Energy Markets & Planning
BERKELEY LAB

Balancing Information Needs and Volume in Distribution System Plan Filings

Utility Template & Guide

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Peer-Sharing Webinars for Public Utility Commissions and State Energy Offices on Distribution System Planning

March 16, 2026

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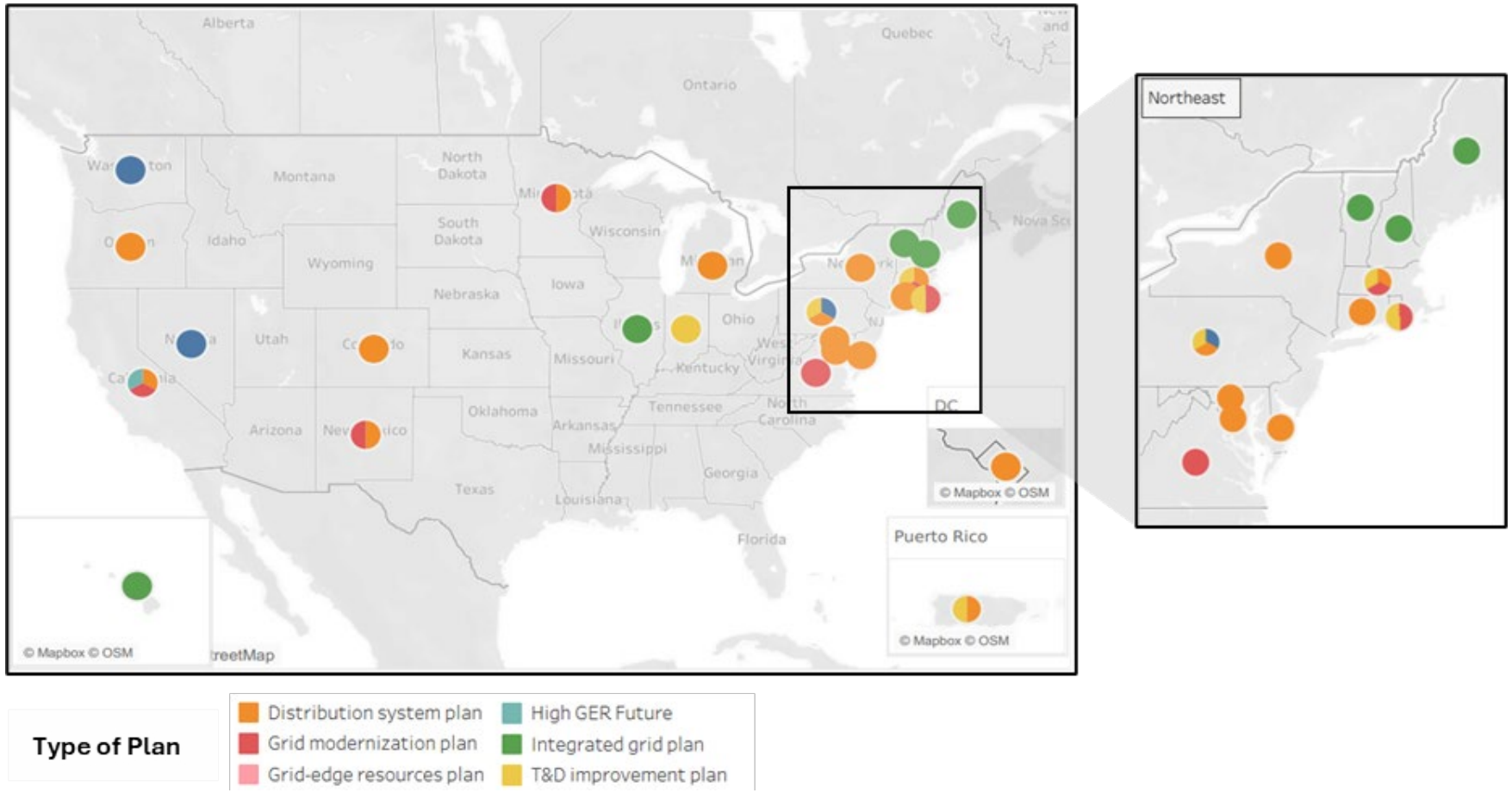
Agenda

- Distribution system planning practices
- Information to support regulatory review and decision making
- Utility template to inform planning processes
- Breakout room topics
- Request for review of draft template and guide

Distribution System Planning Practices (1)

- As of March 2025,* distribution system planning requirements are in place in 22 states, Puerto Rico, and the District of Columbia
- In these jurisdictions, regulated utilities file a distribution system plan with the Public Utility Commission



*Anticipate completing update by end of April 2026

Source: Lawrence Berkeley National Laboratory, 2025, State Distribution Planning Requirements

Information to Support Regulatory Review and Decision Making (1)

- Utility filings provide transparency into the distribution system planning process
- Detailed information included in the plans informs regulatory decisions on distribution system expenditures ultimately recovered from utility ratepayers and facilitates stakeholder engagement.

Information to Support Regulatory Review and Decision Making (2)

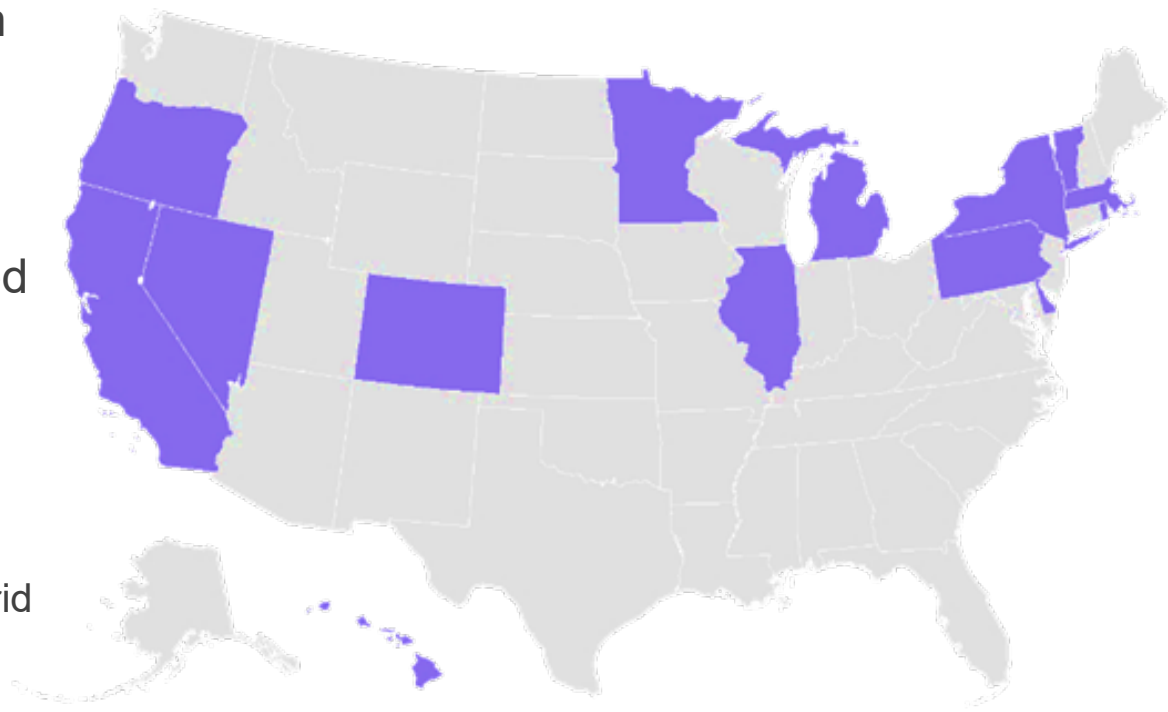
- Utility filings often encompass a significant amount of information
- While detailed information on distribution system planning data, analysis, and results is important, the massive amount of information associated with utility filings can overload regulators and stakeholders.
- That may impede effective plan assessment and potentially reduce oversight effectiveness. At the same time, even voluminous plans may omit critical information.

Utility Template to Inform Planning Processes (1)

- Berkeley Lab developed a template and companion guide that states can adapt to help focus the information submitted in distribution system plans for regulatory decision-making

- To inform the template, Berkley Lab researchers selected 26 distribution system plans in 16 jurisdictions

- Selection criteria
  - Date of plan filing: 2022 or later
  - Type of plan: transmission and distribution improvement plan, grid modernization plan, grid-edge resources (GER) plan, integrated resource plans with distribution system planning elements, and integrated distribution system plans
  - Planning horizon: minimum five-year planning horizon
  - Regional representation: at least one plan for each jurisdiction



Jurisdictions represented in the distribution system plan sample

Utility Template to Inform Planning Processes (2)

- The template includes 10 key sections in utility distribution system plans and underlying topics
  - Categorized as “essential” or “supplemental”
- Jurisdictions can adapt the template to meet their own needs
- For each section, the companion guide provides:
  - A description of the topic and its importance
  - The type of content to include in the plan
  - An example utility approach
  - References to other utility plans that also serve as models for providing information on the topic

Sample template content (draft)
Cost-effectiveness

- Cost-effectiveness evaluation objectives, including how results inform planned expenditures
- Methodologies for evaluating cost-effectiveness of potential grid solutions (e.g., Lowest Reasonable Cost and Benefit-Cost Analysis), including application of multiple planning objectives
  - Qualitative impacts considered and quantified
  - Description of uncertainty and sensitivity analysis *(Supplemental)*
    - How uncertainty of inputs used in cost-effectiveness evaluation may affect results *(Supplemental)*
    - Summary of results of sensitivity analyses *(Supplemental)*
- Detailed information on estimated costs and benefits associated with each expenditure category (subtotals for each cost and benefit considered)
- Prioritization process to identify near-term strategy to address grid needs

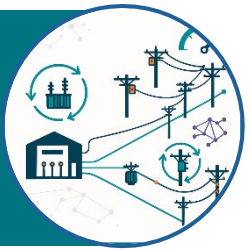
1. **Executive Summary**

2. **Planning Objectives**
   - Grid vision and strategy
   - Compliance with state requirements and priorities

3. **Current Distribution System**
   - Current distribution system operations
   - GER interconnection and utilization

4. **Planning Approach**
   - Planning processes
   - System analysis methodology and tools
   - Stakeholder engagement
   - Utility data access provisions

5. **Asset Management, Reliability and Resilience**
   - Asset management
   - Reliability and resilience



6 O&M Expenses

- Vegetation management
- Asset O&M

7 Capacity Expansion Planning

- Load and GER forecasting
- Scenario analysis
- Hosting capacity analysis

8 Solution Identification

- Grid needs assessment and solution selection
- Capital investments
- Non-wires solutions (procurements, programs, and pricing)

9 Cost-effectiveness

- Cost-effectiveness evaluation objectives
- Methodologies for evaluating cost-effectiveness of potential grid solutions
- Estimated costs and benefits
- Prioritization process

10 Implementation

- Roadmap
- Forecast costs
- Risks and mitigation strategies
- Performance assessment

Breakout Room Topics (1)

Template content (draft)

Capacity expansion planning – Load and GER forecasting

- Description of the load and GER forecasting methodology
  - Overview of forecasting framework for loads and GERs, including model specification, types of GERs and loads forecasted, and geographic granularity of the analysis (e.g., substation-level, feeder-level, or feeder-segments)
  - Description of changes to the forecasting framework implemented since the previously filed distribution system plan
  - Summary of load and GER modeling inputs (e.g., economic data, historical load and GER data, weather data, assumptions), including historical and projected data for each parameter
  - Summary of planned enhancements to the forecast methodology (e.g., deploying new tools)
- GER forecast hourly results, including base cases and scenarios
- Load forecasts (e.g., peak demand, energy, and losses), including comparison to historical data
- Description of the levels of accuracy of previous load and GER forecasts

Breakout Room Topics (2)

Template content (draft)
Asset management, reliability and resilience: Reliability

- Summary of utility's reliability performance in the past five years, including impact of previous activities and expenditures, including those in prior distribution system plans and related utility planning and initiatives, and benchmarking results compared to industry peers
- Description of the process and analytical approach for assessing reliability performance and, if applicable, with respect to target levels**
- Reliability statistics
  - System Average Interruption Duration Index (SAIDI), excluding major events
  - System Average Interruption Frequency Index (SAIFI), excluding major events
  - Customer Average Interruption Duration Index (CAIDI), excluding major events
  - Customers Experiencing Long Interruption Durations (CELID), by customer class
  - Customers Experiencing Multiple Interruptions (CEMI), by customer class
  - Customers Experiencing Multiple Sustained Interruptions and Momentary Interruptions Events (CEMSMI), by customer class *(Supplemental)*
  - Momentary Average Interruption Frequency Index (MAIFI) *(Supplemental)*
  - Worst performing circuits **
  - Benchmark of reliability performance with industry and peers *(Supplemental)***

**A link to where the utility separately filed this information can suffice.

Breakout Room Topics (3)

Template content (draft)

Asset management, reliability and resilience: Reliability (continued)

- Summary of recent impacts of previous activities and expenditures, including those in prior related utility plans and initiatives
- Summary of priorities and planned expenditures to maintain or improve distribution system reliability, including medium- and long-term strategies as well as near-term and ongoing expenditures and programs (e.g., technology and automation, equipment standards, storm readiness)
    - Utility infrastructure and processes (e.g., substations, distribution poles, key company facilities) affected and vulnerabilities mitigated (e.g., storms, wildfires, floods, freezes, seismic events)
    - How the action impacts the prevention of, response to, and recovery from resilience events
    - Expected benefits (e.g., reduced restoration costs, shorter outage duration, avoided customer interruption costs)
    - Timeline, including actual or estimated start and completion dates
    - Cost estimate

Request for Review of Draft Template and Guide

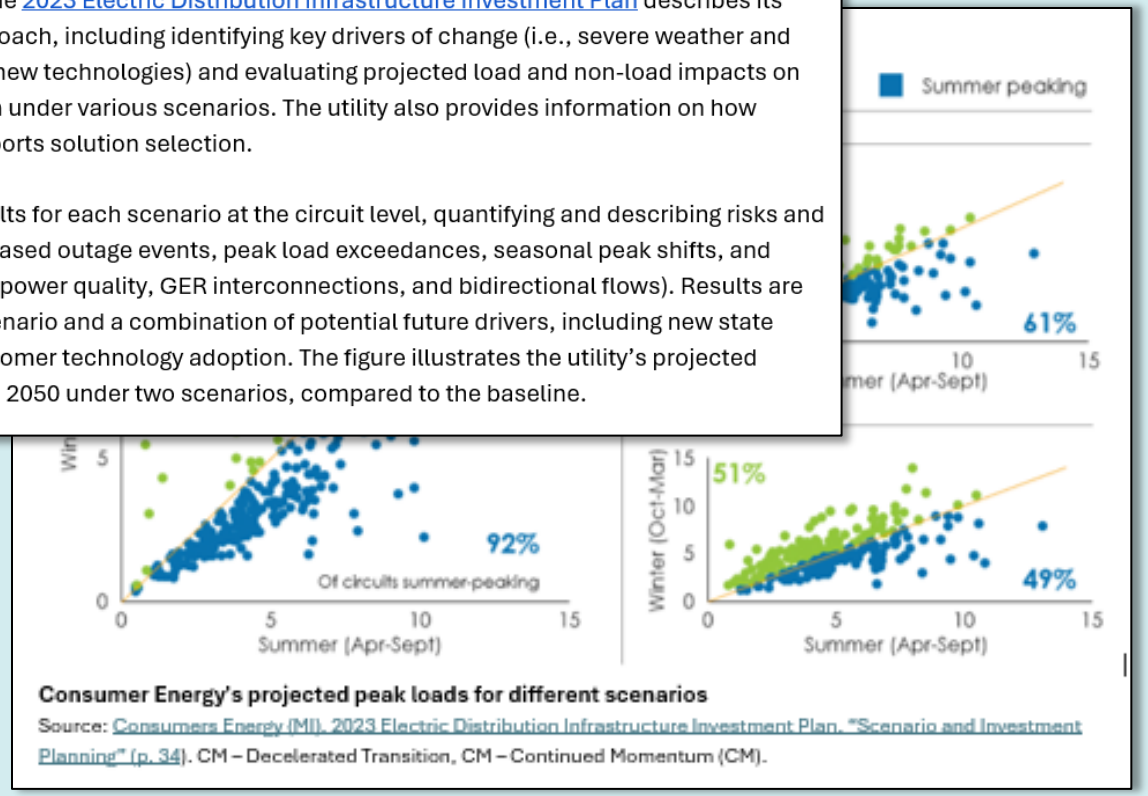
- Please send your comments on the draft template and guide by April 6, 2026, to:
  - Guillermo Pereira GPereira@lbl.gov

Sample guide content (draft)
Capacity expansion planning – Scenario analysis

Utility practice example

Consumers Energy - The 2023 Electric Distribution Infrastructure Investment Plan describes its scenario analysis approach, including identifying key drivers of change (i.e., severe weather and customer adoption of new technologies) and evaluating projected load and non-load impacts on the distribution system under various scenarios. The utility also provides information on how scenario analysis supports solution selection.

The plan presents results for each scenario at the circuit level, quantifying and describing risks and impacts, such as increased outage events, peak load exceedances, seasonal peak shifts, and other challenges (e.g., power quality, GER interconnections, and bidirectional flows). Results are presented for each scenario and a combination of potential future drivers, including new state requirements and customer technology adoption. The figure illustrates the utility's projected seasonal peak shifts in 2050 under two scenarios, compared to the baseline.



Consumer Energy's projected peak loads for different scenarios
Source: Consumers Energy (MI). 2023 Electric Distribution Infrastructure Investment Plan. "Scenario and Investment Planning" (p. 34). CM – Decelerated Transition, CM – Continued Momentum (CM).

Contact

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For more information

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Balancing Information Needs and Volume in Distribution System Plan Filings

NASEO/NARUC/LBNL Distribution System Planning Peer Sharing

March 16, 2026

Presented by

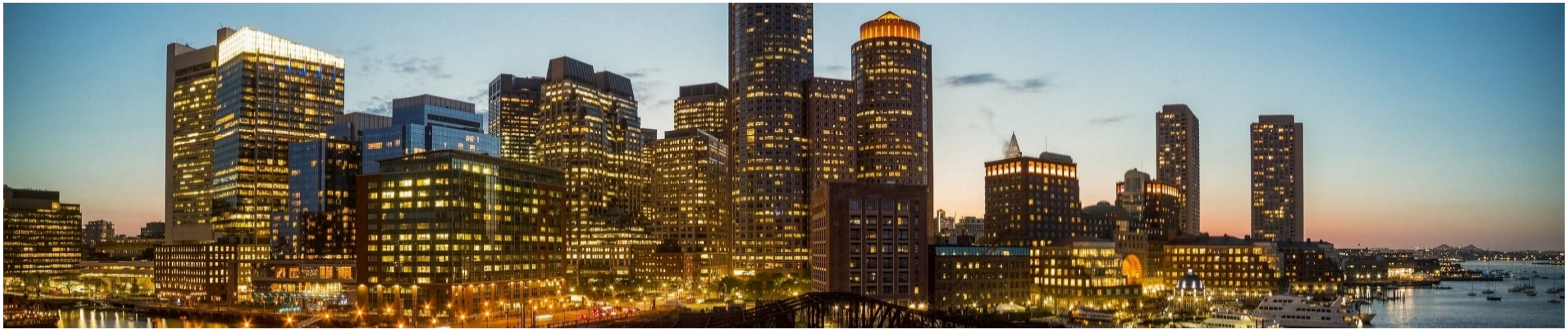
Julia Fox, Grid Modernization Program Coordinator, Massachusetts Department of Energy Resources

Table of Contents

Our Mission

The Department of Energy Resources' (DOER) mission is to create a clean, affordable, resilient, and equitable energy future for all in the Commonwealth.

- ***Who We Are**: As the State Energy Office, DOER is the primary energy policy agency for the Commonwealth. DOER supports the Commonwealth's clean energy goals as part of a comprehensive Administration-wide response to the threat of climate change. DOER focuses on transitioning our energy supply to lower emissions and costs, reducing and shaping energy demand, and improving our energy system infrastructure.*
- ***What We Do**: To meet our objectives, DOER connects and collaborates with energy stakeholders to develop effective policy. DOER implements this policy through planning, regulation, and providing funding. DOER provides tools to individuals, organizations, and communities to support their clean energy goals. DOER is committed to transparency and education, supporting the accessible access to energy information and knowledge.*



The GMAC and the ESMPs were established by the 2022 Climate Law, "An Act Driving Clean Energy and Offshore Wind".

What are the Electric-Sector Modernization Plans (ESMPs)?

The ESMPs are strategic plans created by the electric-distribution companies (EDCs) that must contain:

- Plans to upgrade the distribution system to:
  - improve reliability and resiliency,
  - enable adoption of renewable energy and distributed energy resources,
  - promote energy storage and electrification technologies,
  - prepare for climate-driven grid impacts,
  - accommodate increased transportation and building electrification,
  - minimize or mitigate impacts on ratepayers.
- Descriptions of distribution grid improvements to meet the strategic plan elements noted above, identify availability and suitability of new technologies for grid applications, facilitate achievement of statewide emissions limits, and identify alternatives to investment proposals.
- 5- and 10-year forecasts and a demand assessment through 2050.

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- 5- and 10-year forecasts and a demand assessment through 2050.

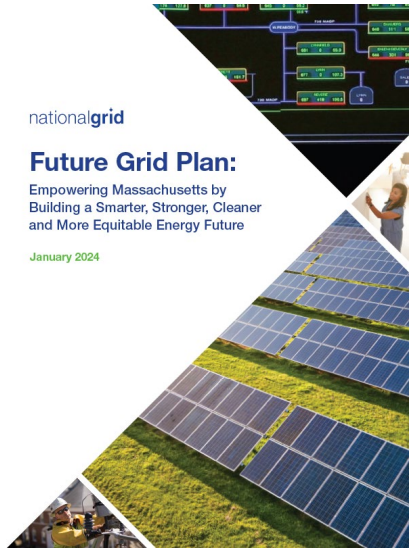
What is the Grid Modernization Advisory Council (GMAC)?

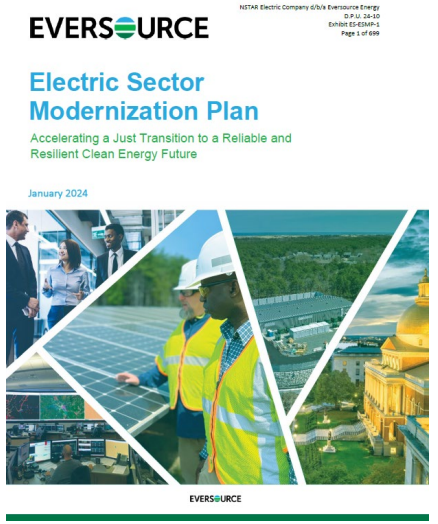
The GMAC is an 18-member stakeholder council chaired by the DOER and charged with:

- encouraging least-cost investments in the electric grid,
- alternatives to investments or to financing investments that facilitate meeting emissions reductions limits,
- increasing transparency and stakeholder engagement in grid planning processes.
- reviewing and providing recommendations to the electric distribution companies (EDCs) regarding their electric-sector modernization plans (ESMPs).

Additional Context

- Massachusetts has three investor-owned utilities (Eversource, National Grid, and Unitil; EDCs).
- The ESMPs are large (500-700 page) documents that are prepared by the EDCs every five years.
- DOER does not create its own load forecasts – this is the responsibility of the EDCs.
- For the GMAC, the review timeline of draft ESMPs was 70 days.
- The regulatory proceeding for:
  - Approving the first term of ESMPs as **strategic plans** was ~ 7 months.
  - Establishing short-term **cost recovery** for ESMP investments was ~ 9 months.
  - Determining the contents and format of **biannual reporting and metrics** requirements was ~10 months.





Example Data for DOER's Evaluation of the ESMPs

ESMP Table of Contents

1. Executive Summary
2. EDC Compliance
3. Stakeholder Engagement
4. Current State of the Distribution System
5. **Five- and Ten-Year Electric Demand Forecast**
6. **Five- and Ten-Year Planning Solutions: Building for the Future**
7. Five-Year Electric Sector Modernization Plan
8. 2035–2050 Policy Drivers: Electric Demand Assessment
9. 2035–2050 Solution Set – Building a Decarbonized Future
10. **Reliable and Resilient Distribution System**
11. Integrated Energy Planning
12. Workforce, Economic, and Health Benefits
13. Conclusion
14. Appendix

Areas of Focus

5-10-year forecast scenarios and assumptions

Challenge: Misalignment of assumptions across EDCs

Investment proposals based on forecasted need

Challenge: Misalignment of investment categories

Climate vulnerability and resilience planning

Challenge: Misalignment of climate hazards, planning tools, and datasets across EDCs

Example Recommendation: Additional Data on Load Management

- DOER argued that the EDCs should better account for load management opportunities in their short-term forecasts.
- Areas needing stronger consideration include electrified buildings, electric vehicles, energy storage, and demand response programs.
- Baseline forecasts should incorporate reasonably achievable and cost-effective load management.
- For future ESMPs, the Department should require more robust load management and flexible distributed energy resource (DER) programs.
- Forecasts should also include standardized parameters for load management.

Lessons Learned from the First ESMPs

ESMP Order Recommendations

- **The review timeline was challenging.** The Department of Public Utilities (DPU) extended the draft ESMP review period to give GMAC 125 days to review and EDCs 85 days to update their plans.
- In the ESMP Order, the DPU recommended several areas for GMAC & EDC collaboration between draft plan filings.
  - EDC presentations on their **forecasting methods**, including differences in assumptions and methods
  - Discussion of **least-cost investments** in electric distribution systems
  - Identifying **alternatives to investments or financing** to minimize or mitigate impacts on ratepayers
  - Discussion of **sensitivity analyses** for 2050 long-term demand assessments
  - GMAC should explore each company's **investment reprioritization process** based on updating forecasts

GMAC Actions

- **In 2025, the GMAC's objectives included:**
  - Engaging in productive dialogue and collaboration
  - Developing shared understanding of grid planning topics
  - Increasing transparency and stakeholder engagement in broader grid planning activities
  - Preparing the Council for more in-depth collaboration in 2026 and 2027
- **In 2026, the GMAC's objectives include:**
  - Identifying and Addressing Electric Load Growth and Impacts on Forecasting
  - Identifying and Addressing the Cost Challenges of Grid Modernization
  - Understanding Challenges of ESMP Implementation and Biannual Reports
  - Tracking Grid Modernization Efforts in MA

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Thank You!