

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENERGY RESOURCES

Grid Modernization Advisory Council

September 14, 2023

Agenda

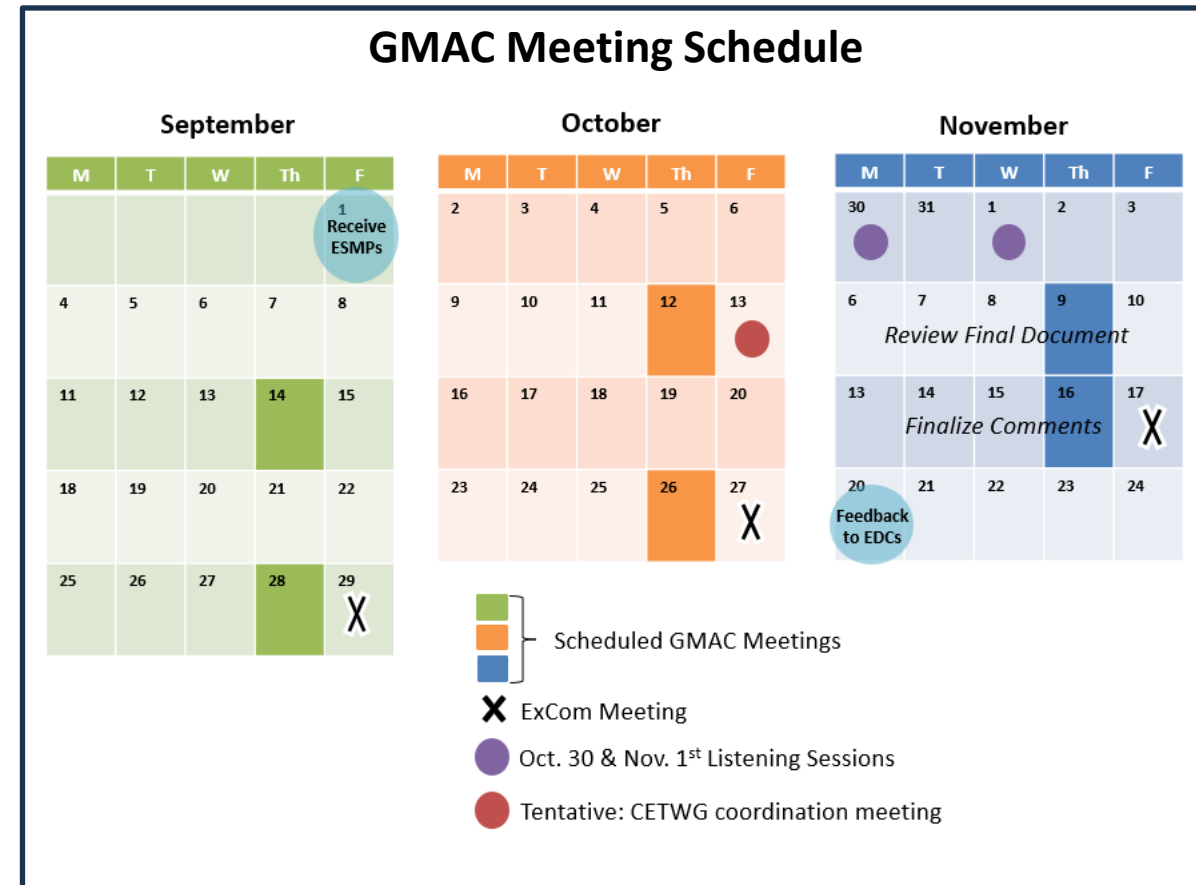
Item	Time
Welcome, Agenda, Roll call	1:00- 1:05
Meeting minutes review and voting	1:05 – 1:10
Equity Working Group vote	1:10 – 1:15
Key Updates on ESMP Review Period	1:15 – 1:20
Consultant Overview	1:20 – 1:40
Section 3: Stakeholder Engagement	1:40 – 2:15
<i>10-minute Break</i>	<i>2:15 – 2:25</i>
Section 4: Current State of the DS	2:25 – 3:05
Section 5: 5- and 10-Year Demand Forecast	3:05 – 3:45
ESMP Review Process Check	3:45 – 3:57
Close	3:57 – 4:00

Meeting Minutes

- Calling for vote to finalize:
 - August GMAC minutes
 - August GMAC Executive Committee minutes
- *Motion to approve the August minutes [as distributed/as corrected]?*

Equity Working Group Details

Date	Details
Thursday, September 14	During GMAC meeting, vote on EWG charter, membership, and leadership.
<i>Sept 15 – Oct 27</i>	EWG determines schedule and meets. Likely ~2 meetings of EWG, up to EWG.
Friday, October 27	EWG provides draft recommendations to GMAC in advance of the listening sessions
Thursday, November 9	EWG presents recommendations for full GMAC discussion



Equity Working Group Vote

- **Charter:** Updated to consist of at least 7 members based on ExCom feedback
- **Membership:**
 - **DOER:** Julia Fox
 - **AGO:** Chris Modlish
 - **GMAC (at least 2):** Larry Chretien, GECA; Kyle Murray, Acadia Center; Kathryn Wright, Barr Foundation
 - **External (2):** Mary Wambui, POUA; Vernon Walker, Clean Water Action
 - **Non-voting EDC:** Erin Engstrom, Eversource
 - **Leadership:** Kathryn Wright, *Chair*
- *Motion to approve the GMAC Equity Working Group Charter?*
- *Motion to appoint the above membership to serve on the EWG?*

Key Updates on ESMP Review Period (1/6)

- **Coordination with CETWG**
 - 10/13 CETWG meeting topic to focus on distribution system
 - GMAC members should have received a meeting hold for this time
- **Listening Sessions**
 - Two sessions have been scheduled with the language interpretation services available.
 - Monday 10/30 at 6:00 - 7:30 PM
 - Wednesday 11/1 at 12:00 – 1:30 PM
 - Please let your stakeholders know.
 - GMAC members are invited to listen.
 - Consultant will take and circulate minutes.

Reminder of ESMP Review Timeline (2/6)

September

M	T	W	Th	F
				1 Receive ESMPs
4	5	6	7	8
			WE ARE HERE	
11	12	13		15
18	19	20	21	22
25	26	27	28	29 X

October

M	T	W	Th	F
2	3	4	5	6
9	10	11	12	13
16	17	18	19	20
23	24	25	26	27 X

November

M	T	W	Th	F
30 ●	31	1 ●	2	3
6	7	8	9	10
<i>Review Final Document</i>				
13	14	15	16	17 X
<i>Finalize Comments</i>				
20 ●	21	22	23	24
<i>Feedback to EDCs</i>				

- } Scheduled GMAC Meetings
- } Scheduled GMAC Meetings
- } Scheduled GMAC Meetings
- X** ExCom Meeting
- Oct. 30 & Nov. 1st Listening Sessions
- CETWG coordination meeting

GMAC Meeting Discussion Plan

- **9/14:** Stakeholder Engagement, Current State, 5–10-year forecast (Chapters 3, 4, 5)
- **9/28:** 5–10-year solutions, Reliable & Resilient, Workforce, Economic, & Health Benefits (Chapters 6, 10, 12)
- **10/12:** 2035-2050 Drivers and Solution, Gas-Electric Planning (Chapters 8, 9, 11)
- **10/26:** Executive Summary, Climate Act Compliance, 5-year ESMP, Conclusion (Chapters 1, 2, 7, 13)
- **11/9:** Discuss draft recommendations
- **11/16:** Finalize recommendations

ESMP Recommendations Template (3/6)

- See template in meeting materials
- Some cells (A, B, C, H) have drop-down menus to select from.
- First row response included as an example.

Use this template to submit your broader recommendations on the ESMPs.

See next slide for when GMAC members should submit their recommendations templates.

Grid Modernization Advisory Council ESMP Review										
Instructions:		Review Meeting #1: September 14, 2023 (Sections 3, 4, and 5) Excel Sheet Due: September 22, 2023								
Please add feedback and/or recommendations pertaining to individual sections in each row. Use the dropdown arrows within the column to select specific EDCs, sections, subsections, etc. Dropdown selections can be made in Columns A, B, C, F, G, I, and K. Row 7 serves as an example entry. Optionally, if there are additional written comments, feedback, or documents that supplement a row entry, please indicate in Column K that additional document(s) will be emailed to MA-GMAC@mass.gov along with your completed Excel sheet. Please send completed Excel sheets with recommendations on the sections corresponding to the GMAC ESMP review schedule. See the "Schedule" sheet for more information on feedback deadlines.										
EDC ESMP	Section	Subsection	Page Number	Area of Concern	Guiding Question	Recommendation or Question	Additional Comment	GMAC Member	Date Added	Additional Information Attachments
National Grid	3 - Stakeholder Engagement	3.3	25	EJ Population Engagement	1. Does the ESMP section demonstrate equity, including increased transparency and stakeholder engagement in the grid planning process and an equitable distribution of impacts and benefits?	To ensure EJ population engagement is meaningful, Ngrid should provide education opportunities on electric grid planning in advance of the stakeholder session .	EEA's EJ Policy defines meaningful involvement as "all neighborhoods have the right and opportunity to participate in energy, climate change, and environmental decision-making including needs assessment, planning, implementation, compliance and enforcement, and evaluation, and neighborhoods are enabled and administratively assisted to participate fully through education and training, and are given transparency/ accountability by government with regard to community input, and encouraged to develop environmental, energy, and climate change stewardship."	Elizabeth Mahony	8/18/2023	Yes, attachment(s) emailed with Excel sheet.

Process for Review – Using 9/14 Meeting as Example (4/6)

Meeting today to discuss Chapters 3, 4, and 5 (Stakeholder Engagement, Current State, 5 to 10-year forecast)

- A. **Tuesday before GMAC meeting, 9/12:** **Consultant team** provides summary slides of selected chapters (posted on GMAC website)
- B. **GMAC meeting, 9/14:** **Consultant presentation** to summarize Chapters and GMAC discussion
- C. **Tuesday after GMAC meeting, 9/19:** **Consultant team** includes Chapter take-aways in meeting minutes for GMAC member review, inclusive of key discussion points from meeting
- D. **Friday (8 days) after GMAC meeting, 9/22:** GMAC members submit their Recommendations sheet for Chapters discussed at 9/14 meeting.
- E. **Tuesday before next GMAC meeting, 9/26:** **Consultant team** updates Chapter take-aways and groups GMAC member recommendations for discussion at opening of next GMAC meeting. Post updates on GMAC website.
- F. **Next GMAC meeting, 9/28:** GMAC discusses updated chapter take-aways and grouped recommendations from last meeting Chapters

September

M	T	W	Th	F
				1 Receive ESMPs
4	5	6	7	8
11	12 A	13	14 B	15
18	19 C	20	21	22 D
25	26 E	27	28 F	29

Repeat process for meetings (and Chapter content) on 9/28, 10/12, and 10/25 GMAC meetings

Process for Questions and Information Requests

- The GMAC is under significant time constraints to discuss the ESMPs.
- We expect the GMAC to have many questions about the provided ESMPs.
- We request the EDCs to prioritize GMAC discussion over immediately answering questions during meetings.
- The meeting minutes taker will keep a list of questions raised by GMAC members during meetings and compile into a list for review by the Chair.
- The Chair will review and send appropriate questions to the EDCs for their response.
- EDCs' responses will be posted on the GMAC website.

Agendas for ESMP Review (5/6)

September 14th

1:00 – 1:20	Administrative Items: EWG Vote; CETWG Coordination
1:20 – 1:40	Consultant Overview
1:40 – 2:15	Section 3: Stakeholder Engagement
2:15 – 2:25	BREAK
2:25 – 3:05	Section 4: Current State of the DS
3:05 – 3:45	Section 5: 5- and 10-Year Demand Forecast
3:45 – 3:57	Review Process Check
3:57 – 4:00	Close

~40 minutes for each Section

- 10 mins consultant
- 30 mins discussion
- End of meeting “Gut check” on ESMP review process

September 28th

1:00 – 1:15	Administrative Items
1:15 – 1:55	Continued Day 1 Discussion
1:55 – 2:30	Section 6: 5- and 10-Year Solutions
2:30 – 2:40	BREAK
2:40 – 3:20	Section 10: Reliable & Resilient DS
3:20 – 3:57	Section 12: Workforce, Economic, & Health Benefits
3:57 – 4:00	Close

~40 minutes for each Section

- 10 mins consultant
- 30 mins discussion
- Continued Day 1 discussion to include check on findings

October 12th

1:00 – 1:15	Administrative Items
1:15 – 1:55	Continued Day 2 Discussion
1:55 – 2:30	Section 8: 2035 - 2050 Policy Drivers
2:30 – 2:40	BREAK
2:40 – 3:20	Section 9: 2035 - 2050 Solution Set
3:20 – 3:57	Section 11: Gas-Electric Planning
3:57 – 4:00	Close

~40 minutes for each Section

- 10 mins consultant
- 30 mins discussion
- Continued Day 2 discussion to include check on findings

Updated Agendas for ESMP Review (6/6)

October 26th

1:00 – 1:15	Administrative Items
1:15 – 1:55	Continued Day 3 Discussion & Overall Thoughts
1:55 – 2:30	Section 7: 5-Year ESMP
2:30 – 2:40	BREAK
2:40 – 3:20	Section 13: Conclusion
3:20 – 3:57	Section 1 & 2: Executive Summary & Climate Act Compliance
3:57 – 4:00	Close

~40 minutes for each Section

- 10 mins consultant
- 30 mins discussion
- Continued Day 3 discussion to include check on findings and overall thoughts of ESMPs

November 9th

1:00 – 1:20	Administrative Items
1:20 – 2:20	Consultant Update
1:20 – 2:20	Draft Recommendations: Sec. 1 - 7
2:20 – 2:30	BREAK
2:30 – 3:30	Draft Recommendations: Sec. 8 - 13
3:30 – 3:50	Draft Revisions
3:50 – 4:00	Close

- Draft Recommendations Review
- Include discussion time for Equity Working Group recommendations

November 16th

1:00 – 1:20	Administrative Items
1:20 – 2:20	Consultant Update
1:20 – 2:20	Final Recommendations: Sec. 1 - 7
2:20 – 2:30	BREAK
2:30 – 3:30	Final Recommendations: Sec. 8 - 13
3:30 – 3:50	Final Revisions
3:50 – 4:00	Close

Final Recommendations Vote

Massachusetts Electric Sector Modernization Plans

Consultant Presentation to
the Massachusetts Grid Mod Advisory Group
ESMP Review Meeting #1

Synapse Energy Economics
Wired Group
GreenerU

September 14, 2023

Introduction to Consultants

Synapse Energy Economics

- A consulting firm specializing economic and technical analyses, regulatory support, research and report writing, policy analysis and development, representation in stakeholder committees, facilitation, trainings, development of analytical tools, and expert witness services
 - Tim Woolf. Senior Vice President, former MA DPU commissioner. See: <https://www.synapse-energy.com/tim-woolf>
 - Ben Havumaki. Senior Associate. See: <https://www.synapse-energy.com/ben-havumaki>
 - Support from Kyle Schultz, Chelsea Mattioda, Aiden Glaser-Schoff.

The Wired Group

- A consulting firm with experience in electrical engineering, economics, finance, marketing, organizational development, information technology and a number of distribution utility businesses (smart grid, demand response, and distributed energy).
 - Paul Alvarez. President. See: <http://www.wiredgroup.net/>
 - Dennis Stephens. Engineer, formerly with Commonwealth Edison Company

GreenerU

- A consulting firm that helps institutions navigate the organizational, operational, and infrastructure changes required to reach climate neutrality, by providing expert facilitation services through complex strategic planning processes.
 - Jen Haugh. See: <https://www.greeneru.com/team/jennifer-haugh/>
 - Daniela Miranda. See: <https://www.greeneru.com/team/daniela-miranda/>

Today's Agenda

1:00 – 1:20	Administrative Items: EWG Vote; CETWG Coordination
1:20 – 1:40	Consultant Overview
1:40 – 2:15	Section 3: Stakeholder Engagement
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~40 minutes for each Section

- 10 mins consultant
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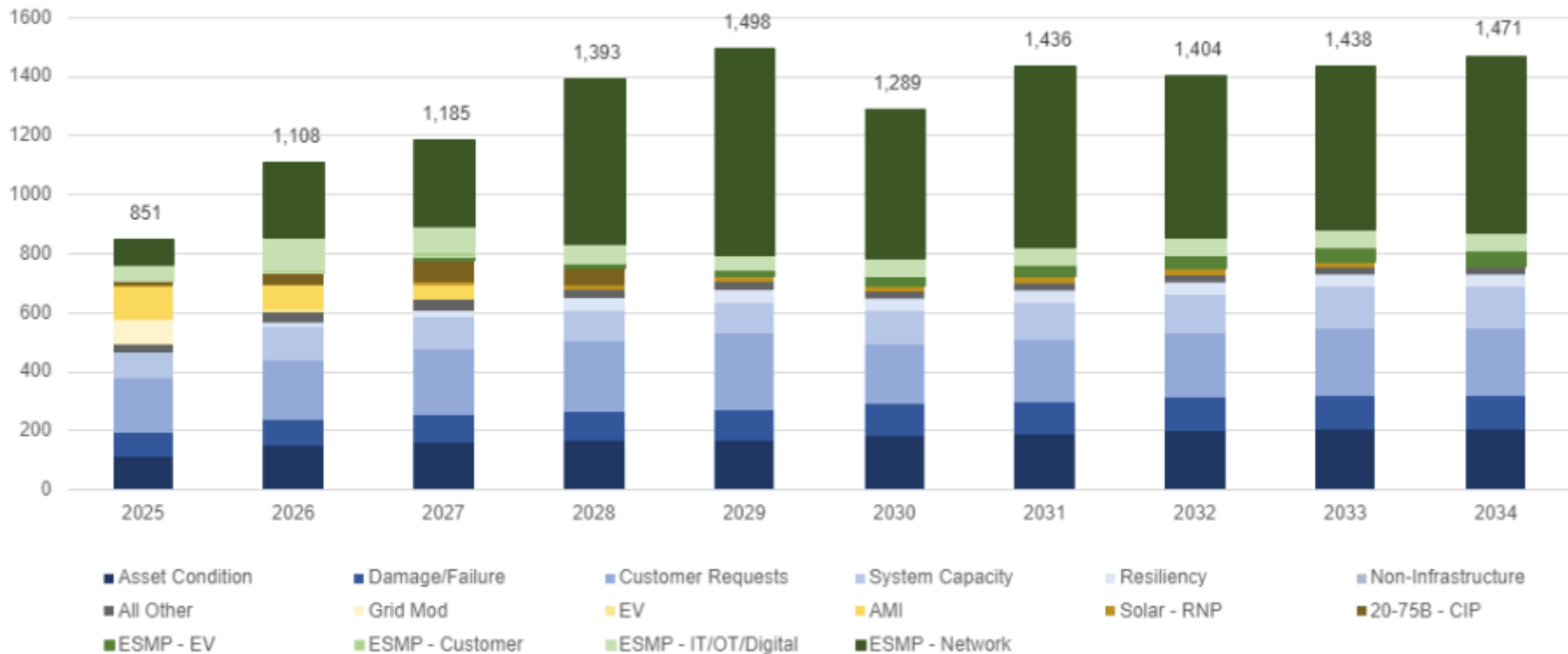
Consultant Overview

Introduction

- We describe some of the ESMP highlights that we think are most relevant to the GMAC
- We offer some initial, high-level reactions to the ESMPs
- We are not able to go into much depth on any topic.
 - That will have to wait for the discussions of specific chapters later today and in future meetings

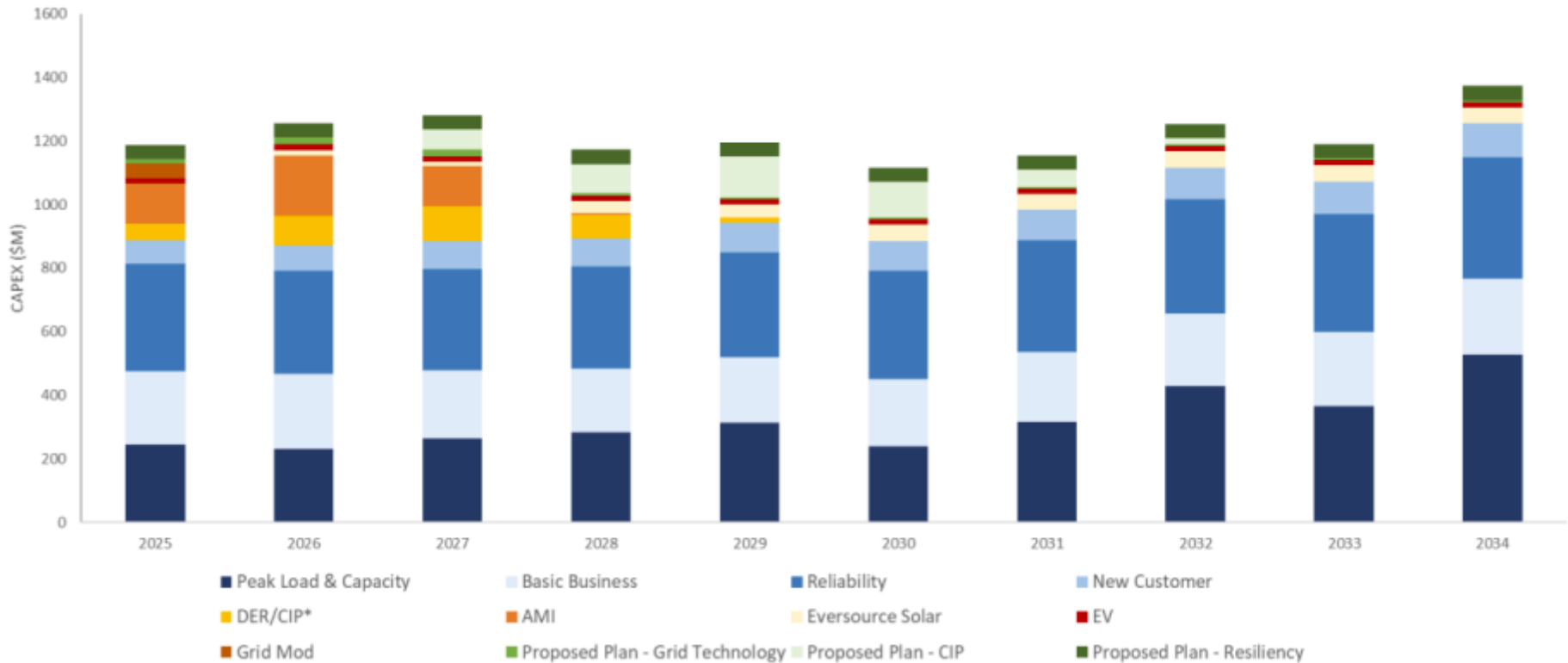
Highlights: Capital Spending – National Grid

Exhibit 7.4: 2025-2034 Capital Investments (\$M)



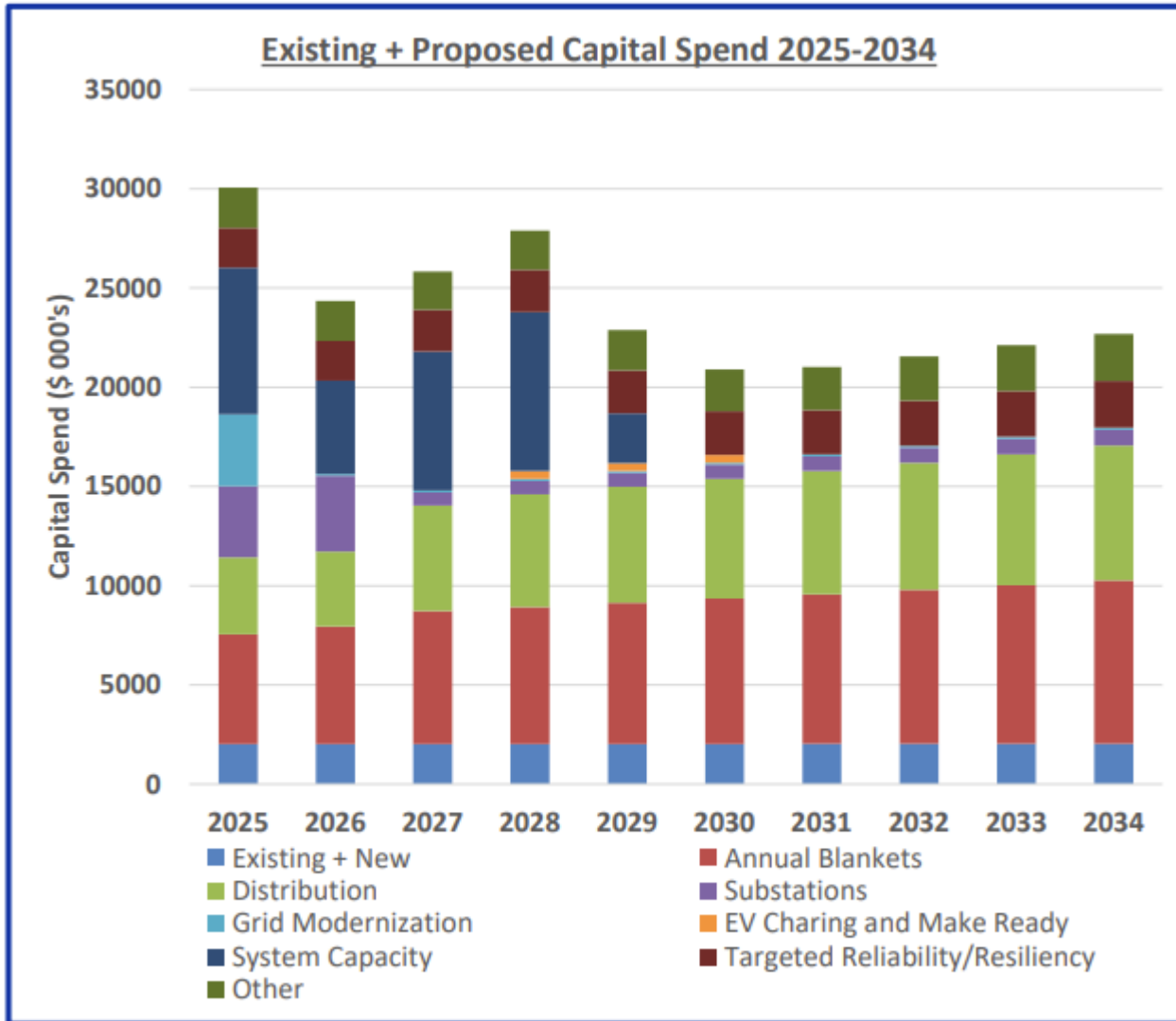
Source: National Grid ESMP, Section 7.2, page 321

Highlights: Capital Spending – Eversource



Source: Eversource ESMP, Section 7.2, page 392

Highlights: Capital Spending - Unitil



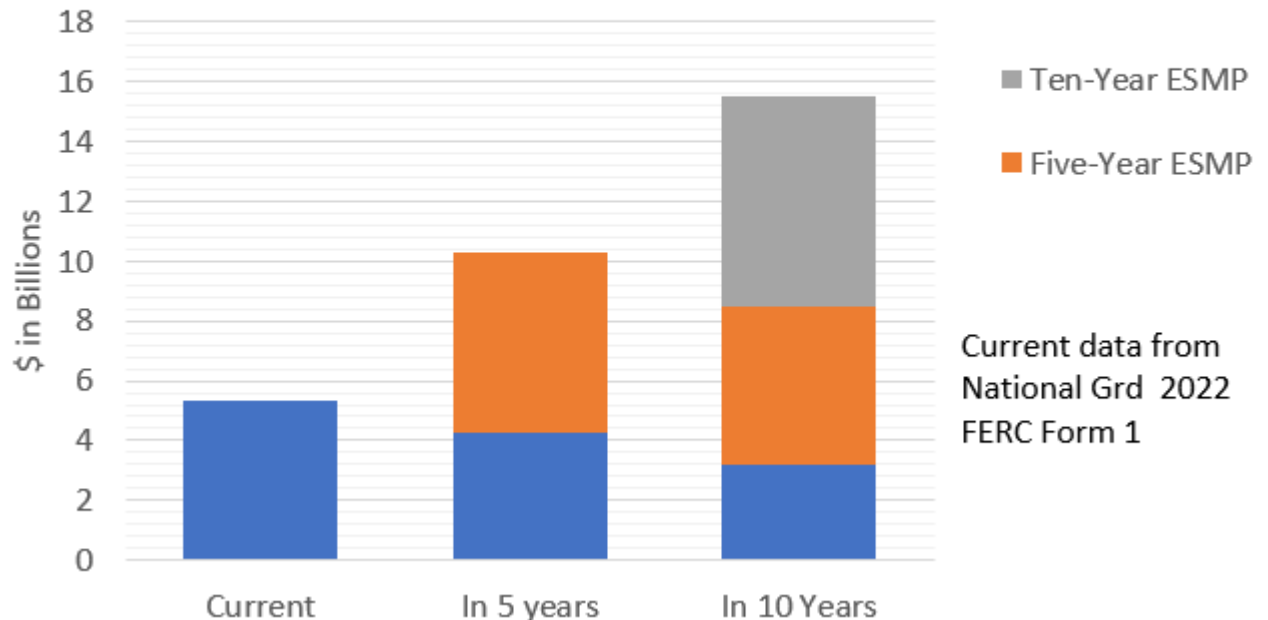
Source: Unitil ESMP, Section 7.2, page 115

Highlights: Cumulative Capital Spending

New capital investments will significantly increase EDCs' rate base

Eversource and Unitil propose similar increases in rate base (see next slide)

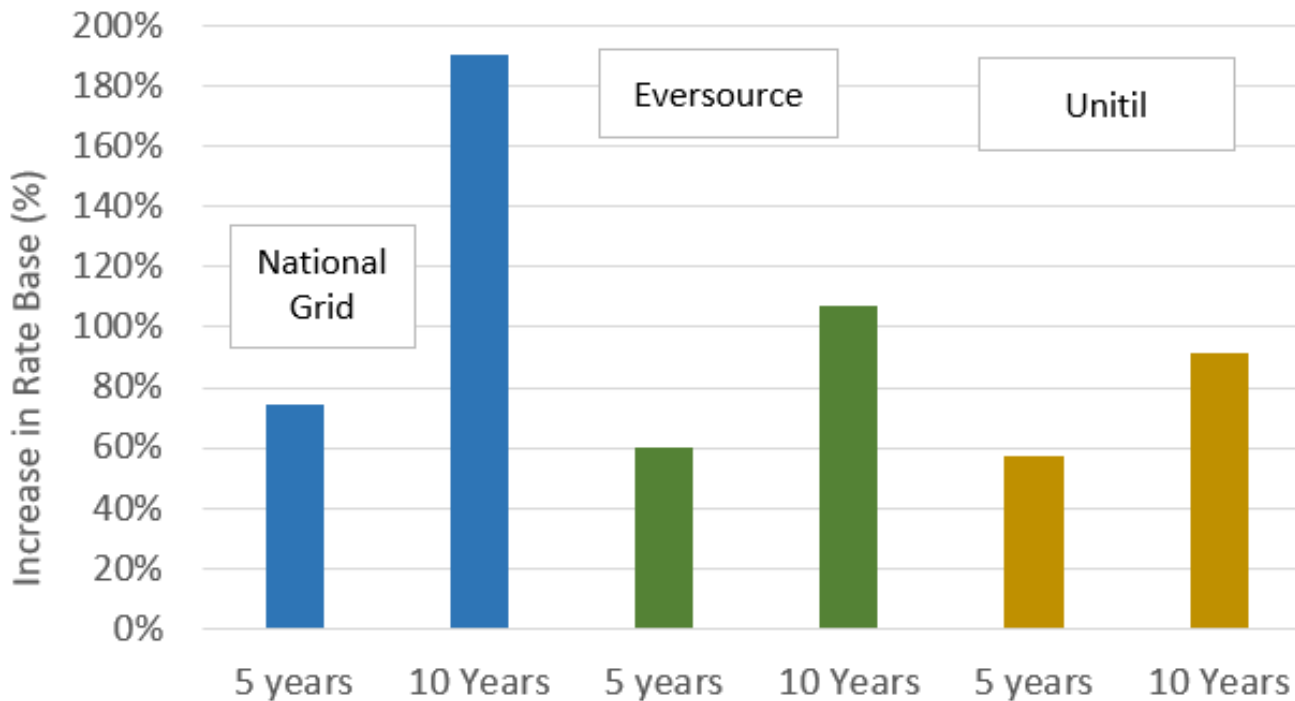
National Grid ESMP
Distribution Rate Base Projection



Source: National Grid ESMP, Section 7.2, page 311

Assumed depreciation periods:
current rate base = 25 years
new spending = 40 years

Highlights: Capital Spending - Increase in Rate Base



The proposed capital spending will increase rate base over the ten-year plan:

- National Grid: 190%
- Eversource: 107%
- Unitil: 91%

Source: Based on material provided in Section 7.2 of each EDC ESMP. See also slides #6, #7, and #8 above

Highlights: Alternatives - NWAs and VPPs

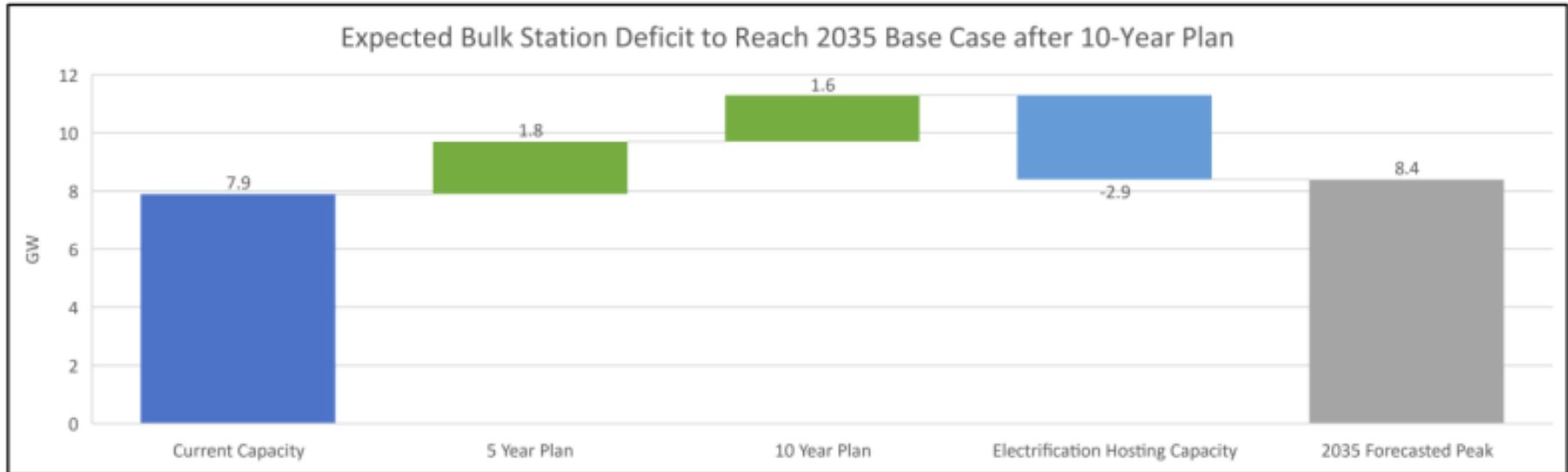
Non-wires alternatives (NWAs)

- All three EDCs discuss previous/current activity and describe frameworks for identifying new NWAs in the future
- But they do not provide estimates of future NWAs
- National Grid describes a “bridge to wires” approach that can use DERs to address an immanent need until a more permanent solution is ready

Virtual power plants (VPPs)

- All three EDCs provide very little information on VPPs
- The EDCs propose to study VPPs as part of the Equitable Transaction Energy Study, to inform proposals in the 2030-2034 ESMPs

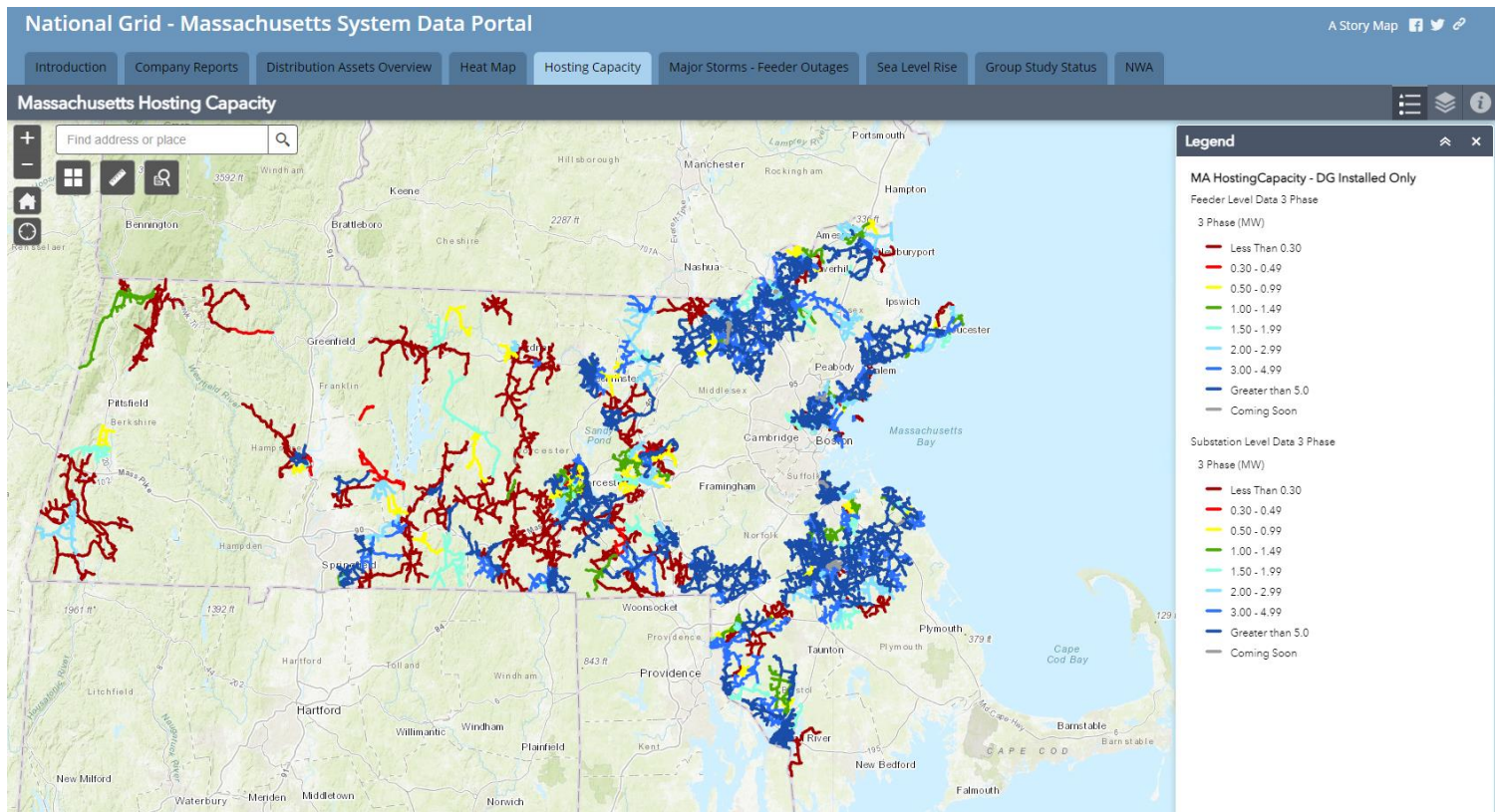
Highlights: Hosting Capacity for New DERs



Source: Eversource ESMP, Section 1.6, page 21

- Eversource's ESMP provides a lot of information about hosting capacity and how its proposed investments will affect hosting capacity over time
- Eversource also has a live portal with hosting capacity heat maps:
<https://www.eversource.com/content/residential/about/doing-business-with-us/interconnections/massachusetts/hosting-capacity-map>

Highlights: Hosting Capacity for New DERs



Source:
National Grid
MA System
Data Portal

- National Grid's ESMP provides much less information about hosting capacity and how its proposed investments will affect hosting capacity over time
- National Grid has a live portal with lots of information, including hosting capacity heat maps:

[National Grid - Massachusetts System Data Portal](https://www.nationalgrid.com/US/Information/Hosting-Capacity)

Highlights: Hosting Capacity for New DERs

In Unitil's ESMP, most of the information on DER hosting capacity is relevant to current capacities

Substation	Total Installed Generation (kVA)	DER Hosting Capacity (kVA)
Beech Street	10,057	15,200
Canton Street 13.8 kV	1,343	13,900
Canton Street 4 kV	625	2,969
Lunenburg	11,284	2,300
Pleasant Street	13,838	3,000
Princeton Road	8,080	14,700
River Street	11,018	4,000
Sawyer Passway	5,571	15,900
Summer Street	3,638	35,500
Townsend	4,584	8,900
West Townsend	7,314	5,600
Total System	77,352	46,300⁹

Table 7 - DER Hosting Capacity (as of 6/1/23)

Source: Unitil ESMP, Section 4.1.5, page 36

Key Items Missing from ESMPs

Net benefits to customers

- Eversource and National Grid are currently working on net benefits assessment, and will file them with the DPU in January 2024
- Unitil does not mention them

ESMP metrics

- National Grid, Eversource, and Unitil
 - Provided high-level metric categories in the ESMPs
 - Will propose detailed ESMP metrics to GMAC by October 1, 2023
 - Will gather stakeholder feedback on proposed metrics
 - Will recommend ESMP metrics to DPU in January ESMP filing

ESMP rate impacts

- There is no data on rate impacts
- Costs are not put in terms of revenue requirements
- There is no estimate of impacts on low-income customers

High-level Questions to Consider

- What is the right balance between "readiness" and cost? To be prepared in advance is important, but how far in advance? The farther in advance, the higher the cost.
- What is the right risk tolerance? Some amount of risk tolerance is appropriate.
- What is the right cadence? Different circuits will need to be ready for DER/Electrification at different times.
- How to account for technology developments and obsolescence? If you develop traditional technologies too soon, opportunities to reduce costs as new technologies arise may be missed.
- How much rate increases are tolerable? High costs and rate impacts are important, not only to protect customers, but also to encourage the goals of grid modernization. As electricity rates rise, customers' ability to electrify becomes increasingly difficult.
- How to protect low-income, underserved, and disadvantaged customers? Programs targeted to low-income customers are important but (a) tend to serve only a portion of the customers in need, and (b) are not necessarily enough to mitigate rising electricity rates.

Guiding Questions for GMAC Review of ESMPs

1. Does the ESMP section demonstrate **equity**, including increased transparency and stakeholder engagement in the grid planning process and an equitable distribution of impacts and benefits?
2. Does the ESMP section encourage **least-cost investments** in the electric distribution systems or alternative investments, such as virtual power plants (VPP) and non-wire alternatives (NWA), that will facilitate the achievement of the statewide greenhouse gas emission limits and sublimits under chapter 21N?
3. Does the ESMP section **maximize net customer benefits and demonstrate cost-effective investments** in the distribution grid, including investments to enable interconnection of, and communication with, distributed energy resources and transmission-scale renewable energy resources, facilitate electrification of buildings, transportation, and other sectors?
4. Does the ESMP section **minimize or mitigate impacts on ratepayers** and reduce impacts on and provide benefits to low-income ratepayers?

GMAC Objectives for This Review

The GMAC does not approve or reject ESMPs.

EDCs will have little time to adopt any GMAC recommendations.

- ESMPs are due to be filed with the DPU on January 29, 2024.

The primary outcome of the GMAC will be to inform (a) the adjudicative DPU dockets, and (b) the ESMP development process:

- Identify elements that GMAC members support or disagree with
- Identify potential improvements to the ESMPs
- Identify discovery requests for the DPU dockets
- Provide guidance on how utilities should conduct ESMPs
 - How to calculate costs to customers and rate impacts
 - How to conduct benefit-cost analyses
 - How to translate customer technology adoption into capacity requirements
 - How to translate capacity deficiencies into investment plans
 - ESMP metrics

Section 3: Stakeholder Engagement

- Consultant Presentation (10 minutes)
- Discussion (30 minutes)

ESMP Section 3

Stakeholder Engagement

Introduction

This section includes:

- A review of expected Section 3 subsections in ESMPs
- An overview of the EDCs' proposed Community Engagement Sustainability Advisory Group (CESAG)
- An overview of two EDCs' equity frameworks
- Initial reactions: all groups and individual ESMPs
- Questions for GMAC to consider

Outline of Section 3

- 3.1 Customer outreach
- 3.2 Municipal outreach
- 3.3 Environmental justice community outreach
- 3.4 Stakeholder meetings and information exchange (including two technical sessions)
- 3.5 Stakeholder input and tracking, including stakeholder input not incorporated
- 3.6 Key takeaways from stakeholder input
- 3.7 Future stakeholder / community engagement process (forecasting, solution alternatives, community impacts)
- 3.8 Ongoing and new proposed stakeholder working groups

Community Engagement Stakeholder Advisory Group

The three EDCs are jointly proposing a **Community Engagement Stakeholder Advisory Group (CESAG)**.

- **Goal:** develop Community Engagement and Community Benefits Frameworks to be used for new clean energy infrastructure projects before the electricity distribution companies (EDCs) submit projects to the Department of Public Utilities (DPU) and/or Energy Facilities Siting Board (EFSB).
- The CESAG will be led by the EDCs, but will include representatives determined by EDCs and GMAC, including community-based organizations (CBOs).
- The group is proposed to begin meeting February 2024, then to meet twice a month for four months.
- Frameworks are to be finalized by Q2 2024.
- CESAG is proposed to be professionally facilitated.

Outcomes from CESAG will be to:

- Guide the EDCs on best ways to inform and educate communities about the electrical distribution system.
- Identify opportunities to support organizations that could help to further cultivate good will and community engagement and/or participation.
- Guide how input should be solicited and responded to.
- Principles for EDC outreach and equitable engagement efforts during project development including recommendations around producing non-technical abstracts about proposed projects that can be disseminated to community members and other ways to provide critical information about the impacts and benefits of projects to the public.
- Define key stakeholders, by categories and specific organizations in specific regions of the Commonwealth.

Equity frameworks

National Grid

Procedural equity is focused on providing stakeholders and communities impacted by energy projects and programs with the necessary information and opportunity to participate in stakeholder processes to inform project siting, development, and implementation.

Distributional equity is focused on ensuring that the clean energy transition supports the more equitable distribution of the benefits and burdens associated with the clean energy transition.

A draft framework can be found on page 411.

Eversource

Framework purpose:

- improve our communication's effectiveness with historically marginalized communities
- increase engagement with our customers
- augment investment and operational activities by proactively listening to communities and seeking to balance:
 - Equity, particularly the demographics and historical burdens of the communities served,
 - Resiliency and the work needed to make systems more efficient and dependable to support clean energy integration.
 - Affordability as a component of fairness in benefit and burden.
- make systems more efficient and dependable to support clean energy integration
- increase inclusion and education of community members by increasing access to programs and services to environmental justice communities.

Initial reactions: all utilities

- It will be important to anticipate **competing priorities** of different stakeholder groups—e.g., public benefits vs. public eyesores, profitability vs. affordability
- Plans should have clearly stated **stakeholder engagement goals**; engagement can be a methodology to achieve overarching goals, but goals may help keep a focus on the intent
- Careful and culturally sensitive **messaging** will be essential—think of visual learners, varying education levels, competition for time and attention, meeting folks where they are
- The EDCs expect a periodic review of frameworks but do not indicate a timeframe

Initial reactions: by utility

National Grid

- Had demonstrably conducted the most stakeholder engagement activity prior to submission of ESMP
- Initial findings are as expected—rate sensitivity, reliability, accessibility, inclusive decision-making processes for siting and permitting, etc.
- Initial results of special outreach to low- to moderate-income, environmental justice, non-English-speaking populations not as clear (e.g., NGCC, Lowell postcard)
- Appreciated statement: “EJC communities are not monolithic”
- Some sections (3.3 Equity-Focused Stakeholder Engagement, 3.4 Outreach and Information-Gathering from Key Stakeholders) may be missing or perhaps labeled differently

Eversource

- Provided clear definitions for terminology
- Provided a great deal of detail on outreach methodology and rationale
- “Figure 7: Community Engagement Approach” is not clear—are boxes stacked in a particular order?
- “Figure 8: Key Clean Energy Stakeholders” illustrates equal weight given to nine stakeholder groups—may obscure emphasis on equity piece of ESMP goals
- Voice of the Customer survey did provide an oversampling of low-income and environmental justice population customers

Unitil

- Least detailed of the ESMPs
- Would benefit from more structure, definitions, and stakeholder identification
- Not many efforts identified outside of the Community Engagement Stakeholder Advisory Group (CESAG) and two public meetings in fall 2023
- Would like to see maps illustrating environmental justice populations, low- to moderate-income communities, and other research on customer base
- Need to see plan, not just pathways under consideration
- Details regarding the CESAG plans do not align with Eversource and National Grid’s details

Questions for GMAC to consider

What recommendations does the GMAC want to make:

1. How will EDCs iterate and evaluate the efficacy of their methodologies to engage stakeholders?
2. How will EDCs communicate back to stakeholders their understanding of concerns and steps to address them?
3. Should the EDCs operate from a single agreed-upon equity framework?
4. What input does the GMAC have for EDCs in scheduling their minimum two required technical community meetings in fall 2023?

Break

Please be ready to start again in ~10 minutes at 2:25

After the break...

- *Section 4: Current State of the DS*
- *Section 5: 5- and 10-Year Demand Forecast*
- *ESMP Review Process Check*
- *Close and Next Steps*

Section 4: Current State of the DS

- Consultant Presentation (10 minutes)
- Discussion (30 minutes)

ESMP Section 4

Current State of the Distribution System

Introduction

- We describe some of the ESMP highlights that we think are most relevant to the GMAC
- We offer some initial, high-level reactions to the ESMPs
- After this presentation, GMAC members can engage in discussion among themselves and ask questions of the consultants

Outline of Section 4

4.1 State of the Distribution System and Challenges to Address

4.2 Planning sub-regions

4.3 Sub-region 1

4.3.1 Maps

4.3.2 Customer demographics

4.3.3 Economic development

4.3.4 Electrification growth

4.3.5 DER adoption (Battery Storage and PV Solar)

4.3.6 Grid services (Demand response, Smart inverter Controls, Time-varying rates)

4.3.7 Capacity deficiency

4.3.8 Aging infrastructure

4.3.9 Reliability and resilience

4.3.10 Siting and permitting

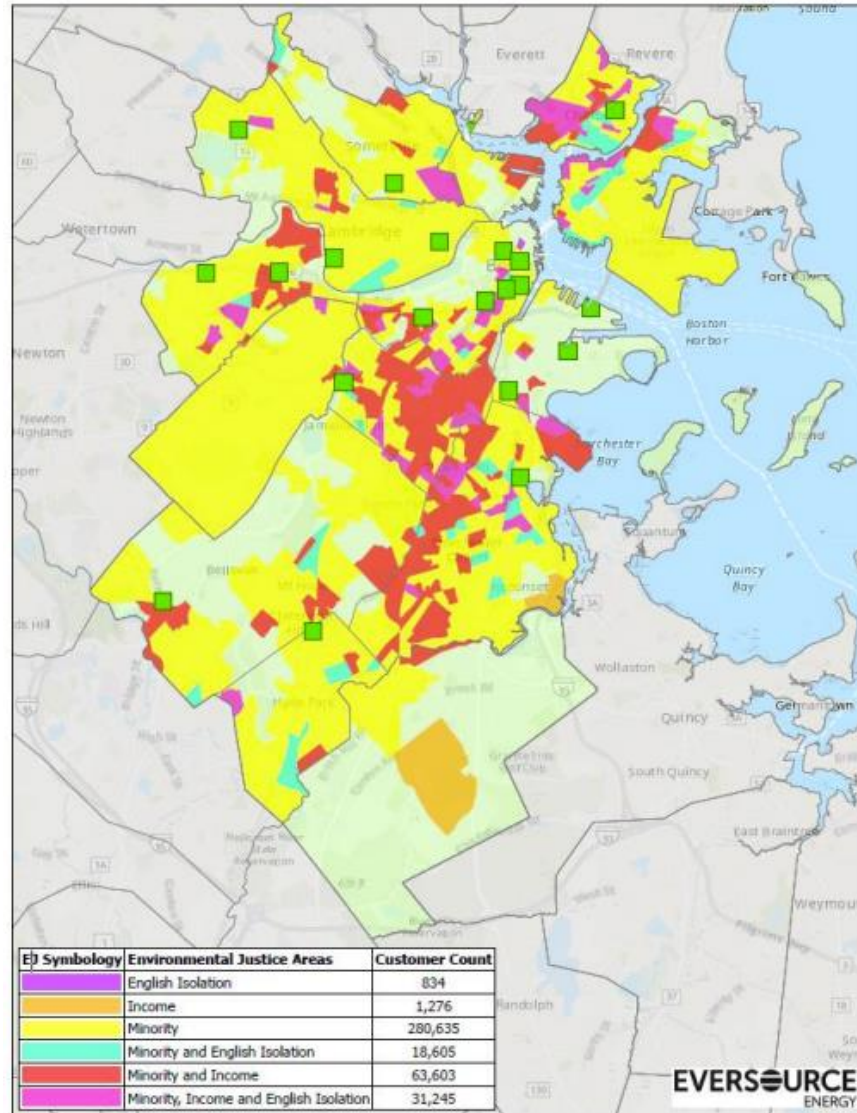
4.4 Sub-region N (new sections for each additional subregion)

4.5 Technology platforms that we have in place today

Substations and Environmental Justice Areas

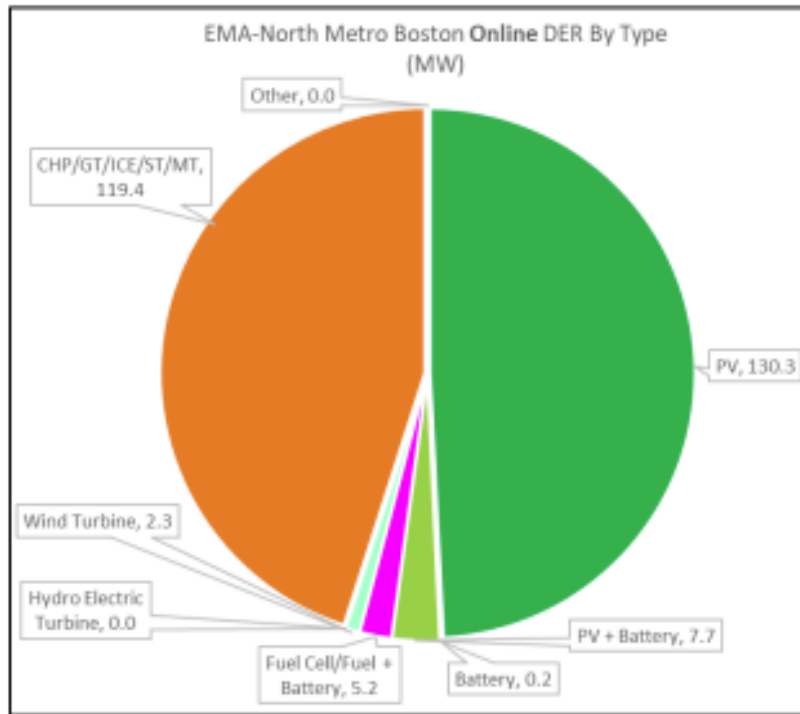
This map shows where substations are located relative to environmental justice areas

Source: Eversource ESMP, Section 4.3.1, page 85

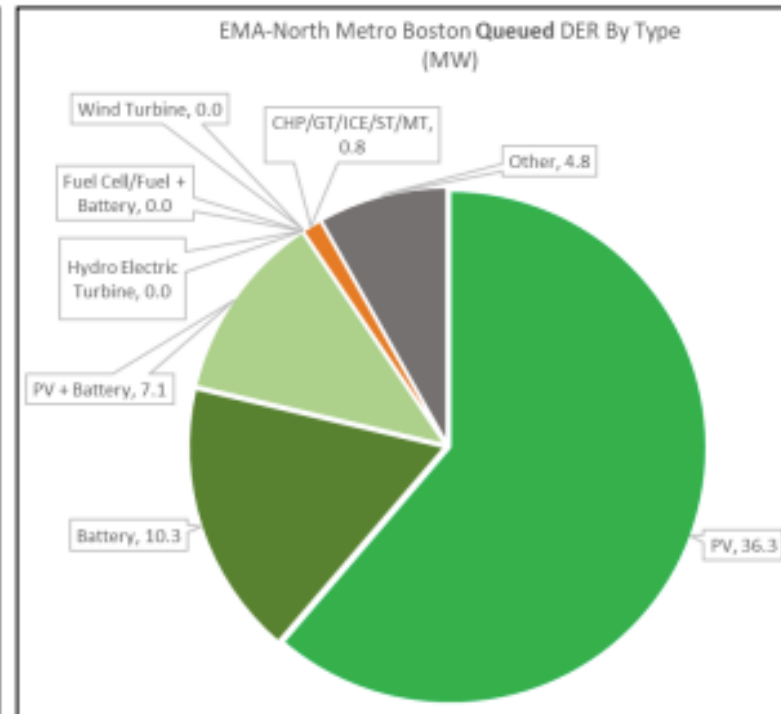


DER Adoption

DERs On-Line Now



DERs in Queue



- This graphic shows different types of DERs on-line or in queue.
- DER Types Include: PV, battery, PV+battery, fuel cell, fuel cell + battery, wind turbine, hydro turbine, CHP, and more

Source: Eversource ESMP, Section 4.3.5, page 92

Capacity Deficiency – Eversource

Municipality	Type	County	Deficiency/Need	Timeframe for Need
Cambridge ⁴⁵	City	Middlesex	Capacity and Reliability	Now/Existing
Chelsea	City	Suffolk	Capacity and Reliability	Now/Existing
Milton	Town	Norfolk	Capacity	Now/Existing
Somerville	City	Middlesex	Capacity and Reliability	Now/Existing

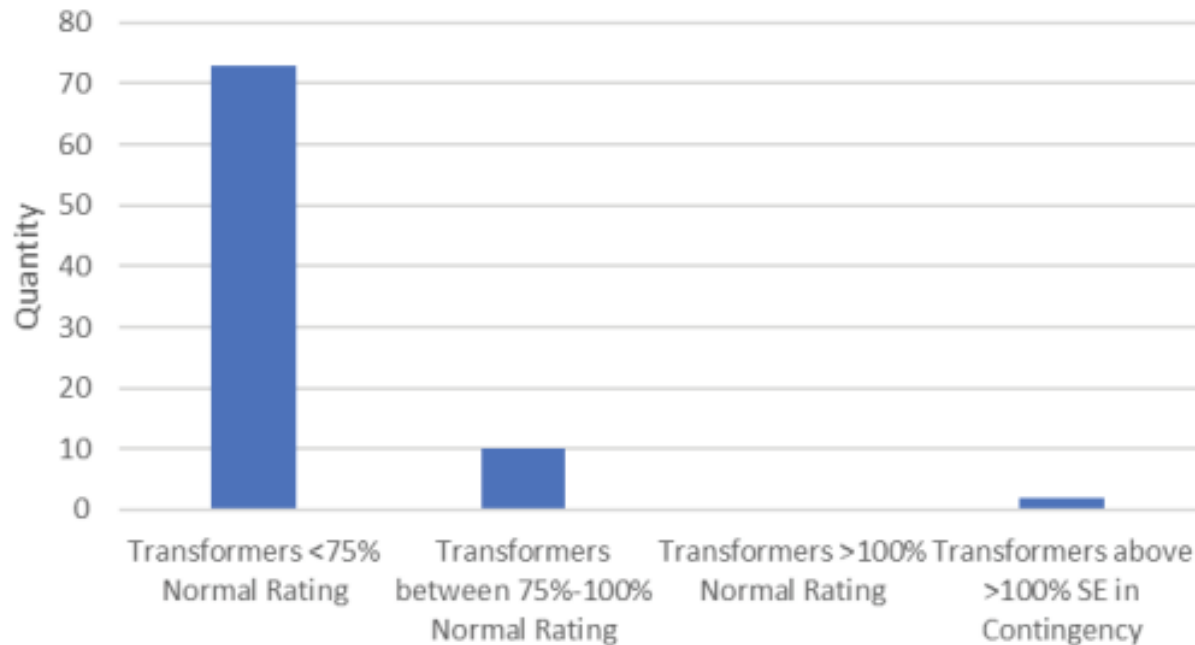
Substation Name or Location	Communities Supplied	2023 % of Substation Capacity
Hyde Park	Milton, City of Boston	100
Chelsea ⁴⁷	East Boston, City of Chelsea	98
East Cambridge	City of Cambridge – East	99
Somerville ⁴⁸	City of Cambridge – North	95

These are different ways that Eversource present capacity deficiencies

Source: Eversource ESMP, Section 4.3.7, page 96

Capacity Deficiency – National Grid

Exhibit 4.16: Central sub-region 2023 Forecasted Transformer Loading Profile



This is how National Grid portrays capacity deficiency

Source: National Grid ESMP, Section 4.3.7, page 86

Highlights: Capacity Deficiency – Unitil

This is how Unitil portrays capacity deficiency

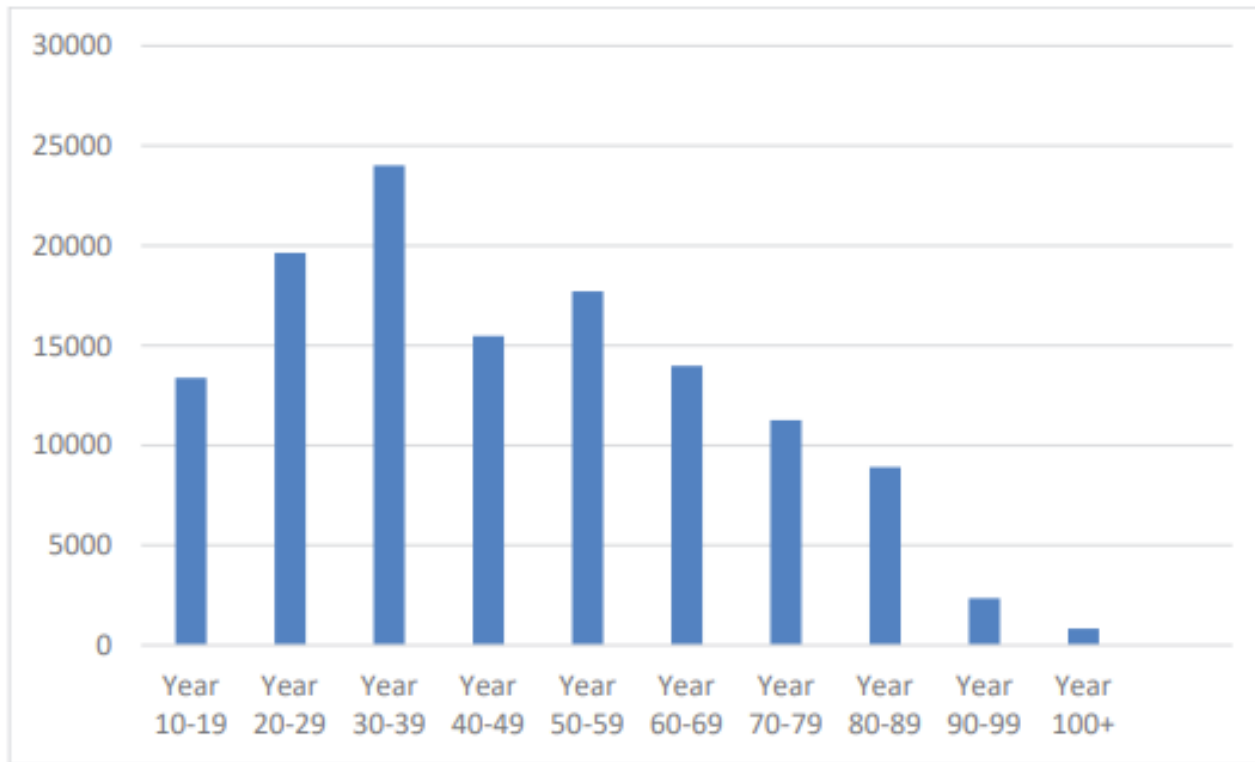
Substation Transformer	Overall Rating Normal (kVA)	LTE (kVA)	Forecasted 2023 Peak Load (kVA)
Beech St.	25,470	26,880	14,316
Canton St. T1	14,000	14,000	4,460
Canton St. T2	4,060	4,220	2,031
Lunenburg	11,989	12,670	11,408
Pleasant St.	14,000	14,000	9,842
Princeton Rd T2	23,200	24,130	7,880
Princeton Rd T3	23,200	24,130	20,187
River St. 13.8 kV	16,240	16,890	7,436
Sawyer Passway T1	21,225	22,946	6,487
Sawyer Passway T2	21,225	22,946	6,487
Summer St.	28,683	28,683	17,366
Townsend	12,340	12,700	10,175
W. Townsend	10,756	10,756	7,578

Table 8 – Substation Transformer Loading Constraints

Source: Unitil ESMP, Section 4.1.7, page 38

Aging Infrastructure

Exhibit 4.21: Central sub-region Distribution Pole Age Profile

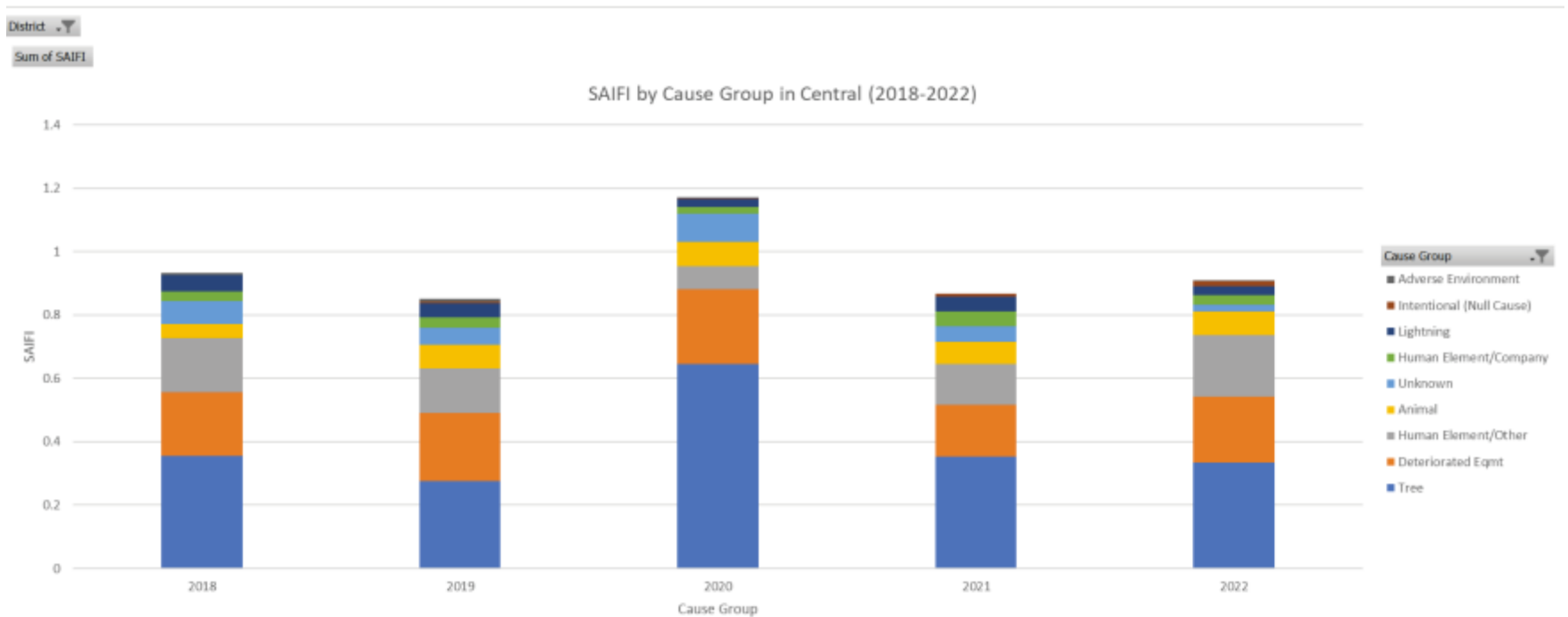


This is how National Grid portrays aging infrastructure data, as one example

Source: National Grid ESMP, Section 4.3.8, page 90

Historical Reliability

Exhibit 4.23: Central sub-region Leading Causes of Blue-Sky Outages and SAIDI and SAIFI Reliability Performance



This is how National Grid portrays historical reliability, as one example

Source: National Grid ESMP, Section 4.3.9, page 91

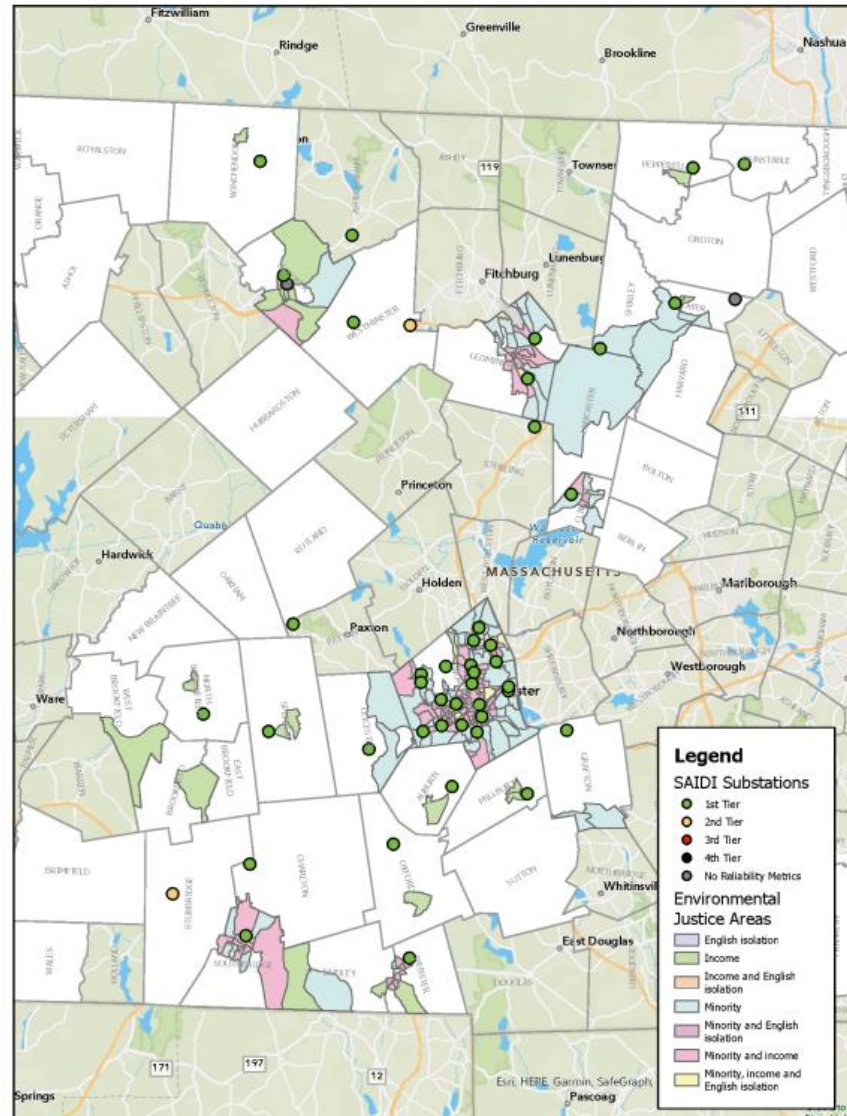
Resilience – National Grid

Exhibit 4.24: Central sub-region Resiliency in EJsCs as shown as SAIDI Substation Performance

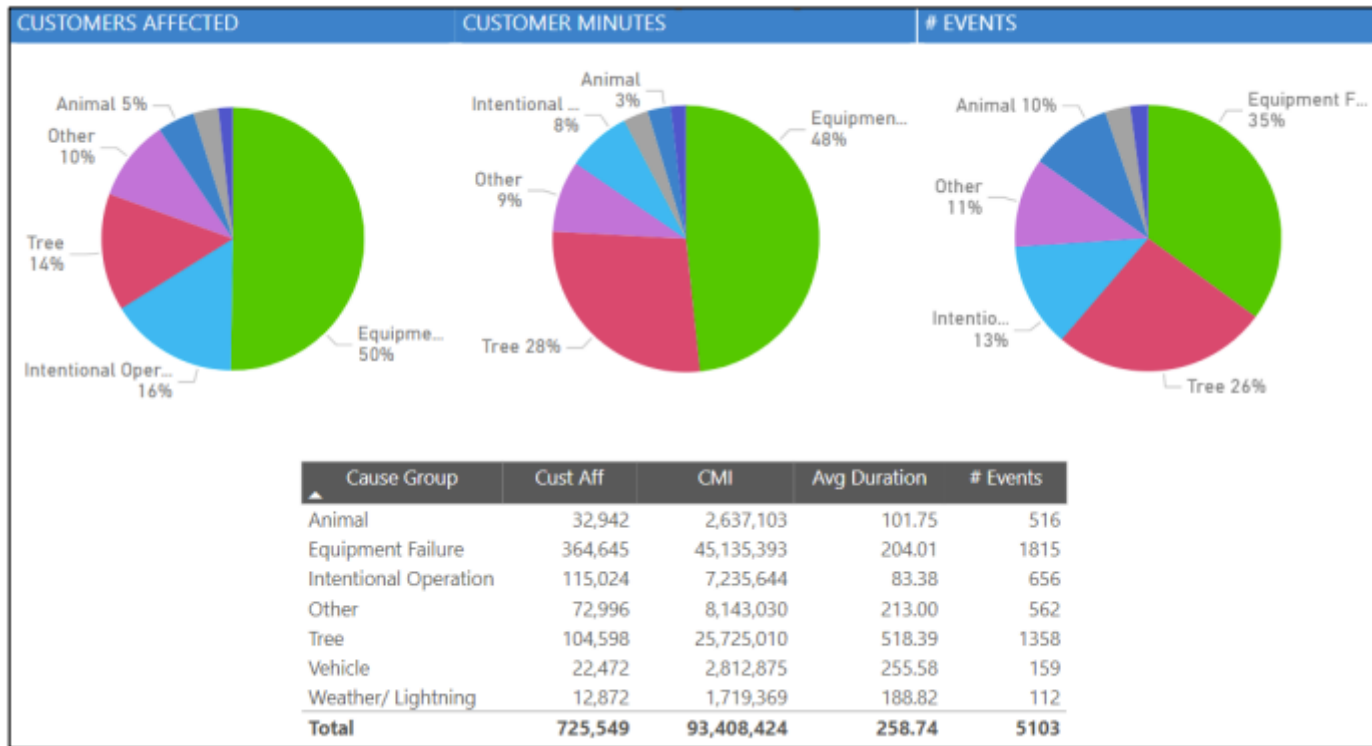
All-in performance includes reliability results for blue-sky days with outages from extreme events added in.

National Grid calculates all-in SAIDI and presents in terms of 4 tiers

Source: National Grid ESMP, Section 4.3.9, page 135



Resilience – Eversource



- All-in performance includes reliability results for blue-sky days with outages from extreme events added in.
- Eversource presents the leading causes of all-in outages.

Source: Eversource ESMP, Section 4.3.9, page 110

DER Hosting Capacity

Eversource's ESMP provides a lot of information about hosting capacity and how its proposed investments will affect hosting capacity over time

- See slide 11 for an example

National Grid's ESMP provides less information about hosting capacity and how its proposed investments will affect hosting capacity over time

- See slide 12 for example of hosting capacity data portal

Unitil's ESMP mostly provides information on DER hosting capacity that relevant to current capacities, with less information on how its proposed investments will affect hosting capacity over time

- See slide 13 for an example

Technologies In Place Today

	Eversource	National Grid	Unitil
Geographical information systems (GIS)	y	y	y
Supervisory control and data acquisition (SCADA)	y	y	y
Outage management system (OMS)	y	y	y
Advanced metering infrastructure (AMI)	AMR	AMR	y
Advanced distribution management system (ADMS)		y	y
Volt/var optimization (VVO)			y
Energy management system (EMS)		y	
Outage prediction model (OPM)	y		
Distribution automation	y		
Flooding model	y		
Advanced forecasting	y		

Sources: Eversource ESMP Sec. 4.7; National Grid ESMP Sec. 4.9; Unitil ESMP Sec. 4.2

Initial Consultant Reactions

The information in Section 4 does not have a lot of bearing on the GMAC Guiding Questions because it is about existing conditions

- Nonetheless, it provides important foundation for later chapters

The type and depth of information varies across EDCs

Some information is inconsistent and limited:

- Historical reliability and resilience
- Historical equity and EJ impacts
- Current distribution capacity deficiencies

Topics for the GMAC to Consider

What recommendations does the GMAC want to make :

- Should there be more information on historical reliability or resilience?
- Should there be more information on historical EJ/equity issues?
- Aging infrastructure:
 - Should it simply be replaced in-kind?
 - When should it be replaced?
- Capacity deficiency:
 - How should it be measured and presented?
 - Substations
 - Transformers
 - Feeders
 - Poles
- DER hosting capacity: how should it be measured and presented?

Section 5: 5- and 10-Year Demand Forecast

- Consultant Presentation (10 minutes)
- Discussion (30 minutes)

ESMP Section 5

5- and 10-Year Demand Forecast

Outline of Section 5

5.1 Five- and ten-year electric demand forecast at the EDC territory level

5.2 Subregion 1

- 5.2.1 Aggregate demand – summer and winter
- 5.2.2 Weather normalized econometric forecast
- 5.2.3 Large load (step/spot load)
- 5.2.4 Energy efficiency
- 5.2.5 DER Growth: Solar PV, Battery Storage, Grid Services
- 5.2.6 Electric vehicles 5.2.7 Heat Electrification

5.3 Subregion N (new sections for each additional subregion)

Statutory Requirements Sec. 92B

“In developing a plan pursuant to subsection (a), an electric company shall:

(i) **Prepare and use 3 planning horizons for electric demand, including a 5-year forecast, a 10-year forecast** and a demand assessment through 2050 to account for future trends, including, but not limited to, future trends in the adoption of renewable energy, distributed energy resources and energy storage and electrification technologies necessary to achieve the statewide greenhouse gas emission limits and sublimits under chapter 21N.”

Top-Line Results from EDC Forecasts

Eversource

- 16% growth in net electric demand over ten-year forecast (ESMP, page 187), with most dramatic growth in the Boston metro area (ESMP, page 219).
 - Peak load growth is largely driven by baseload growth, the result of economic development in the Boston metro area (ESMP, page 231).
 - Eversource forecasts a shift to a winter peak in 2035 (ESMP, page 228).

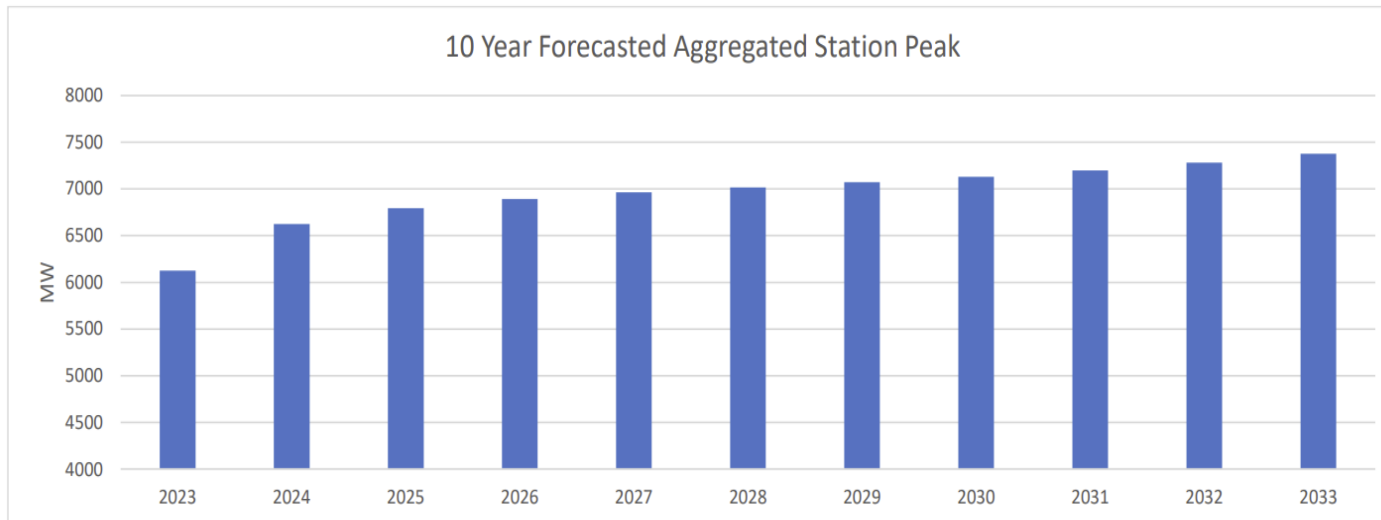
National Grid:

- 23% growth (estimated) in net electric demand from 2025–2034 (ESMP, pages 199-200).
 - Peak load growth is largely driven by EV load (ESMP, page 200).
 - National Grid expects a switch to winter peaking after 2024, in the later 2030s (ESMP, page 212).

Unitil

- 13% growth (estimated) in net electric demand from 2025–2034 (ESMP, page 62).
 - Electrification and baseload growth contribute similarly to peak load growth (ESMP, page 62).
 - Switch to winter peaking by 2034 (ESMP, page 134).

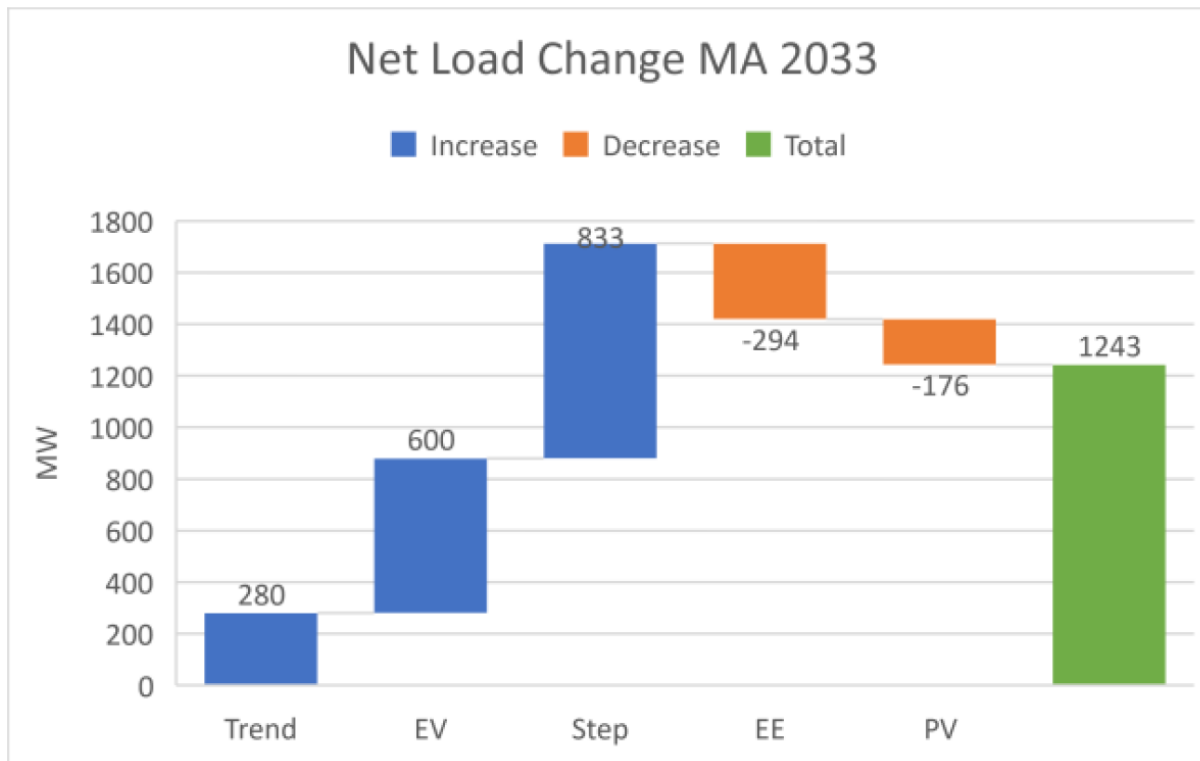
Eversource: Change in Peak Load



- Peak growth is equal to about 16% over the 10-Year forecast period, with the total system peak rising from 6.1 GW to 7.4 GW.

Source: Eversource ESMP, Section 5.2.1, page 231.

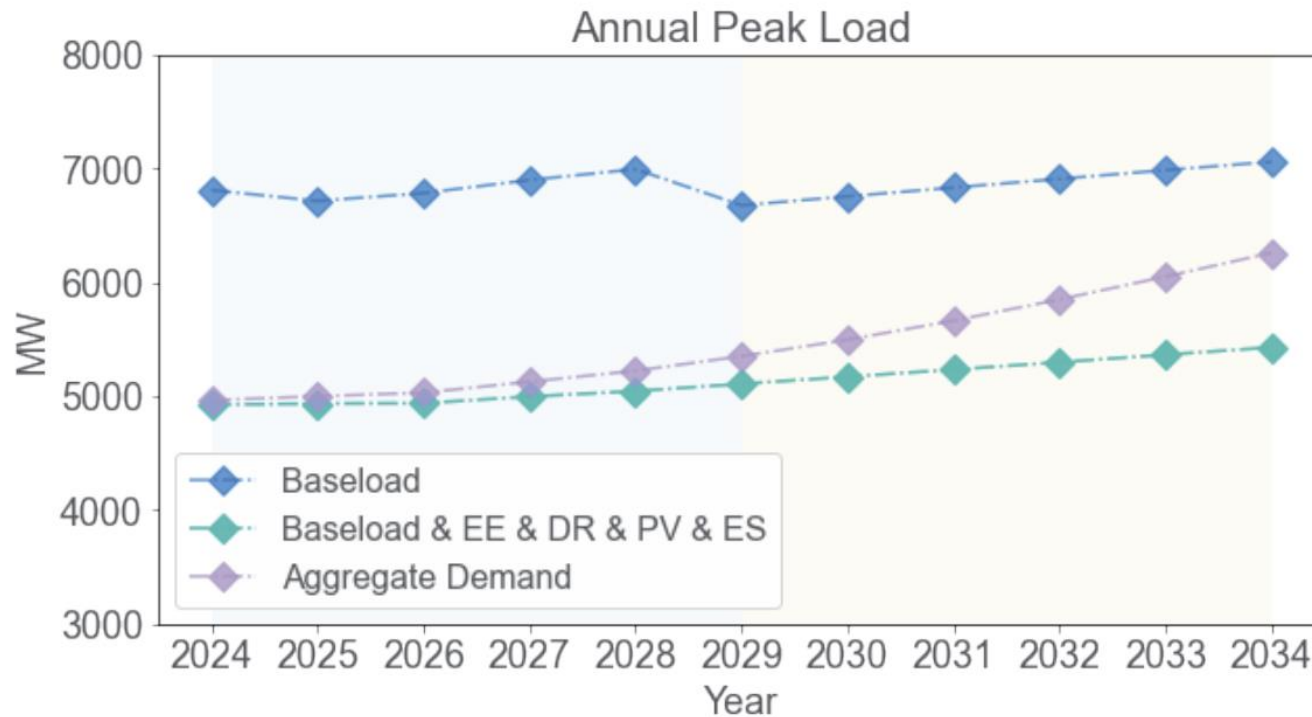
Eversource: Contributors to Peak Load Change



- Peak growth is mostly attributable to new EV load and “step” increases, which are large new customer loads (e.g., businesses in the metro Boston area).
- EE and PV provide only relatively limited load reduction.

Source: Eversource ESMP, Section 5.1.6, page 227.

National Grid: Change in Peak Load

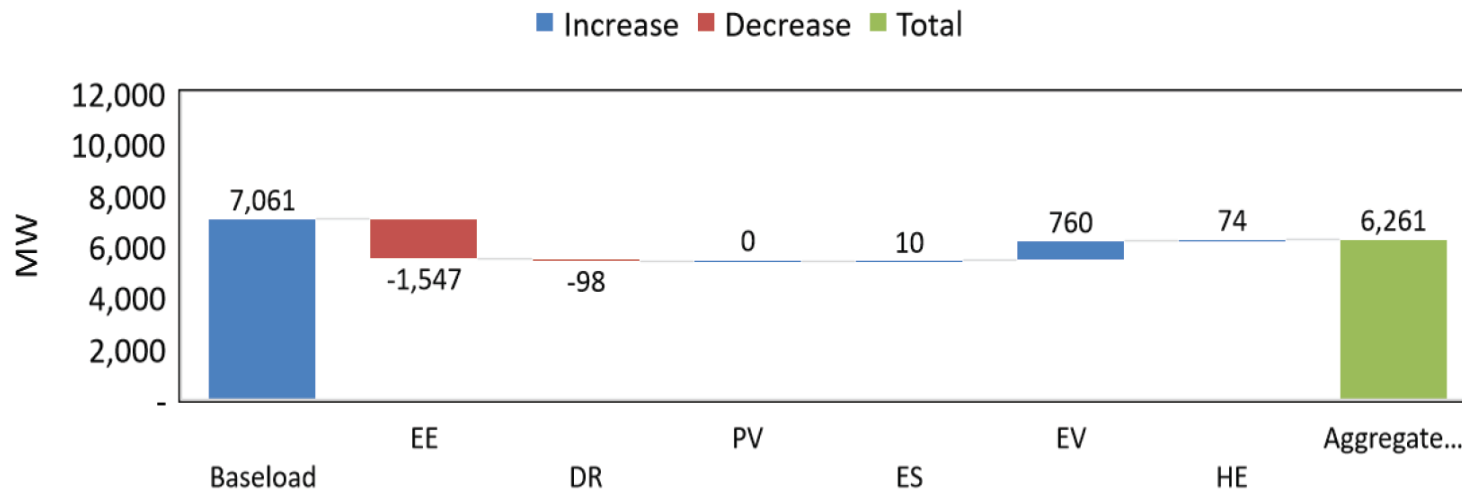


- Peak load is forecast to increase at a rate of about 1.3% through 2029; between 2030-2034, peak grows at a rate of about 2.1% per year.
- Peak growth is only offset to a limited degree by incremental EE, DR, and PV.

Source: National Grid ESMP, Section 5.1.1, page 201.

National Grid: Contributors to Peak Load Change

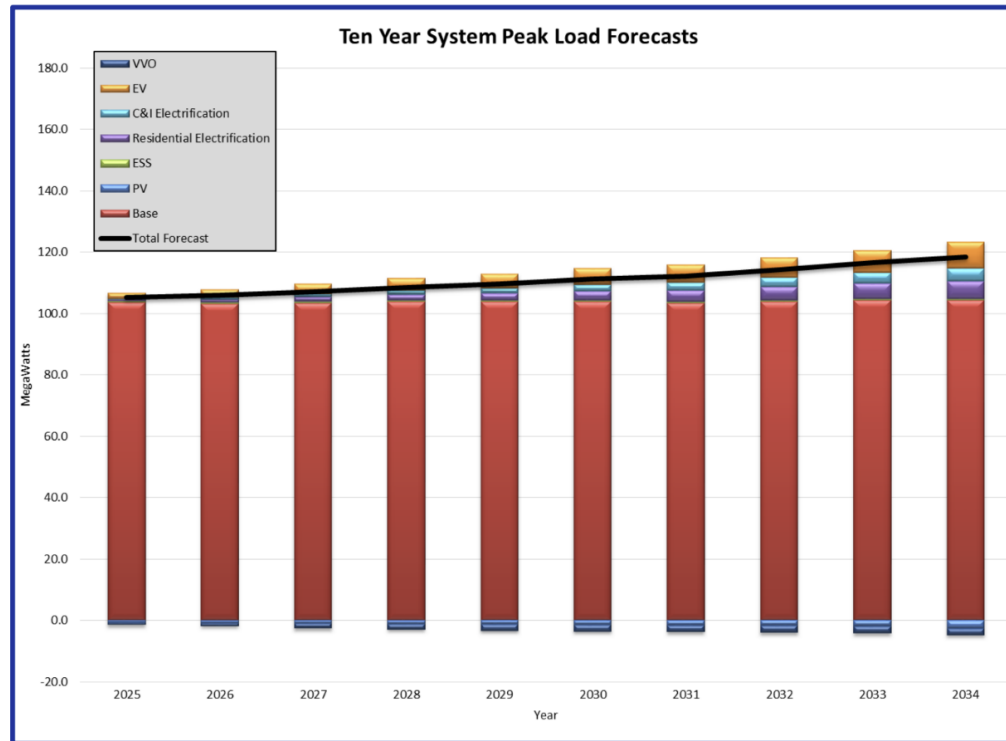
Exhibit 5.5: Annual Peak Load by Components in 2034



- Peak growth is mostly attributable to new EV load; EE provides the greatest load reduction benefit, while DR makes only a very minor offsetting contribution.
- While National Grid is not forecasting a switch to winter peaking until after 2034, heating electrification (HE) still contributes to summer peak as some heat pumps are used for cooling.

Source: National Grid ESMP, Section 5.1.1, page 202.

Unitil: Change in Peak Load



- Peak load is expected to grow at an estimated rate of 1.3% per year over the 10-year forecast period.
- VVO and PV provide limited peak load reduction benefits.

Source: Until ESMP, Section 5.1.8, page 61.

Unitil: Contributors to Peak Load Change

	Total Peak Forecast (MW)	Contribution to Total (MW)							Season ESS	Hour
		Base	PV	ESS	Residential Electrification	C&I Electrification	Base	PV		
2025	105.3	103.6	-0.6	0.5	0.5	0.3	1.9	-0.8	Summer	7PM
2026	106.0	103.2	-0.8	0.5	1.0	0.7	2.5	-1.0	Summer	7PM
2027	107.1	103.5	-0.9	0.5	1.4	1.0	3.3	-1.6	Summer	7PM
2028	108.6	104.0	-1.1	0.5	1.9	1.3	3.9	-1.8	Summer	7PM
2029	109.5	103.8	-1.2	0.5	2.4	1.6	4.6	-2.1	Summer	7PM
2030	111.2	103.9	-1.4	0.5	3.0	2.1	5.3	-2.2	Summer	7PM
2031	112.1	103.4	-1.5	0.5	3.7	2.6	5.7	-2.2	Summer	7PM
2032	114.2	103.8	-1.7	0.5	4.4	3.1	6.4	-2.3	Summer	7PM
2033	116.5	104.3	-1.8	0.5	5.1	3.6	7.2	-2.3	Summer	7PM
2034	118.5	104.5	-2.6	0.5	5.7	4.1	8.7	-2.1	Summer	7PM

Table 13 – Ten Year System Peak Load Forecast

- Growth in system peak is driven by new EV load (second “Base” column) and other electrification, with each of these drivers contributing similarly to demand increase.
- Incremental PV and EE do not substantially offset peak load growth.

Source: Until ESMP, Section 5.1.8, page 62.

EDCs' Shared Load Forecasting Approach

- The EDCs utilize a consistent approach to formulating 5-year and 10-year demand forecasts with three key features:
 - Econometric analysis of design weather conditions at the 90th percentile.
 - Baseload forecast – econometric or based on historical (Unitil)
 - Adjustments for DER
- Baseload changes are driven by # of customers, usage per customer (excluding DER/electrification), and weather.
- DERs, including PV, ES, EV, EE, and DR are separately forecast; electrification is separately forecast.
- Regional/subregional forecasts derived from systemwide forecast.

Energy Efficiency

Eversource

- Includes historical savings and savings associated with ongoing programs through approved three-year plan (ESMP, page 225).

National Grid:

- Forecast for EE is based upon approved three-year plan, with subsequent slowdown in incremental annual savings, from 1.4% per year to 0.7% per year over the next five years (ESMP, page 5).

Unitil

- Somewhat ambiguous – appears to assume continuation of historical savings trends without any projections of additional EE savings (ESMP, pages 54-55, 67, 122).

Demand Response

Eversource

- Included only to the extent that historical demand response shows up in the baseload trend forecast. Does not forecast new demand response (ESMP, pages 209, 221, 226).

National Grid:

- Assumes that demand response, through Mass Save, will continue to grow at same rate following end of three-year plan period, with 60% growth in DR by 2034 relative to 2022 (ESMP, page 205).

Unitil

- Does not include demand response in forecast (ESMP, page 122).

Solar PV

Eversource

- Rooftop solar is projected with an econometric model estimated using recent data and solved over an array of technical and economic variables (ESMP, page 193); ground mounted solar forecast based upon state targets with adjustments for interconnection queue (ESMP, page 196).
- Distributed generation is second largest contributor of capacity deferral, but the marginal benefit is decreasing with peak shifting to the evening (ESMP, page 226).

National Grid:

- From 2023-2027, forecasted from interconnection cue, expert input, and state goals. Long-term forecast based on share of overall state targets – “All Options” Scenario from 2050 Decarbonization Roadmap (ESMP, page 204).
- The marginal peak reduction benefit is decreasing with peak shifting to the evening (ESMP, pages 199-201).

Unitil

- PV forecast based upon five-year and three-year historical growth rate in PV, as well as total DER penetration/number of customers served (ESMP, page 55).
- The marginal peak reduction benefit is decreasing with peak shifting to the evening (ESMP, pages 52, 61).

Electric Vehicles

Eversource

- Annual electric vehicle adoption is calculated from state policy targets (ESMP, page 205); exponential growth in EV adoption forecast through the end of the decade (ESMP, page 221).

National Grid:

- Consistent with Eversource's approach, growth in EVs is based upon state policy targets. Includes both plug-in hybrid and battery-only vehicles, and covers light-duty, medium-duty, and heavy-duty EVs (ESMP, page 205).

Unitil

- Forecast EV growth is based upon ISO-NE forecast (ESMP, page 56).

Electrification

Eversource

- System is summer peaking, and 10-year forecast does not include effects of heating electrification (ESMP, page 188); some substations expected to transition to winter peaking between 2024–2034 (ESMP, page 207).
- The Company anticipates a switch to winter peaking in 2035, with electric heating load representing just above 38% of total peak load (ESMP, page 228).

National Grid:

- Through 2024, forecast for heating electrification is based upon approved three-year plan; post 2024, forecast is based upon achievement of MA CECP “Phased” electrification scenario targets by 2050 (ESMP, page 206).
- System expected to continue to summer-peak through 2034 (ESMP, page 206).

Unitil

- Forecast covers heating and other appliance end uses (ESMP, pages 58-60).
- Assumes 1% total forecast load incorporated per year, 2025–2029; assumes 2% total forecast load incorporated per year, 2030-2034 (ESMP, page 58).

Initial Consultant Reactions

1. The load forecasts include many unsubstantiated assumptions.
2. The EDCs do not appear to seriously consider sensitivities over the 10-year forecast period.
3. The EDCs could better explain dependencies between proposed investments and projected growth. In many instances, the projected load growth for given end uses would be contingent on utility actions, including, potentially, both grid investments and programmatic inducements.

Questions for GMAC to Consider

What recommendations does the GMAC want to make :

1. Should the EDCs better substantiate assumptions? If so, which specific assumptions most require substantiation?
2. How should the EDCs address uncertainty in their forecasts?
3. What additional information might be provided so that reviewers can better assess how much uncertainty there is in the forecasts (and the implications of any uncertainty for proposed investments)?

ESMP Review Process Check

- Will this process over the next two months meet the objectives of the GMAC?
- Would the GMAC final product/goal be served by the proposal from the GMAC consultant in their introduction slides (copied below)?

The primary outcome of the GMAC will be to inform (a) the adjudicative DPU dockets, and (b) the ESMP development process:

- Identify elements that GMAC members support or disagree with
 - Identify potential improvements to the ESMPs
 - Identify discovery requests for the DPU dockets
 - Provide guidance on how utilities should conduct ESMPs
 - » How to calculate costs to customers and rate impacts
 - » How to conduct benefit-cost analyses
 - » How to translate customer technology adoption into capacity requirements
 - » How to translate capacity deficiencies into investment plans
 - » ESMP metrics
- Did the consultant Chapter presentations kick-off GMAC discussion well?

Close and Next Steps

- Next GMAC Meeting: September 28th, 2023 from 1-4 PM.
- Topics for next meeting
 - Continued September 14th Discussion and Review of Key Chapter Findings
 - Section 6: 5- and 10-Year Solutions
 - Section 10: Reliable & Resilient DS
 - Section 12: Workforce, Economic, & Health Benefits