Massachusetts Grid Modernization Advisory Council

Meeting Presentation

May 1, 2025

GMAC

Grid Modernization Advisory Council

Agenda & Roll Call

Item	Time
Administrative Items • Welcome, Roll Call, Agenda • Public Comment Period • Meeting Minutes Review and Voting	1:00 – 1:20
IEP Stakeholder Working Group Vote	1:20 – 1:25
Updates on ESMP Activities	1:25 – 1:35
Reliability Presentations • EDC presentation (10 min) • DPU presentation (10 min) • *Q&A throughout presentations*	1:35 – 2:00
Break	*2:00 – 2:05*
Reliability Facilitated Discussion	2:05 – 2:45
Other Discussion Areas	2:45 – 2:55
Close	2:55 – 3:00

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.

GMAC Minutes Review and Voting

Meeting Minutes

- Calling for vote to finalize:
  - March 27, 2025 GMAC minutes
  - April 24, 2025 ExCom minutes

Motion to approve the March 27th GMAC minutes [as distributed/as corrected]?

Motion to approve the April 24th GMAC minutes [as distributed/as corrected]?

IEP Working Group

- The EDCs are seeking one primary and one alternate participant from the GMAC for the integrated energy planning (IEP) stakeholder working group.
- The group will meet every two months beginning on May 29th, to create a 5-, 10-year, and 2050 IEP plan.
- The group proposes to hold public listening sessions on August 21st and December 11th.
- **Kyle Murray** nominated himself for the role. His statement of interest was posted in the meeting materials.

1. **Are there any GMAC members interested in serving as the alternate member?**
2. **Is there a motion to call a vote on the GMAC representative(s) for the IEP stakeholder working group?**

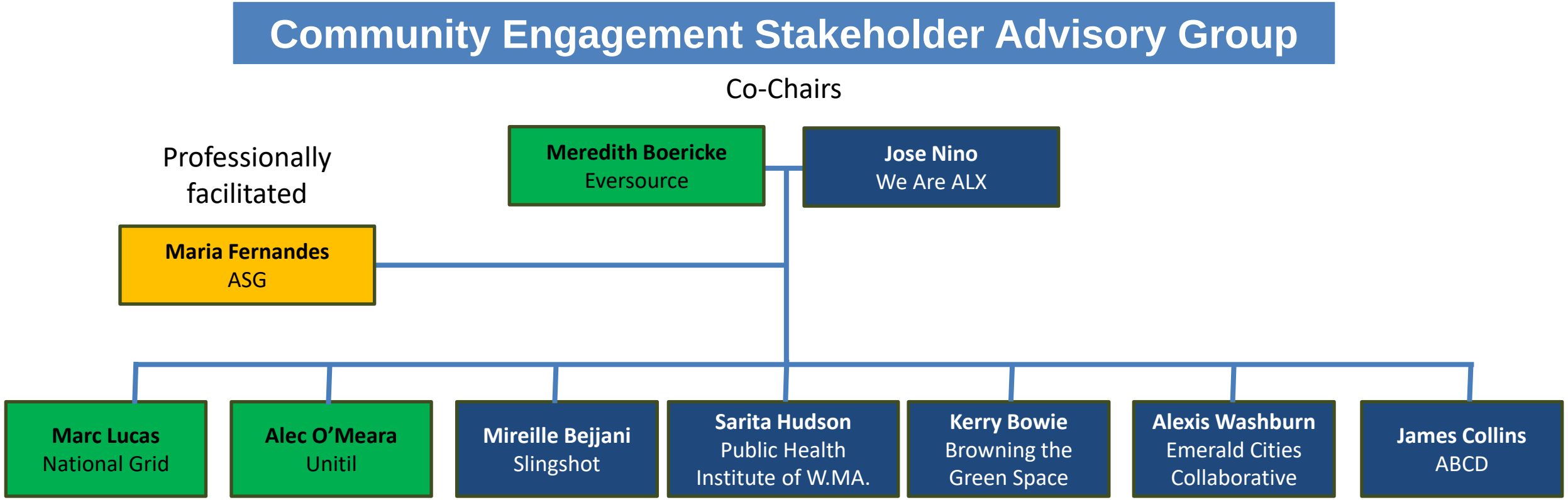
ESMP Activities Updates

1. **ESMP Phase II**
   - **Interim ESMP Mechanism**
   - **Metrics and Reporting**
2. **CESAG** *(see next two slides)*
3. **IEP Working Group**
4. **LTSPP Working Group**
5. **Other**

Key Upcoming Dates	
LTSPP Proposal filed	**5/9**
EDC Reply Comments on Metrics/Reporting filed	**5/15**
1st IEP Working Group Meeting	**5/29**

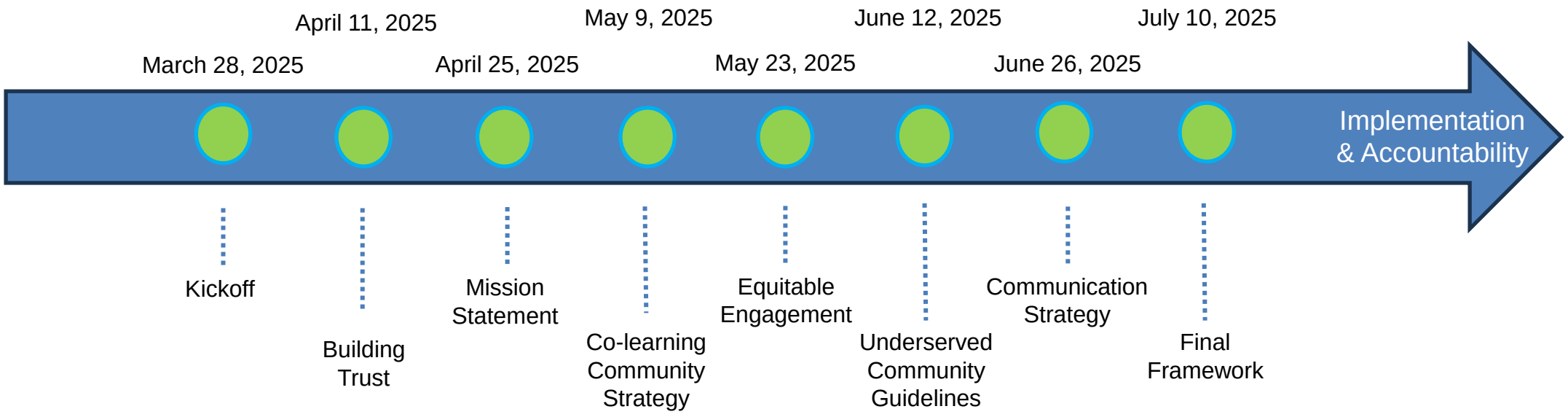
Are there any updates on these items?

CESAG members represent a wide variety of communities



CESAG timeline

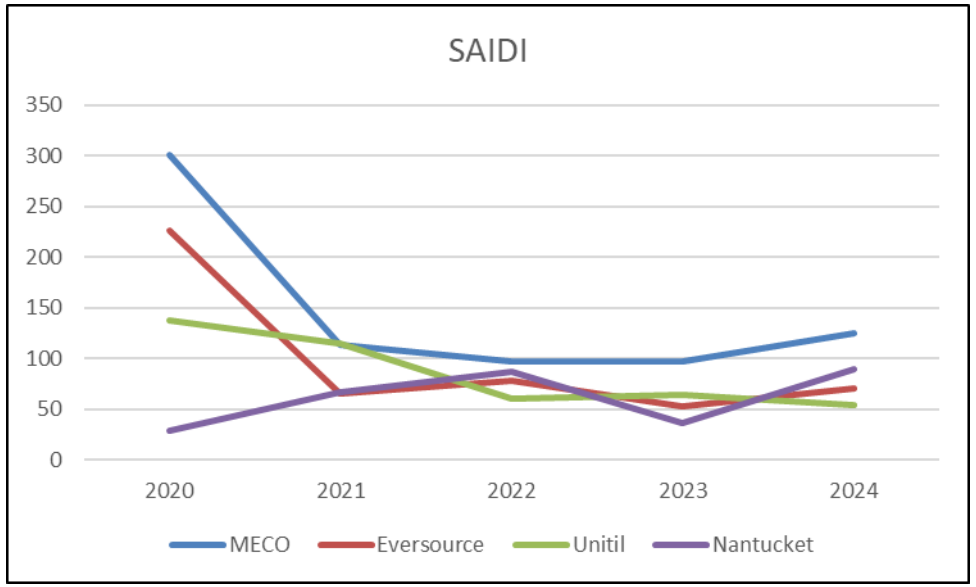
Develop a **replicable community engagement framework** that can be used by the Electric Distribution Companies (EDCs) as a **guide to work with communities and stakeholders.**

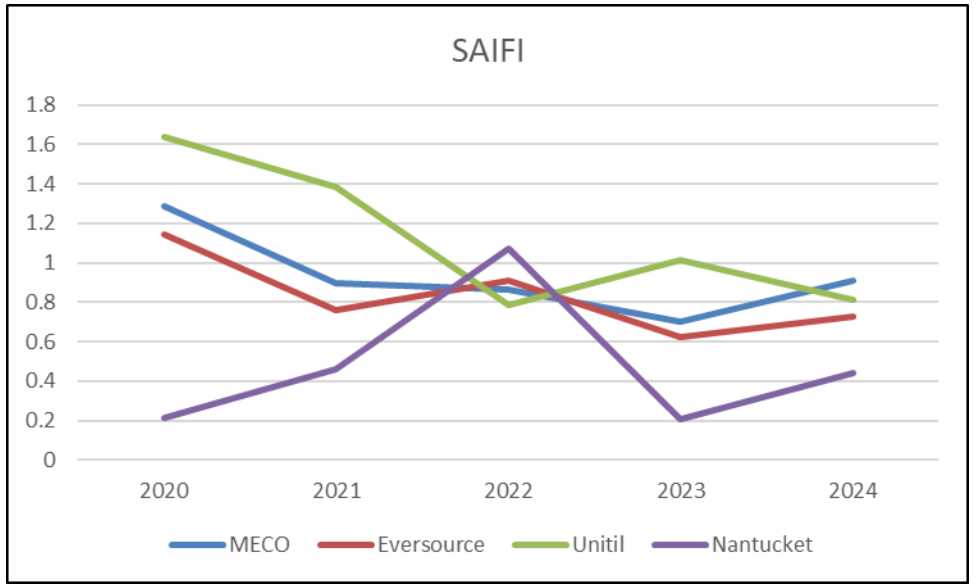


Reliability & Resilience Planning
Update to the GMAC

May 2025 GMAC Meeting

Recent Reliability Performance





Since 2020, a year with a significant number of non-excludable storms, the EDCs have shown consistent SAIDI performance and steady improvement in SAIFI.

A utility's size, geography, age, and characteristics (e.g., overhead, underground, rural, urban) have an impact on SAIDI and SAIFI.

EJ communities have better reliability performance on average across all 3 EDC's.

SAIDI: System Average Interruption Duration Index
SAIFI: System Average Interruption Frequency Index

Reliability Planning and Execution

A Focus on Reliability

Daily, weekly, monthly, and annual reports and meetings bring attention to recent, ongoing, and upcoming reliability issues and risks.

Local and system level meetings give the appropriate granularity and ability to share best practices.

(Source: T&D World)

The 3 EDC's take many approaches to maintaining and improving reliability for our customers:

- Distribution Automated Switching
- Asset Condition Replacement
- Targeted Improvements (Engineering Reliability Reviews)
- Programs that Improve Reliability
  - Underground Cable Replacement Program (URD, Mainline Cable)
  - Overloaded Transformers
  - Oil-Fused Cutouts (OFCs)
  - Inspection and Maintenance (I&M)
- Customers Experiencing Multiple Interruptions Analysis
- Vegetation Management (Cycle Pruning, EHTM, EVM)
  - Storm Resiliency Programs and Hazard Tree Removals
- Visual and Operational Inspections at Substations
- Early Fault Detection*
- ReBOT (Reliability Budget Optimization Tool) that optimizes a portfolio of reliability programs for poor performing zones and circuits.**

*National Grid

**Eversource

Resiliency Planning

Planning to cost effectively reduce risk of outages caused by intense storms

Resiliency Planning

- **Goal** – Cost effectively **reduce impact** of outages on our customers
- Climate vulnerability to **assess impact** on the electric system
- **Identification** and **evaluation** of risk areas
- **Targeted** and **surgical** approach where traditional projects do not work
- Prioritize projects to **reduce risk**

Typical Resiliency Improvements

- **Storm Resiliency Program** and **Hazard Tree** Removal
- Targeted **spacer cable** installation
- Targeted **undergrounding**
- Projects **prioritized** based upon:
  - Cost per saved **customer-minute of interruption**
  - Cost per saved **customer interruption**

Climate Vulnerability Assessments (CVA) are developed to identify the risk that climate change poses to our system. Resiliency strategies are developed to mitigate the risks with targeted solutions such as:

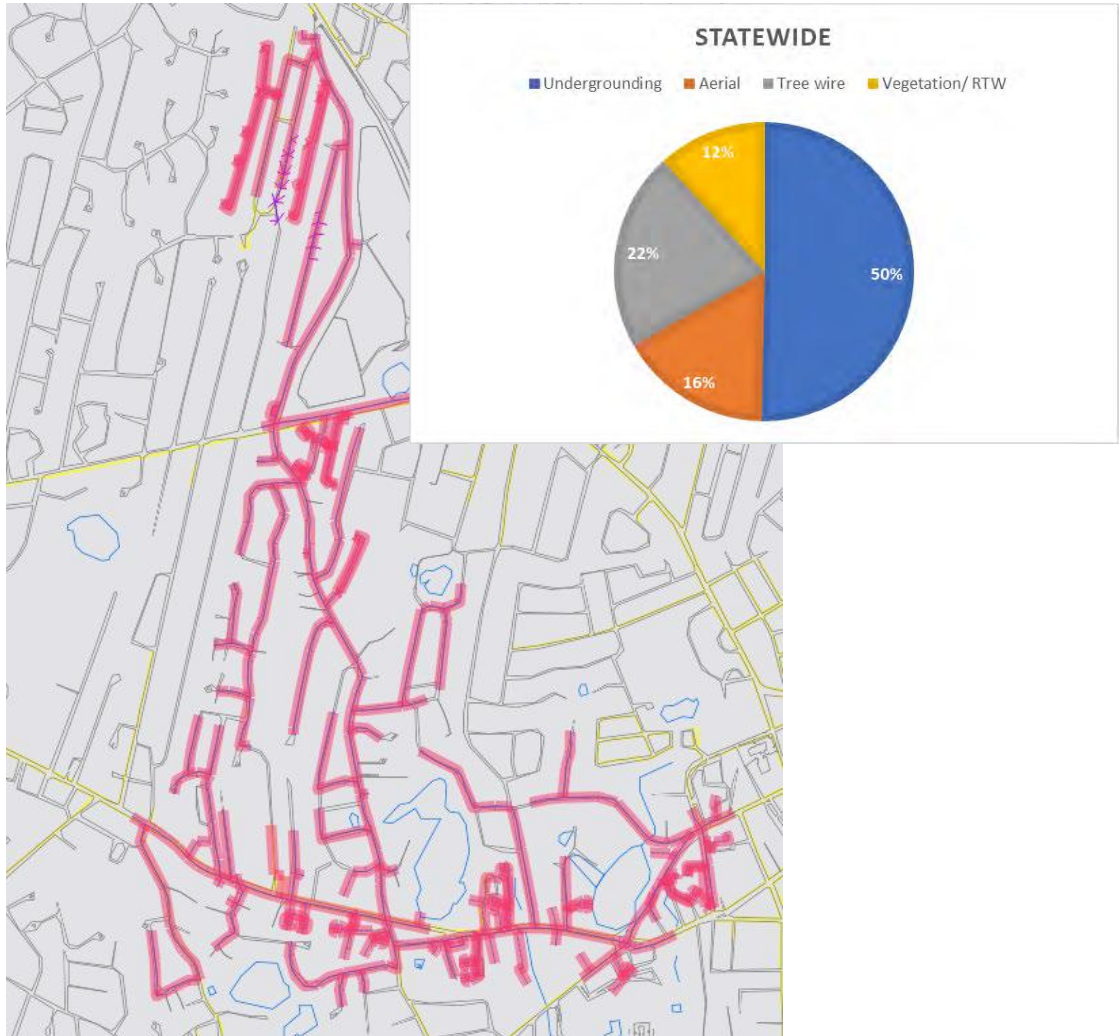
- Flood Mitigation
- Targeted Undergrounding
- Mainline Hardening with Spacer Cable

In addition, the CVA can help shape standards for future infrastructure to strengthen the entire system. The EDCs are preparing for the climate vulnerability resiliency plan (CVRP) due with next ESMP.

Resilience Planning (Eversource Example)

$225M over the next 5 years approved resilience plan as part of ESMP

- Multiple Eversource teams are working internally to refine the proposed resilience projects on a case-by-case basis, using detailed characteristics, to improve the cost effectiveness.
- 4-80B-523 was proposed as a Year 1 undergrounding project.
- We are indeed targeting an area with multiple issues: all bare wire construction, with non-ES maintained poles; limited capacity through manual ties; supplies 2 4kV circuits.
- We are proposing to rebuild the entire backbone with spacer.



Presentation to the Grid Modernization Advisory Council on Annual Reliability Reports

Brian Ritzinger, Director
Clean Energy and Resilience Engineering,
Department of Public Utilities
May 1, 2025

Disclaimer

This presentation is intended to inform the Grid Modernization Advisory Council members and other interested stakeholders on the topics identified and does not reflect the official position or policy of the Department of Public Utilities or of its Commission on the matters identified.

Agenda

I. What is the Department of Public Utilities (“DPU”)?
II. Critical Energy Infrastructure Information (“CEII”)
III. Integrated Resource Plans (“IRPs”) (Past)
IV. Forecast and Supply Plans (“F&SPs”)/Annual Reliability Reports (“ARRs”) (Present)
V. Electric Sector Modernization Plan (“ESMP”) Load Forecasts and Demand Assessments
VI. Questions

What is the Department of Public Utilities?

- The DPU is overseen by a three-member Commission and is one of the agencies within the Executive Office of Environmental Affairs. It is responsible, in part, for oversight of investor-owned electric power, natural gas, and water utilities in the Commonwealth.

- The DPU is a quasi-judicial agency bound by the requirements of the State Administrative Procedure Act, G.L. c. 30A.

- The mission of the DPU is to ensure that consumers' rights are protected and that electric distribution companies ("EDCs") like NSTAR Electric, National Grid, and Unitil are providing the most reliable service at the lowest possible cost.

- Pursuant to G.L. c. 25, § 1A, the DPU must also prioritize with respect to itself and the entities it regulates security, reliability of service, affordability, equity, and reductions in greenhouse gas emissions to meet statewide greenhouse gas emission limits and sublimits established under state law.

CEII

- G.L. c. 4, § 7, cl. 26 sets out the statutory definition for "Public Records" and delineates those documents which are exempted due to their sensitive nature and the fact that public safety would likely be jeopardized in the event that they were released publicly. Specifically, Clause 26(n) exempts the following from public disclosure:
  - (n) records, including, but not limited to, blueprints, **plans, policies, procedures, and schematic drawings, which relate to internal layout and structural elements, security measures, emergency preparedness, threat or vulnerability assessments,** or any other records **relating to the security or safety of persons or buildings, structures, facilities, utilities,** transportation, cyber security **or other infrastructure** located within the commonwealth, the disclosure of which, in the reasonable judgment of the record custodian, subject to review by the supervisor of public records under subsection (c) of section 10 of chapter 66, is likely to jeopardize public safety or cyber security.
- The Legislature enacted Clause 26(n) in 2002 in response to the events of September 11, 2001, and the requirement aligns with treatment of electric infrastructure at FERC.
- The DPU has noted that its authority to keep materials exempt under Clause 26(n) is "separate and apart" from (and by implication, broader than) its more narrowly construed authority under G.L. c. 25, § 5D involving confidential treatment of materials filed with the DPU.

CEII Continued

- The DPU has determined that it has plain and unambiguous statutory authority to treat information as CEII under G.L. c. 4, § 7, cl. 26(n).
- The DPU must balance two competing interests of the public in making its determination whether to keep particular information such as the CEII data confidential pursuant to Clause 26(n). The DPU weighs the public's interest in transparency and information with public safety, security, and the safe and reliable provision of electric service.
- Certain aspects of the ARRs filed with the DPU are protected under the CEII exemption from public disclosure, as they provide information regarding the location, design, operational characteristics, and/or construction status of a company's electric distribution and transmission infrastructure, and the public dissemination of this information could jeopardize public safety by providing potentially malfeasant actors with a roadmap of company facilities that would enable creation of an emergency situation on the system.

Integrated Resource Plans (Past)

IRPs preceded the ARRs submitted by EDCs

- Submitted by EDCs pursuant to G.L. c. 164, § 69*I*, the same statute that continues to apply to gas F&SPs submitted to the DPU.
- Were utility plans for meeting forecasted annual peak and energy demand through a portfolio of supply side and demand-side resources over a specified future period. IRPs were commonly found in most vertically integrated/non-restructured states. After restructuring in MA, the IRPs became obsolete and were replaced by the DPU with the ARRs. See D.T.E. 98-84/EFSB 98-5 (2003). The 1997 Restructuring Act permitted the DPU to make such an exemption.
- The DPU's IRP regulations, since rescinded, addressed forecasts of electricity demand and supply, evaluations of resource need and potential; requests for resource proposals; solicitations and evaluations of alternative project proposals; and plans to meet additional resource requirements as they applied to the rates, terms, and conditions of contracts between resource suppliers and EDCs. Pursuant to the 1997 Restructuring Act, EDCs were no longer responsible for forecasting, planning, soliciting, and procuring long-term electricity supplies for their customers except in specific circumstances.

Forecast and Supply Plans (Present)

F&SPs (gas):

- Pursuant to G.L. c. 164, § 69*I*, the gas distribution companies must submit a five-year F&SP for DPU approval every two years.
- Under the current DPU review standard, the forecast of a gas company's F&SP must contain accurate and complete historical data, employ reasonable statistical projection methods, and be consistent with the approved forecasts of other gas companies.
- In its review of a gas company's forecast, the DPU determines if the company's projection method is reasonable based on whether the method is: (1) reviewable, that is, contains enough information to allow a full understanding of the forecast method; (2) appropriate, that is, technically suitable to the size and nature of the particular gas company; and (3) reliable, that is, provides a measure of confidence that the gas company's assumptions, judgments, and data will forecast what is most likely to occur. As part of this review, the DPU examines a company's: (1) planning standards, including its historical weather data; (2) forecast method and results; (3) derivation and results of its design and normal sendout forecasts; and (4) scenario analysis, which is used for evaluating the flexibility of the company's planning process, inclusive of any cold snap and sensitivity analyses. See, e.g., Boston Gas Company, D.P.U. 20-76, at 3-4 (2021) (identifying the standard of review for analyzing the company's forecast).

Annual Reliability Reports (electric) (Present)

ARRs (electric) – Requirements and data included:

- Each EDC submits an ARR by March 31 each year. Each ARR includes an annual distribution system resiliency report with heat maps that are required pursuant to G.L. c. 164, § 146.
- Section 146 requires that EDC heat maps:
  - show the electric load on the distribution system, including electric loads during peak electricity demand time period;
  - highlight the most congested or constrained areas of the distribution system; and
  - identify areas of the distribution system most vulnerable to outages due to high electricity demand, lack of local electric generating resources, and extreme weather events.

Annual Reliability Reports (electric) (Present) con't

ARRs (electric) – Distribution system data included

Distribution system information in the ARRs include:

- 10-year peak demand forecasts for each EDC's service area, including for both summer and winter for each operating company and each service area;
- planning criteria and guidelines for the distribution system planning process;
- an operating study showing power flows and voltages under normal and emergency conditions (for each operating company and each service area);
- certification that the EDC maintains a listing of critical loads (e.g., hospitals) by towns and the circuits by which they are fed;
- a listing of significant reliability and infrastructure improvement projects planned for construction within the next five years;
- vegetation management planning information; and
- a prioritization of current and future projects.

Annual Reliability Reports (electric) (Present) con’t

ARRs (electric) – Transmission-level data included

- Transmission-level information identified in the ARRs include:
  - an electronic-only map of transmission facilities;
  - listings for existing 69kV or higher transmission and substation facilities; and
  - a description of all transmission system needs identified within the ten-year planning horizon and, where information is available, all transmission-level projects that are being developed to meet these needs.

ESMP Load Forecasts and Demand Assessments

Background:

- G.L. c. 164, § 92B(c)(i) requires the EDCs to used three planning horizons for electric demand: a 5-year forecast, a 10-year forecast, and a demand assessment through 2050.

ESMPs – 5-year forecasts, 10-year forecasts, and demand assessments through 2050 - background:

- In their initial ESMPs, based on the records, the EDCs used load forecasts to identify system constraint(s) for which they propose planning solutions. In general, the EDCs use the same 5-year and 10-year forecast methodology used in their ARRs but differ in their approaches/assumptions for distributed energy resource ("DER") adjustments.
- Each EDC provided load projections for the 5-year forecast, 10-year forecast, and demand assessment through 2050, and accounted for DERs and electrification and technologies (e.g., heat pumps, energy efficiency ("EE"), solar photo-voltaic ("PV"), electric vehicles ("EV"), and energy storage systems)

ESMP Load Forecasts and Demand Assessments con't

ESMPs – 5-year forecasts, 10-year forecasts, and demand assessments through 2050 – background (con't):

- While one EDC may separately model an input, that same input may be embedded in another input for another EDC, or each EDC may consider data at a different stage (e.g., during planning rather than forecasting).
- The data on which the EDCs relied for their load projections is based on data from paid subscriptions and internal sources.
- The data includes reported substation peaks, years of historical peak-day weather data, territory-specific demographic data, the number of EVs, spot loads, solar PV and EV forecasts, and more.

ESMP Load Forecasts and Demand Assessments con't

ESMPs – 5-year forecasts, 10-year forecasts, and demand assessments through 2050 – background (con't):

- The EDCs aligned their forecasting assumptions, in particular for the demand assessments, with the electrification scenarios and decarbonization pathways specified in the 2025/2030 CECP, 2050 CECP, and the 2050 Decarbonization Roadmap, respectively.
- The EDCs explained that they worked closely to align forecast assumptions and methodologies where possible.
- The EDCs all also used their approved 2022 through 2024 Three-Year EE Plans for EE forecasts and solar forecasting assumptions, each treated spot loads in the same way, and each used their respective interconnection queues for the 5- and 10-year forecasts.

ESMP Load Forecasts and Demand Assessments con't

ESMPs – 5-year forecasts, 10-year forecasts, and demand assessments through 2050 – DPU Order:

- A forecast should provide a sound basis for a company's resource planning decisions.
- The ability of the EDCs to provide a safe and reliable system depends on a company accurately forecasting demand.
- The DPU determined that the uncertainty of future assumptions and the potential impact on loads associated with rate design, demand resources, heat pumps, EE, EV, storage, solar PV, and building efficiency codes, particularly when they may rely on actions of third parties outside the EDCs' control or on hypothetical data, would render the EDCs' 5- and 10-year forecasts less reliable for capital planning purposes.
- The EDCs must use reliable and firm data to develop its demand forecast for capital planning purposes.

ESMP Load Forecasts and Demand Assessments con't

ESMPs – 5-year forecasts, 10-year forecasts, and demand assessments through 2050 – DPU Order (cont'd):

- Each EDC's forecasting methods are a matter for utility management's judgment, and, within a substantial range, utility business decisions are matters for company management to determine.
- The DPU determined that in certain instances, it would be inappropriate for the EDCs to align their forecasts and assumptions due to the varying characteristics of each company's service territory.
- Varying characteristics in service territories can impact the EDCs' demand forecasts and demand assessments. For instance, the differences between rural communities and urban centers, residential or commercial areas, as well as customer demographics, building stock, available open space, and load growth and technology adoption, all vary significantly across the EDCs' territories and, as a result, the assumptions associated with the specific characteristics of one company's service territory may not be applicable to another company's territory.

ESMP Load Forecasts and Demand Assessments con't

ESMPs – 5-year forecasts, 10-year forecasts, and demand assessments through 2050 – DPU Order (con't)

- The EDCs used the base forecast, i.e., the most probable forecast, to develop near-term investments and solutions, and not the range of forecasts considered as part of any sensitivity analyses. The DPU declined to require the use of sensitivity analyses for the 5- and 10-year forecasts.
- In their biannual ESMP reports, the DPU required the EDCs to provide a comparison of the forecasted demand (according to the most recently updated ARR) and actual demand, separated by component (baseload and DERs) for each completed year in the ESMP term. Furthermore, each company should include variances between 5- and 10-year demand forecast components in the approved ESMP and the updated ARR 10-year demand forecast components.
    - In addition to performing sensitivity analyses for their 2050 demand assessments for future ESMP filings, the DPU directed each EDC to separately model for all three demand forecasting windows: (1) demand response and other demand management programs not managed under the ISO-NE wholesale markets; and (2) the impact of EE, including implementation of building efficiency codes.
- For future ESMP filings, the DPU also directed the EDCs to demonstrate how they considered and accounted for time-varying rates in their near- and long-term forecasts and for the impact of building weatherization on the heat pump demand forecast.

QUESTIONS?
THANK YOU

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Break

Please be ready to start again in ~5 minutes

Facilitated Discussion

Questions for the EDCs

Reliability Planning

1. How do you use your load forecasts to inform your reliability planning?
2. How do you account for uncertainty in reliability planning?
3. How do you account for power quality in reliability planning?
4. How do you consider equity issues in reliability planning?
5. What are the key metrics that you use to support reliability planning?
   - Examples: SAIDI, SAIFI, CAIDI, CEMI, substation headroom, circuit headroom, hosting capacity, others?

Reliability and Investment Decisions

1. How does reliability planning influence your proposed ESMP investments?
2. How does reliability planning influence your proposed non-ESMP investments?
3. How do you balance reliability goals with the goal of maintaining low costs?

Discussion Questions for GMAC Members

Which aspects of reliability matter most to your constituents?

- Duration of outages? Frequency of outages? Power quality? Something else?

Do you find the ARRs and Service Quality Reports (SQRs) provide useful information?

- How can they be modified to be more useful?
- What reliability information would you like to see in the biannual ESMP reports?

Do you see value in more detailed reliability metrics?

- Examples: metrics for EJ communities, circuit level metrics (e.g., CKAIDI, CKAIFI)

Do you have a sense of how to balance reliability goals with affordability goals?

- How much reliability is enough? Are you willing to pay more for greater reliability?

Is it clear how the EDCs use reliability planning to inform ESMP and non-ESMP investments?

- If not, what additional information would be useful?

Other Discussion Areas

- Are there other issues or items the GMAC would like to discuss?

Close and Next Steps

- The next GMAC meeting is May 29th from 1 – 3 PM.
- The next ExCom meeting is June 5th from 9:30 – 10:30 AM.
- The next EWG meeting is July 11th from 10 – 11:30 AM.
- The first GMAC stakeholder session is July 17th from 9 – 12 PM.