also contain several flaws that, together, mean we have little confidence in them.
  - Especially because they consider only a small fraction of the likely increase in revenue requirements.
  - Given the large amount of spending proposed, the bill impacts will likely be very large.

Appendix

Includes Slides That the GMAC Might Not Have Time to Discuss

Integrated Energy Planning (IEP)

The ESMPs note that gas planning and electric planning have historically been bifurcated and do not include any analysis that integrates the two.

The ESMPs provide discussion on how the IEP process can be used in the future, including:

- Identification of investment alternatives
- Determination of investment alternatives
- Implementation of determined investments
- Joint utility planning working group, including stakeholder engagement

In November 2023, the Department issued Order 20-80 addressing the long-term planning issues facing the gas local distribution companies. It finds, among other things:

- The evaluation of investments should take place in the context of joint gas and electric planning.
- Additional ratepayer dollars cannot be used for hybrid heating systems and funds should be directed to targeted electrification and networked geothermal.
- Gas utilities will be required to file Climate Compliance Plans to be issued every five years starting in 2025.

ESMP Metrics

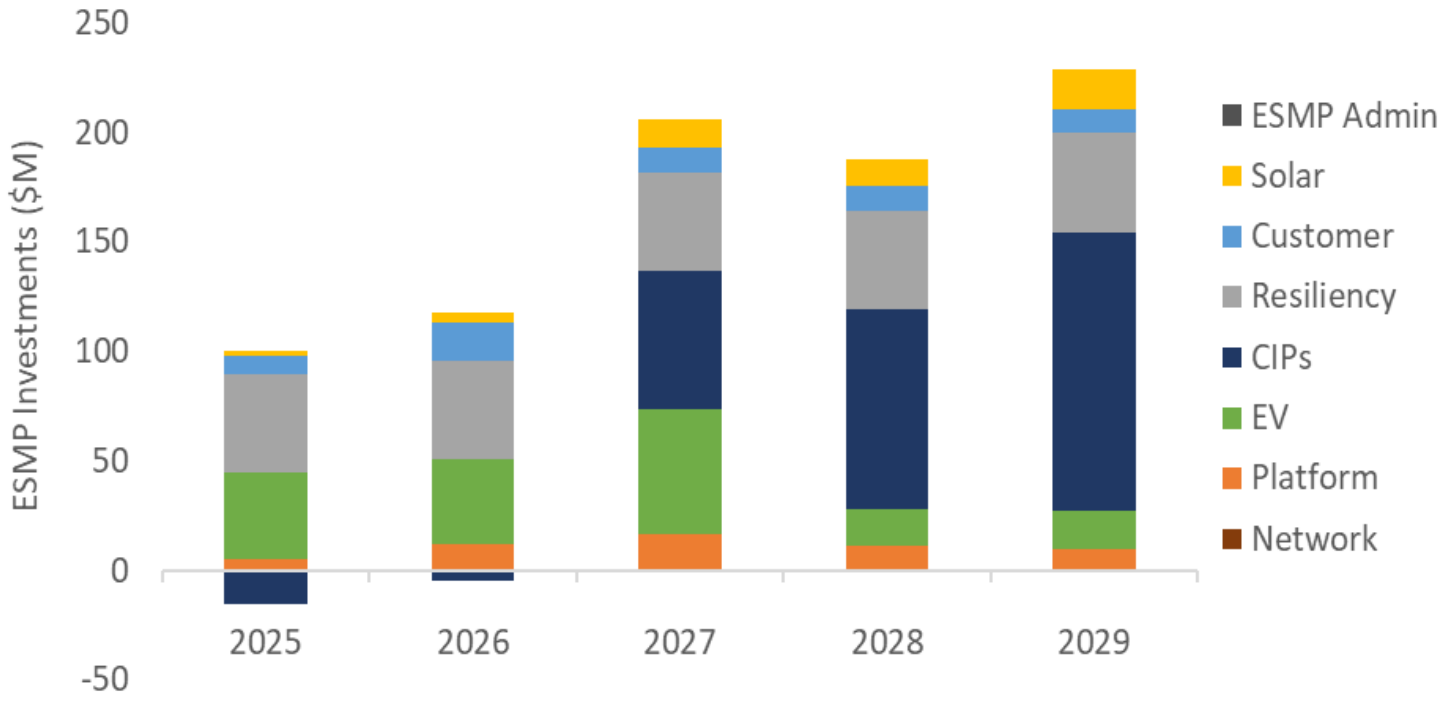
Investment Metrics

- Percentage of customers benefiting from incremental resilience investments
- Increase in DER hosting capacity and substation load-serving capacity including what percentage of these benefits are located in environmental justice communities
- Number of DERM sites, kW of non-company owned dispatchable assets, number of times assets dispatched
- GHG impact of proposed investments
- Ready for load dates

Stakeholder Metrics

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

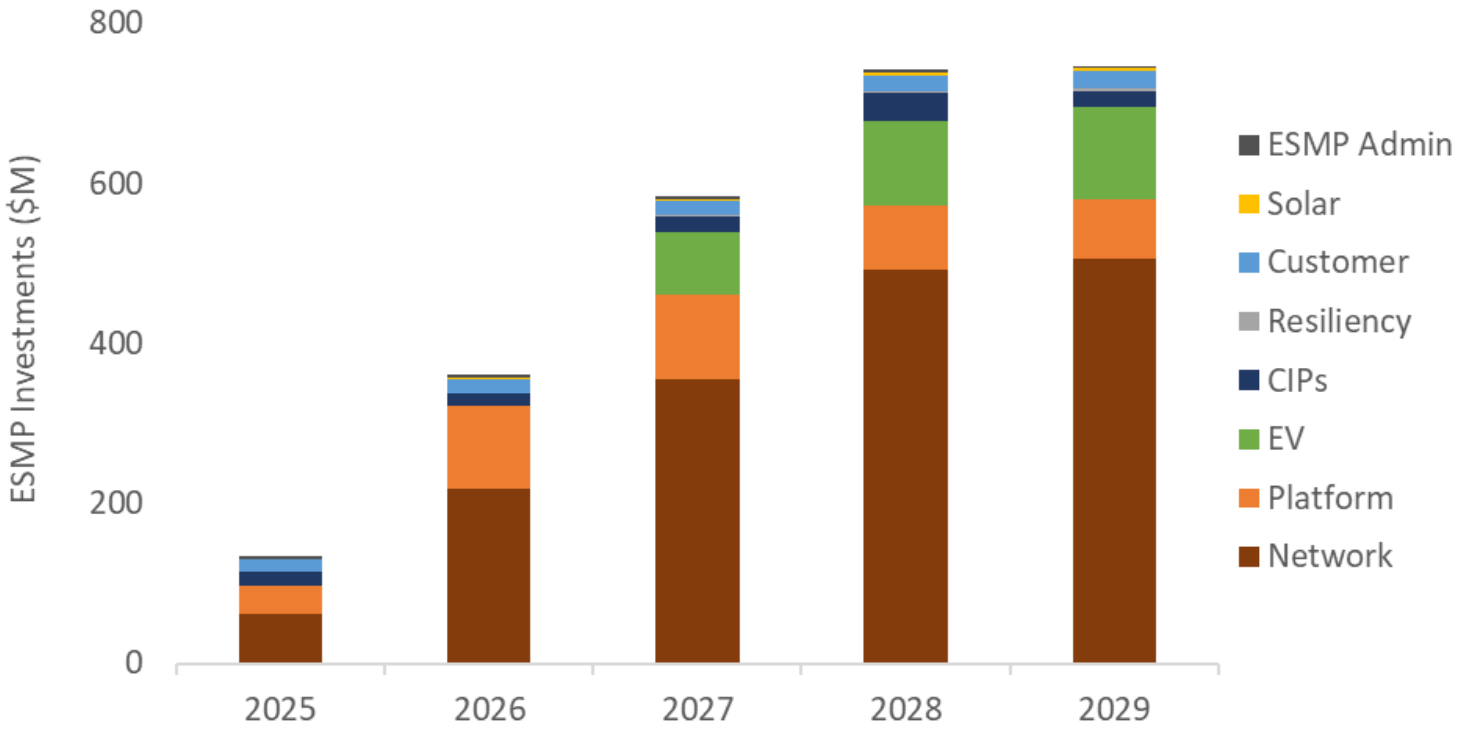
Proposed ESMP Investments: Eversource



CIPs play a large role, especially in the later years.

Resilience plays a large role and is consistent throughout.

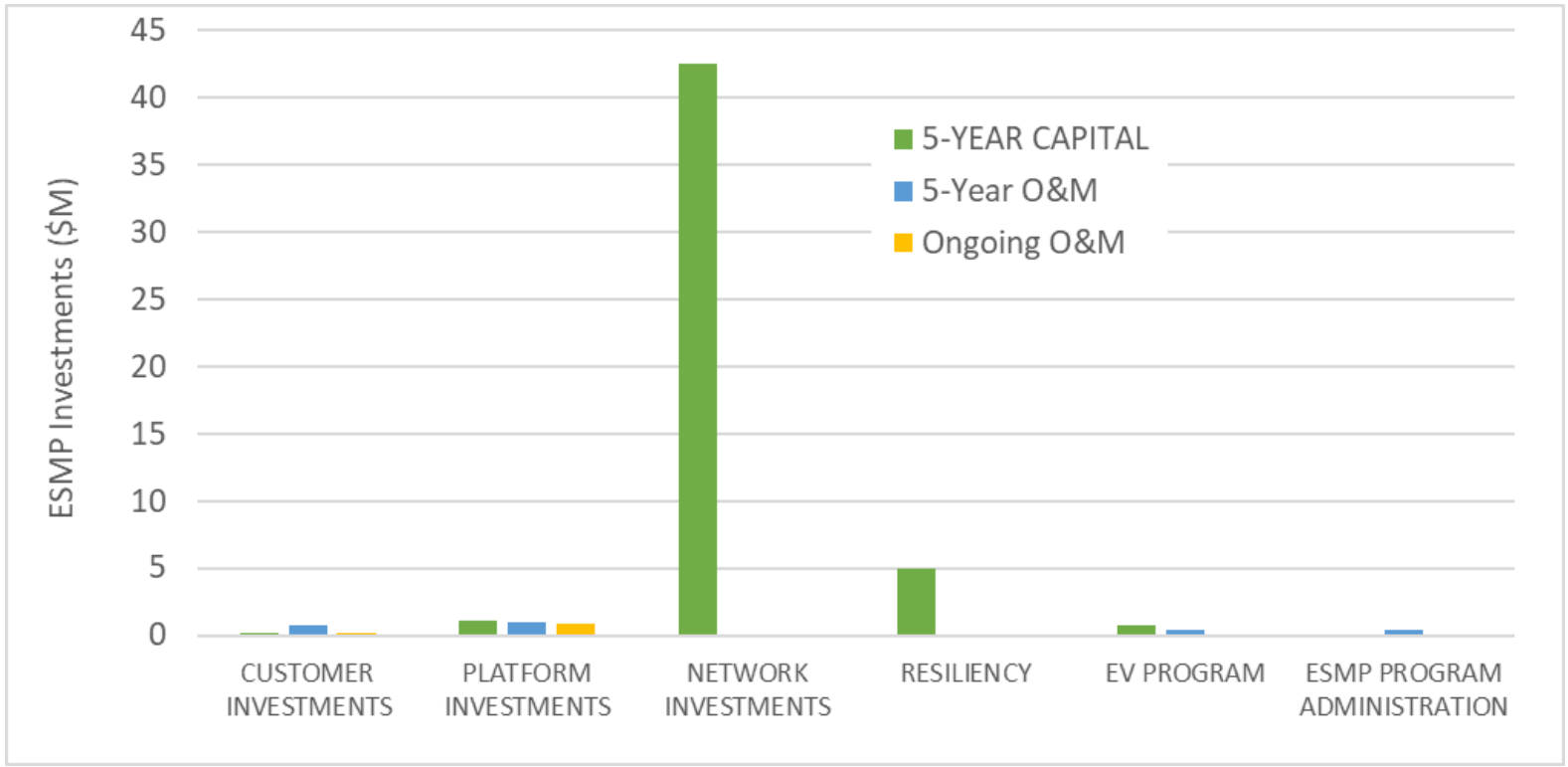
Proposed ESMP Investments: National Grid



Network plays a large and increasing role.

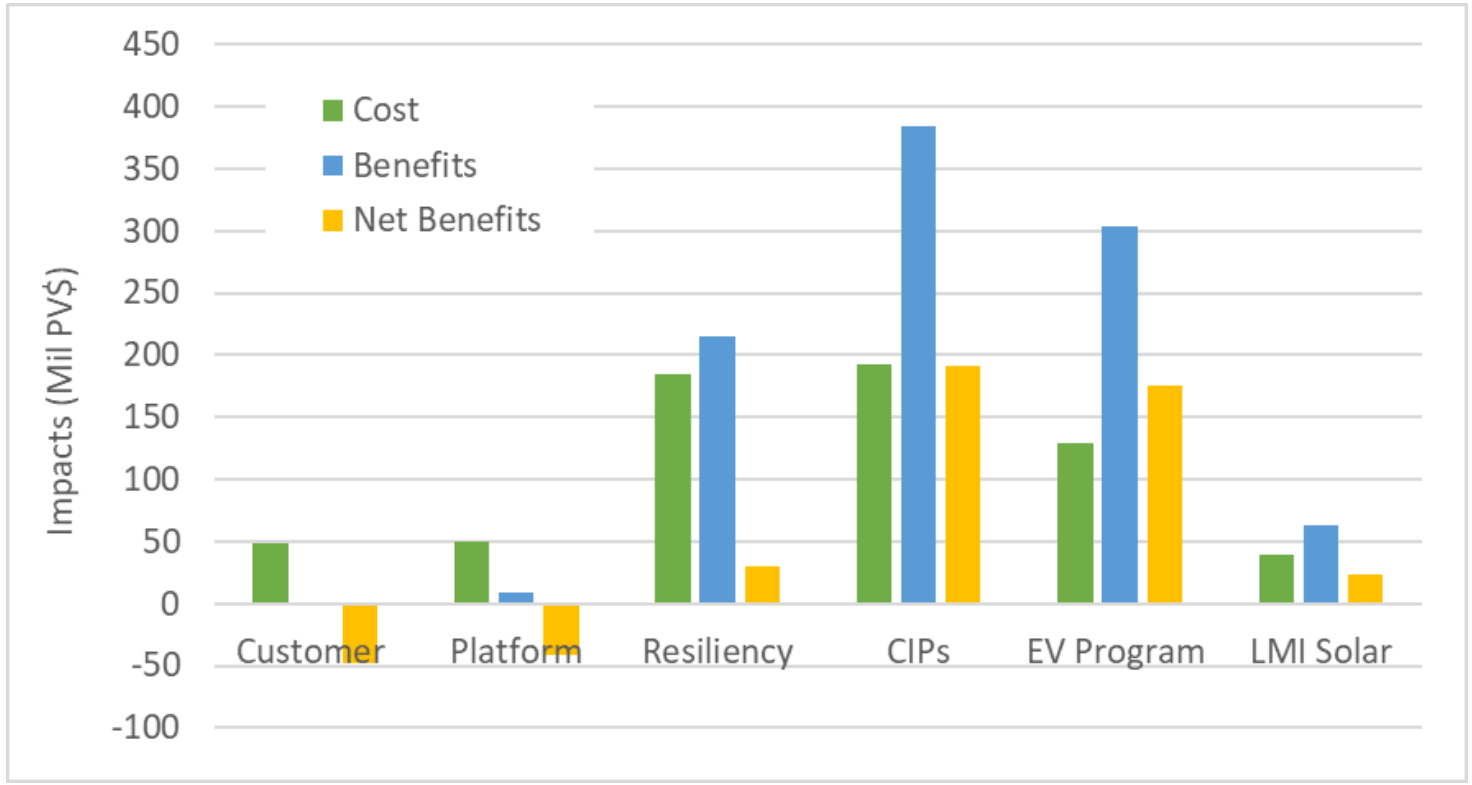
EV programs paly an increasingly large role.

Proposed ESMP Investments: Unitil

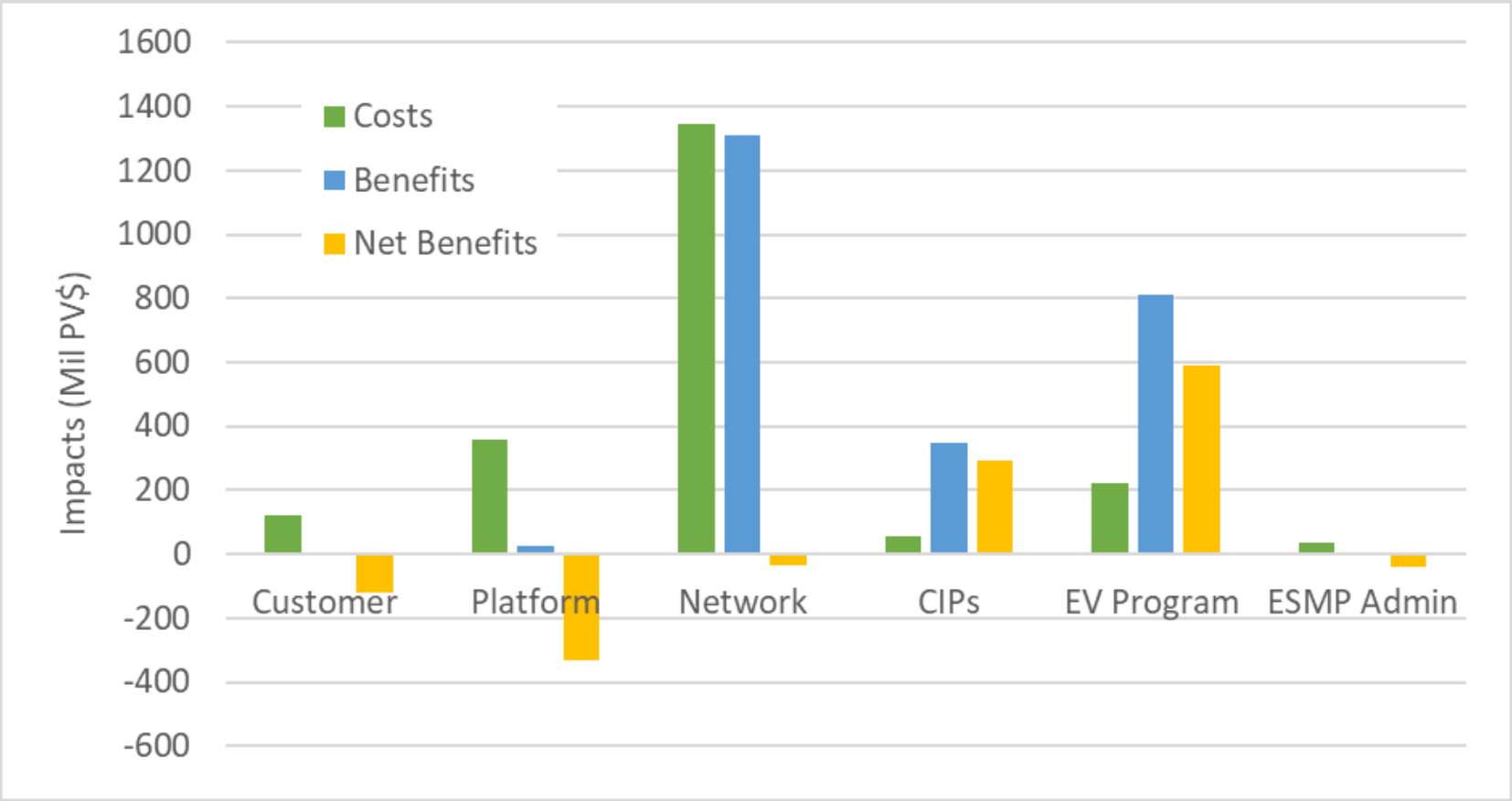


Network investments are the largest by far.

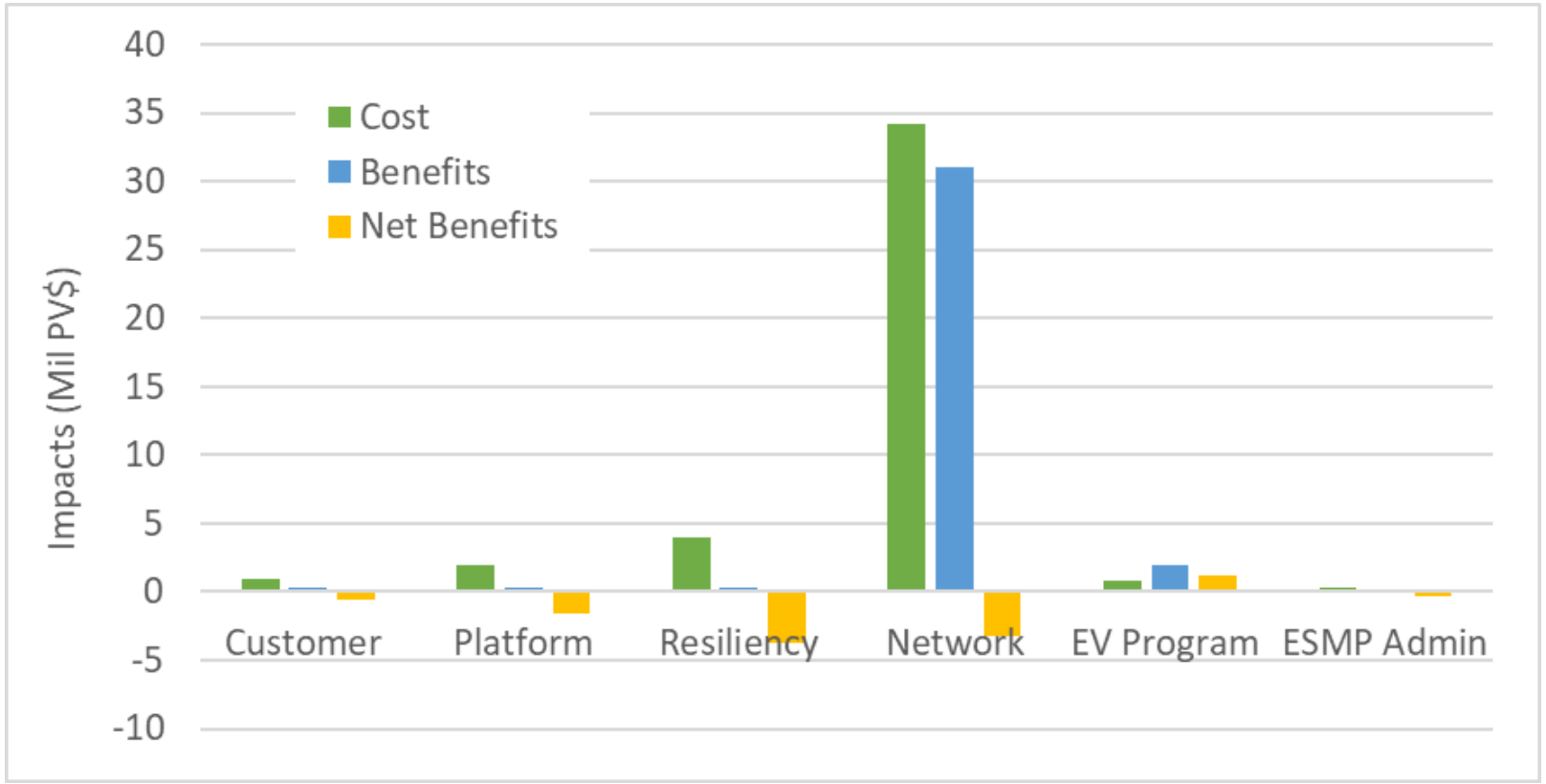
Detailed BCA Results: Eversource



Detailed BCA Results: National Grid



Detailed BCA Results: Unitil



Close and Next Steps

- DOER plans to send out a poll for scheduling the July and late September GMAC meetings in the next few days.
  - Please stay tuned for that poll.

- The Equity Working Group will meet on March 5th, from 3-4 PM.