MASSACHUSETTS
DEPARTMENT OF ENERGY RESOURCES

Ratemaking and Massachusetts Electric Utilities

Expert Presentation Series | August 25, 2025

This expert level presentation series session will provide the Massachusetts Electric Rate Task Force an opportunity to learn from experts and/or other jurisdictions on the above topic.

Note: The contents of this presentation do not necessarily reflect the views or positions of the Massachusetts Department of Energy Resources.

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Massachusetts Electric Rate Task Force Goals

The Rate Task Force brings together diverse stakeholders to reimagine how electric rates and the regulatory framework can drive an affordable, equitable, and decarbonized energy future.

Through targeted conversations, expert presentations, and thoughtful exploration of complex issues, the Task Force aims to deepen understanding, surface critical questions, clarify challenges, and build the foundation for durable regulatory reform and action.

The Rate Task Force will use the Massachusetts Interagency Rates Working Group's Long-Term Ratemaking Study and Recommendations as a starting point for discussion and knowledge building on rate designs, ratemaking, and regulatory mechanisms.

Build technical knowledge

Provide an opportunity for **knowledge-building** by and amongst stakeholders, including those who have not traditionally been involved

Develop shared understanding

Converge towards **shared understandings** of the challenges and priorities

Today's Focus

Facilitate open, inclusive dialogue

Engage in **open, inclusive dialogue** about complex ratemaking and regulatory issues outside of a regulatory proceeding

Frame critical questions and opportunities

Empower stakeholders to identify **critical questions and opportunities** for the advancement of rate design and ratemaking reform

Ground Rules & Engagement

This work is complex – and your insight matters; let's focus on learning, listening, and shaping together!

Participation, Engagement, & Respect

- Everyone's perspective is valuable – this space works best when all voices are heard
- Respect differences in background, experience, and priorities
- Bring curiosity – ask questions and offer potential answers
- Focus on understanding others' goals and values, not just their positions
- <u>It's okay not to have a solution – help us shape the right questions</u>

Collaboration, Not Consensus

- This body is deliberative, it is not a decision-making space
- <u>We don't need to agree on everything, but we should work toward shared understanding</u>
- Where we disagree, help clarify what the tension is and why it matters

Transparency & Trust

- We'll be clear about how input is used
- Share what you can; identify when you're speaking on behalf of your organization or personally
- Materials, summaries, and key findings will be shared openly to support accountability

Focus & Productivity

- <u>Stay on topic and honor the scope of the Task Force</u>
- Raise related concerns, but help us stay anchored in the rate design and regulatory issues at hand
- Use the structures provided (i.e., expert sessions, targeted conversations, office hours) to deepen discussion
- Avoid discussion about open and ongoing proceedings at the DPU

Expert Presentations

I. Massachusetts Electric Regulatory Framework

Massachusetts Department of Energy Resources, Austin Dawson

Present an overview of existing Massachusetts regulatory framework for electric distribution companies, based on the Massachusetts Regulatory Framework Primer

II. Utility Operations and Challenges in Massachusetts

Massachusetts Electric Distribution Companies

Present on the current and future demands of the electric power system and the challenges to electric utilities as we decarbonize and electrify

III. Electric Sector Modernization Plans, Grid Modernization Advisory Council, and Distribution System Planning

Massachusetts Department of Energy Resources, Aurora Edington

Present on the current landscape of distribution system planning and grid modernization activities and proceedings in Massachusetts, focused on the Electric Sector Modernization Plans (ESMPs) and the Grid Modernization Advisory Council (GMAC)

IV. Utility Regulatory Innovation for the Energy Transition

Analysis Group, Daniel Stuart

Present on policy innovations to support the electric distribution system transition (e.g., integrated distribution system planning, pre-authorization of investments, future test years, etc.), based on Massachusetts Energy Transition: Innovation for Electric Utility Regulation

Reminder

Expert presentation sessions are not for substantive deliberation amongst participants. Questions for each speaker will be taken as time allows.

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Massachusetts Electric Regulatory Framework

Massachusetts Electric Rate Task Force

August 24, 2025

This presentation explores the existing Massachusetts regulatory framework for electric distribution companies, based on the Massachusetts Regulatory Framework Primer.

Note: The contents of this presentation do not necessarily reflect the views or positions of the Massachusetts Department of Energy Resources.

Presented by

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The existing regulatory framework is a tapestry of statutory requirements, regulations, and policies

This framework is modified by changes in law and the DPU’s actions in response to evolving policies and priorities, changing operating environments, and industry transformation

- The regulatory environment should:
  - maintain the reliability and safety of the electric system;
  - complement the Commonwealth’s clean energy and climate goals;
  - support energy affordability, equity, and a least cost electric system;
  - ensure efficiency and flexibility of the grid; and
  - encourage the EDCs to develop innovative solutions

The existing regulatory framework is a tapestry of statutory requirements, regulations, and policies

Today's review will be high-level and cursory to prepare for subsequent expert presentations and targeted conversations

Cost of Service Regulation	Revenue Decoupling, Reconciling Mechanisms, and Capital Investments	Performance-Based Regulation in Massachusetts
Revenue requirement, rate base, and rate of return	Revenue decoupling	Formula-based rates and multi-year rate plans
Test year, regulatory lag, and cost containment	Reconciling mechanisms and accelerated cost recovery	Earning sharing mechanisms
Cost of service studies	Integrated distribution system planning	Performance metrics

Revenue requirement represents a utility's cost of service

Revenue requirement, rate base, and rate of return

Revenue requirement is often represented by the following formula:

Revenue Requirement *($)* = **Operation & Maintenance** *($)* + **Taxes** *($)* + **Depreciation** *($)* + **Rate Base** *($)* × **Rate of Return** *(%)*

Operation & Maintenance ($)	Taxes ($)	Depreciation ($)	Rate Base ($)	Rate of Return (%)
Costs of operating the company, including labor, healthcare, insurance, uncollectible accounts, enterprise information technology, etc.	Taxes including income taxes, FICA, Medicare, federal unemployment, state unemployment, property taxes, franchise tax, federal income tax, etc.	Depreciation (tangible property) and amortization (intangible property) allow a utility to recover investments in a timely manner over the investment's useful life	Utility's net investment current in service (i.e., utility plant less accumulated depreciation)	Weighted average cost of capital (WACC), determined based capital structure and the authorized return on debt and equity

In other words, revenue requirement is the calculation of the total annual revenue an EDC needs to recover from its ratepayers to account for the costs the company incurs to operate its electric system; to invest in additional capital to maintain and expand its system; and to earn a reasonable return, or profit, on capital investments.

Base distribution revenue requirement

Revenue requirement, rate base, and rate of return

Revenue requirement for base distribution costs (i.e., excluding reconciling mechanisms, riders, or trackers) is reviewed, modified, and approved by the DPU during a rate case

Revenue requirement, $million

	Eversource	National Grid	Unitil
Operation & maintenance expense	$428	$610	$15
Taxes	$234	$141	$4
Depreciation & amortization	$218	$189	$7
Return on rate base	$277	$222	$6
Total	**$1,158**	**$1,163**	**$32**

Taxes, $million

	Eversource	National Grid	Unitil
Property	$142	$89	$1
MA income tax (8%)	$23	$16	$0.5
Federal income tax (21%)	$56	$38	$1
Payroll	$13	$16	$0.3

Return on Rate Base, $million

	Eversource	National Grid	Unitil
Return on debt (i.e., interest expense)	$72	$67	$2
Return on equity (i.e., shareholder profit)	$206	$155	$4

Note: As approved in EDCs' most recent base distribution rate case (D.P.U. 22-22; D.P.U. 23-80, D.P.U. 23-150), numbers may not add due to rounding and omission of nominal expenses categorized as other

Annual growth of rate base is increasing for all companies

Revenue requirement, rate base, and rate of return

Rate base refers to the utility plant or investments in service, less offsetting liabilities like accumulated depreciation and accumulated deferred income taxes

Eversource, $million

	D.P.U. 17-50	D.P.U. 22-22
Rate base *(rates effective)*	$3,169 *(2018)*	$3,930 *(2023)*
CAGR from last rate case	-	4.4%

Note: As approved in EDCs' applicable base distribution rate case; CAGR = compound annual growth rate

National Grid, $million

	D.P.U. 09-39	D.P.U. 15-155	D.P.U. 18-150	D.P.U. 23-150
Rate base *(rates effective)*	$1,521 *(2009)*	$1,783 *(2016)*	$2,151 *(2019)*	$3,127 *(2024)*
CAGR from last rate case	-	2.3%	6.5%	7.8%

Unitil, $million

	D.P.U. 07-71	D.P.U. 11-01	D.P.U. 13-90	D.P.U. 15-80	D.P.U. 23-80
Rate base *(rates effective)*	$50 *(3/2008)*	$56 *(2/2011)*	$52 *(6/2014)*	$57 *(5/2016)*	$84 *(1/2024)*
CAGR from last rate case	-	3.7%	(2.3)%	4.9%	5.3%

Rate of return on debt and equity has been slowly declining

Revenue requirement, rate base, and rate of return

- Rate of return, or the weighted average cost of capital (WACC), and the capital structure (i.e., balance of debt and equity financing) is reviewed, modified, and approved by the DPU during a rate case
- Cost of debt represents the interest expense on borrowed funds, while the allowed return on equity is a proxy for the return required to attract and retain shareholder investment in utility

Eversource, %

	Debt	Equity	WACC
D.P.U. 17-50*	4.23%*	10.00%	7.32%
D.P.U. 22-225	3.93%	9.80%	7.06%

National Grid, %

	Debt	Equity	WACC
D.P.U. 09-39	5.96%	10.35%	7.85%
D.P.U. 15-155	5.21%	9.90%	7.58%
D.P.U. 18-150	5.22%	9.60%	7.56%
D.P.U. 23-150	4.56%	9.35%	7.09%

Unitil, %

	Debt	Equity	WACC
D.P.U. 07-71	6.99%	10.25%	8.38%
D.P.U. 11-01	6.99%	9.20%	7.93%
D.P.U. 13-90	6.99%	9.70%	8.28%
D.P.U. 15-80	7.01%	9.80%	8.46%
D.P.U. 23-80	5.34%	9.40%	7.46%

- Return on rate base, which is a component of the utilities' revenue requirements, has grown despite lower rates of return due to the growth in rate base; the growth in rate base also drives increases in other revenue requirement components such as property tax and depreciation expense

Note: As approved in EDCs' applicable base distribution rate case, preferred stock excluded; *weighted average cost of debt and rate of return between NSTAR Electric and WMECO

Representing the cost to provide service; but for when?

Test year, regulatory lag, and cost containment

Historical test year (ex-post)

- A test year represents a twelve-month period of a utility's financial situation
- DPU has long-standing precedent of relying on **historical test years** during rate cases, which use a twelve-month period prior to the rate case
- Utility traditionally does not recover a return of (through depreciation expense), nor a return on (through return on equity) for capital investments placed in service after the test year
  - Delay in recovery between when a company incurs the cost of the capital investment and the time it recovers the costs in rates is referred to as regulatory lag, which is considered a counterbalance to the utility's incentive for capital investments

Future test year (ex-ante)

- **Future test years** use a forecasted twelve-month period
  - Instead of focusing on booked, or accounting records for expenses, considers a forward-looking revenue requirement and forecasted sales to establish rate levels
- While not utilized to establish base distribution rates during a rate case, Massachusetts utilities use a future test year approach for various reconciling mechanisms
- Base distribution rates have become a smaller portion of the total revenue requirement collected from customers

Studies inform the costs of serving each customer class

Cost of service studies

Embedded (Allocated) cost of service studies (ACOSS)

- ACOSS allocates a utilities revenue requirement across customer classes, focusing on the current accounting costs associated with past investments currently in use
  - Ensure that a utility's rates are set at levels to recover the utility's cost to serve
  - ACOSS allocates costs across customer classes, but also assigns cost to different utility functions (e.g., distribution, billing and customer service) and classifies costs based on the rate structure (i.e., as a unit of energy, demand, or customer)
- The DPU only requires an ACOSS for electric utilities given dependence on long-standing rate design principles

Marginal cost of service studies (MCOSS)

- MCOSS focuses on how electric system costs change with an incremental increase in service
  - Useful in designing rates that promote efficient price signals that reflect the cost of incremental service to different customers
  - May not recover the utility's cost to serve, so typically adjusted to better approximate the utility's cost to serve
- Since 2019, the DPU no longer required the utilities to prepare a MCOSS as part of electric base distribution rate cases

Revenue decoupling adopted to address throughput incentive

Revenue decoupling

- In 2008, revenue decoupling mechanism was adopted to reduce or eliminate the financial disincentive utilities face on customer-sited, cost-effective demand resources
  - Disconnects utility revenues from customer sales to eliminate the incentive to sell more electricity to increase revenues and earnings (i.e., throughput incentive)
  - Revenue requirement is established in a rate case and a revenue decoupling mechanism adjusts rates to account for over or under-recovery from customers relative to the approved revenue requirement
- In 2022, the DPU concluded that full revenue decoupling must be discontinued for electric utilities to ensure their business models aligned with the Commonwealth's policy goals that depend on a net increase in energy consumption, despite energy efficiency and demand response efforts
  - However, in 2024 the DPU found it reasonable to maintain full revenue decoupling for Unitil and National Grid during their most recent rate cases citing that "energy efficiency and strategic electrification will be necessary" going forward and that there was uncertainty "surrounding the timing and extent of widespread acceptance of electrification and decarbonization alternatives"
- Load growth driven by electrification (i.e., fuel switching) and load management strategies to minimize additional system costs (i.e., demand flexibility) present a meaningful opportunity to control the increase of electricity rates

Revenue requirement represents a utility's cost of service

Reconciling mechanisms and accelerated cost recovery

- Reconciling mechanisms are separate charges included on customer bills that support recovery of costs associated with specific investments, programs, polices, and legislative directives
  - Include cost recovery for: internal and external transmission, smart meter (AMI) implementation, residential assistance and customer debt management, net metering, revenue decoupling, attorney general consultant expense, long-term renewable contracts, capital costs, solar costs, grid modernization, basic service, vegetation management, storm reserve, exogenous cost, renewable resources, energy efficiency, energy efficiency reconciliation, and solar incentive program (SMART)
- Following the adoption of revenue decoupling, the regulatory framework in Massachusetts has evolved to increasingly rely on methods outside of rate cases, through capital cost recovery mechanisms, other reconciling mechanisms, and authorized revenue requirement adjustments
  - Capital cost recovery mechanisms, which provide utilities' accelerated cost recovery for capital investments, have become common place to replace incremental revenues from growth in sales prior to revenue decoupling
  - Utilities have also used alternatives to traditional capital cost recovery mechanisms, including revenue cap formulas or other mechanisms that adjust revenue requirement annually (e.g., K-Bar approach)
  - DPU has noted that the use of reconciling mechanisms reduces financial risk to the utility by shifting it to customers

Revenue requirement represents a utility's cost of service

Formula-based rates and multi-year rate plans

- Formula-based rates and multi-year rate plans are two approaches to utility regulation that can provide greater predictability for forward-looking revenue recovery to infuse some aspects of a competitive market, while typically expediting cost recovery, reducing regulatory lag, and reducing the frequency of rate cases
  - **Formula-based rates** periodically adjust the approved revenue requirement based on a predefined formula
  - **Multi-year rate plans** set rates for a multi-year term typically based on a forward-looking revenue requirement
- DPU has approved these alternative regulation mechanisms to support utilities through a changing regulatory environment and the demands of the Commonwealth's energy transition
- Each electric utility in Massachusetts uses a formula-based rate for at least a portion of their revenue requirement (though only for base distribution revenues), referred to as a revenue cap formula (i.e., I-X regulation), which adjusts revenues annually based on this generalized formula:

$$\mathrm{Revenue}_t = \mathrm{Revenue}_{t-1} * (1 + \mathrm{i}_t - \mathrm{X} - \mathrm{CD}) + \mathrm{Z}_t$$

where Revenue$_t$ represents a given year's revenue cap; Revenue$_{t-1}$ represents the prior year's revenue cap; i_t is a measure of inflation in the given year; X is a productivity factor or offset; CD is a consumer dividend and Z_t is an exogenous cost mechanism

Regulatory tools incentives

Earnings sharing mechanism and performance metrics

Earning sharing mechanism

- Earning sharing mechanisms (ESMs) adjust a utility's return on equity (ROE) if the actual ROE exceeds the allowed ROE by a specified deadband
- ESMs have been used to protect ratepayers from the uncertainty associated with performance-based regulation plans approved by the DPU
- The Massachusetts utilities have ESMs with a deadband of 100 basis points, or 1%, and share 75% of earnings above the deadband with customers while retaining the remaining 25%

Performance metrics

- Regulatory tool intended to monitor and align utility behavior with broader public policy objectives
- Three types of performance metrics employed in utility regulation:
    1. Reporting metrics require data reporting
    2. Scorecard metrics define a baseline and establishes a target
    3. Performance incentive mechanisms provide a financial incentive or penalty for meeting a target
- Massachusetts utilities are subject to all three types of metrics, though reporting and scorecard metrics are most common

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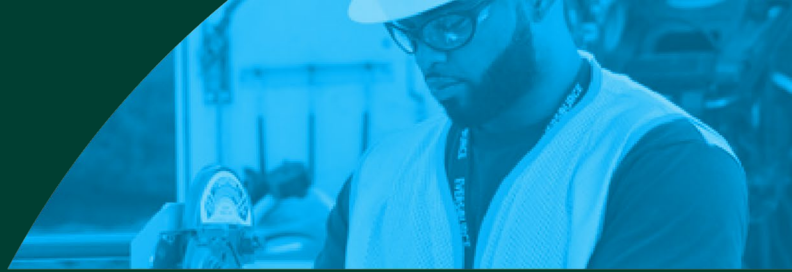
Thank You!



UTILITY OPERATIONS AND CHALLENGES

UTILITY OPERATIONS AND CHALLENGES

Aging and Stressed Grid Infrastructure

- Customer Reliability
- Asset condition
- UG Distribution
- High heat day impacts
- Capacity limitations
- Power quality
- UG Transmission
- Storm Response and Resilience Planning

- New Customer connects
- Electrification growth
  - Proactive EV infra.
  - Proactive bulk infra.
- Proactive DER growth

Capital and Operating Costs

- Unit Cost Increases
- Competing with other demand growth sectors
- Siting and Permitting
- Meaningful stakeholder feedback
- Operations Technology
- Strategic Sourcing
- Work Order Lifecycle

- AMI-ADMS-DERMS Capex related O&M
- New Substation buildout related O&M
- Customer Engagement

Technological Advancements

- OT Innovation
  - Real Time switching
  - Outage management
  - Capital Engineering
  - Maintenance
  - Storm Management
- DSO – ISO Interaction
- Automation Change Management [FLISR]
- ADMS to Corrective Network Upgrades
- Targeted VPP, NWA applications - spatial & temporal compensation
- Customer education & demand management

Intersection of Policy and Regulation

- Affordability feedback into Policy timelines
- RMRs & Out of Market PPAs vs tackling T&G buildout to address Resource Adequacy
- Fixed Tariff Rates to incentivize adoption
- Balance adoption with cost recovery and re-coupling to fund infra.
- Rate Design Equity
- Incentive design around Infra. capex reduction outcomes vs deployment targets
- PBRs tied to outcomes & cost recovery

Stakeholder Engagement

- Outreach, participation, and incorporation of feedback into planning phase requires significant investment and time
- Electric system safety & reliability education
- Balancing input with safety and reliability
- Transparency on Needs, Solutions, and Alternatives
- Transparency on Electric Bills and costs
- Ensuring the pace of the transition is affordable

MA STAKEHOLDER ENGAGEMENT

ESMP

1. Grid Modernization Advisory Council (GMAC)
2. Long Term System Planning Process (LTSPP)
3. Integrated Energy Planning (IEP)
4. Community Engagement Stakeholder Advisory Group (CESAG)
5. GMAC Equity Working Group (EWG)

Future of Gas

6. Non-Pipes Alternative (NPA) Stakeholder WG
7. NPA Technical Subcommittee
8. NPA Community Focus Group
9. Risk Ranking Technical Subcommittee

EEA/Office of Energy Transformation

10. Energy Transformation Advisory Board (ETAB)
11. Everett Marine Terminal (EMT)
    - 3 EMT Subcommittees
12. Financing the Transition
13. Decarb the Peak
14. Economic Development
15. Interconnection/New Customer Monthly Meeting
16. Workforce Transition
17. Electric Vehicles
18. Siting & Permitting Reform

Affordability/Rates

19. DPU Affordability Working Group
20. Arrearage Management Best Practices
21. Interagency Rates WG
22. Rate Taskforce

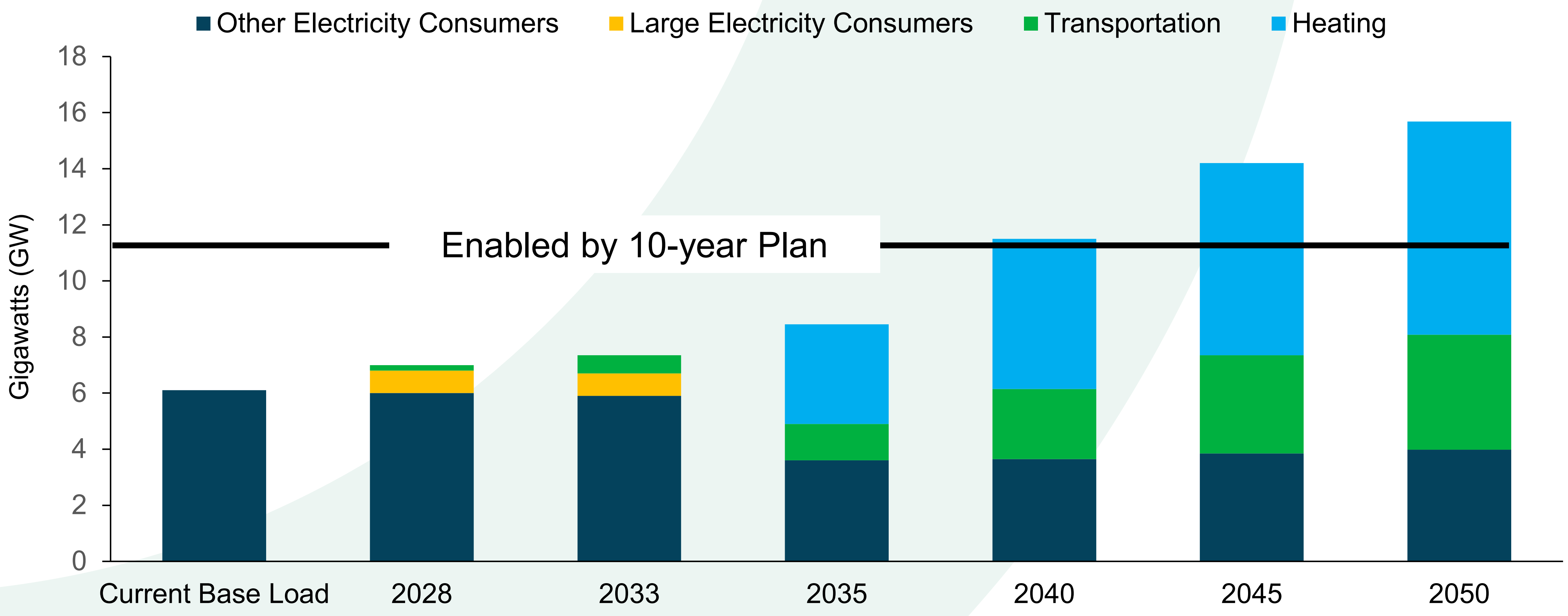
Energy Efficiency

23. Energy Efficiency Advisory Council (EEAC)
24. EEAC Equity Working Group
25. 6 Additional Subcommittees

DEMAND GROWTH FORECAST

20% INCREASE IN DEMAND BY 2033 AND 150% BY 2050

10-Year plan meets 85% of 2050 goals



Utility Operations and Challenges in Massachusetts

Massachusetts Electric Rate Task Force
June 9, 2025

nationalgrid

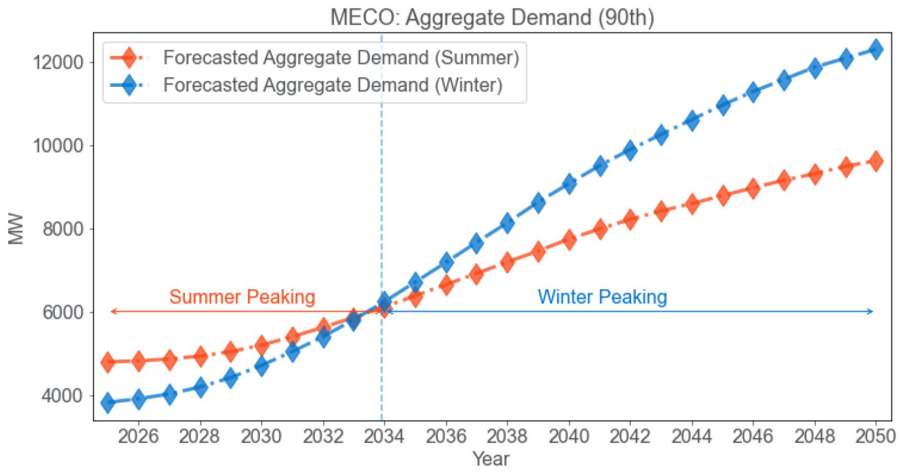
Pressures of the Current Environment

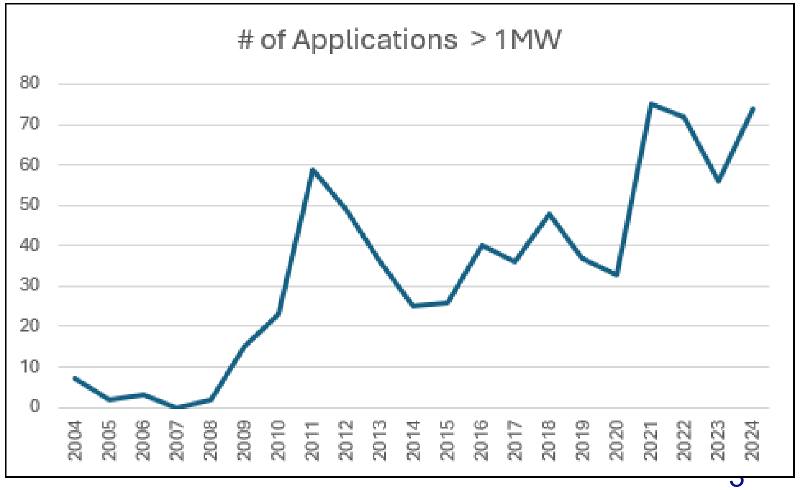
- Aging Infrastructure
- Capacity Constraints
  - Limited capacity causes interconnection delays for DG and load customers
    - Headwind for both decarbonization and economic development
  - Growing demand from EV's, heat pumps, and economic development
- Rising material and contractor costs driven by;
  - Increasing material costs from rising demand on long-lead items in a competitive environment
    - Some material categories have seen >100% increases since 2021
    - Large Power Transformers and High Voltage Breakers have a 4-year lead time
  - Tariffs
    - Direct impact from oversea suppliers for equipment (e.g., power transformers)
    - Indirect impact from domestic suppliers that source some commodities from overseas
- Climate Change
  - As we electrify and place further dependence on our grid, we need to maintain focus on reliability and resiliency.
  - Threats include more frequent and intense storms, heatwaves, flooding
- Siting and Permitting
  - Growing infrastructure needs means more siting, permitting, and stakeholder engagement
- Affordability
  - Balancing the need for proactive grid upgrades to accommodate increased loads and ensure reliability with increased costs for customers
  - Customer's ability to pay

Mitigation Efforts: National Grid

- Aging Infrastructure
  - National Grid is developing and maintaining comprehensive asset strategies for roughly 30 asset classes (e.g., poles, transformers, cables). These strategies identify at risk equipment and prioritize upgrades using data models.
- Capacity Constraints
  - Proactive capacity expansion was not funded through the ESMP. Therefore, required upgrades to meet specific customer requests will continue by using the CIAC process.
  - National Grid's Electric Distribution Planning Criteria is used to identify developing distribution system needs and initiate investment to achieve or improve upon service quality standards, reliability, and resiliency in a safe, clean, and economical manner.
    - The Criteria includes a loading threshold on a feeder mainline, substation transformer, or sub-transmission line when load is forecasted to exceed 75% of either summer or winter normal ratings during non-contingency operating periods.
    - This threshold is intended to allow sufficient available capacity to meet short-term changes in customer demand due to increased electrification and enable operational flexibility for contingency scenarios.
  - Long Term System Planning Proposal (LTSPP), DPU 25-20, aims to identify and prioritize incremental investments that expand DG hosting capacity through comprehensive system planning.

Equipment	Expected Service Life	% over Service Life
Distribution Transformers	50 Years	55%
Circuit Breakers	50 Years	20%
Poles	45 Years	40%





Mitigation Efforts: National Grid

- Rising material and contractor costs
  - We have updated our contractor strategy to form long term relationships with select vendors to provide visibility into the workplan resulting in greater efficiency and pricing.
  - Establishment of long-term partnerships to provide more cost certainty and value.
    - Improve forecasting and order materials further in advance
  - Revamping entire capital delivery skillsets, new technology for Project Management
- Climate Change
  - The Climate Vulnerability Assessment (CVA) helps inform resiliency planning.
  - We have a robust Emergency Response Plan and train resources to respond when storms strike.
- Siting and Permitting
  - The 2024 Climate Act mandates comprehensive reforms to siting and permitting for clean energy infrastructure
    - Consolidated Permitting Tracks for Utility Infrastructure
    - Streamlined Appeals: Appeals of consolidated permits now go directly to the Massachusetts Supreme Judicial Court, eliminating years-long delays
    - Comprehensive guidelines for stakeholder engagement, including availability of intervenor funding for EFSB proceedings

Affordability

- National Grid Implemented a new tiered discount rate for income-eligible customers.
  - Effective June 2025
  - Discount range 32% - 71%
- Planned, prioritized asset replacement avoids costly emergency repairs and outages.
- Procurement and contractor strategies aim to reduce the cost for customers.
- Non-Wire Alternatives (NWA's) through ESMP focused on finding ways to solve grid-needs in novel, reliable, and affordable ways.

Utility Operations and Challenges in Massachusetts

Massachusetts Electric Rate Task Force
August 25, 2025

Mitigation Efforts: Unitil

- Aging Infrastructure
  - Asset management practices to inspect, identify, prioritize and proactively replace equipment prior to reliability concerns. No specific concerns with any particular asset class
- Capacity Constraints
  - Routinely evaluate planning guidelines for improvements where available
  - Modified forecast to account for spot loads, DER and electrification forecasts
  - Will continue with CIAC based process for customer related projects requiring additional capacity
  - DERMS implementation to begin shortly to assist with DER interconnections
  - DPU 25-20 Long Term System Planning Proposal specific to planning for DER Interconnection capacity
- Rising material and contractor costs
  - Actively working with manufacturers to understand tariff impacts. Some vendors working to modify manufacturing to avoid tariff concerns
  - Competitive bidding process and searching for new vendors who may not be subject to tariff pressures
  - Modifying procurement practices to account for extended lead times
- Climate Change
  - Climate vulnerability analysis
  - Identifying resiliency projects focused on minimizing impact of severe weather
- Siting and Permitting
  - Active engagement with stakeholders early in the process to address concerns in advance of project need
- Affordability
  - Performance Based Ratemaking
  - Enabling future TVR
  - Approved heat pump rate with lower winter rates
  - Low income customers receive 40% discount on electric and 25% on gas (DPU 24-15 open investigation into tiered discount structure
  - Prioritization of spending to address most important capacity, reliability and resiliency needs
  - Energy Efficiency, Arrearage Management Program, Budget Billing

Load Forecast: Unitil

What assumptions make up the load forecast?

Load Adders

Large Spot Loads
(Source: Autodesk)

Electric Vehicles

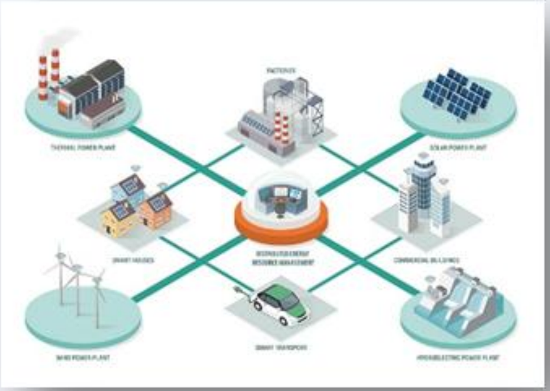
Electrification

Base Load Forecast

Load Reducer

mass save

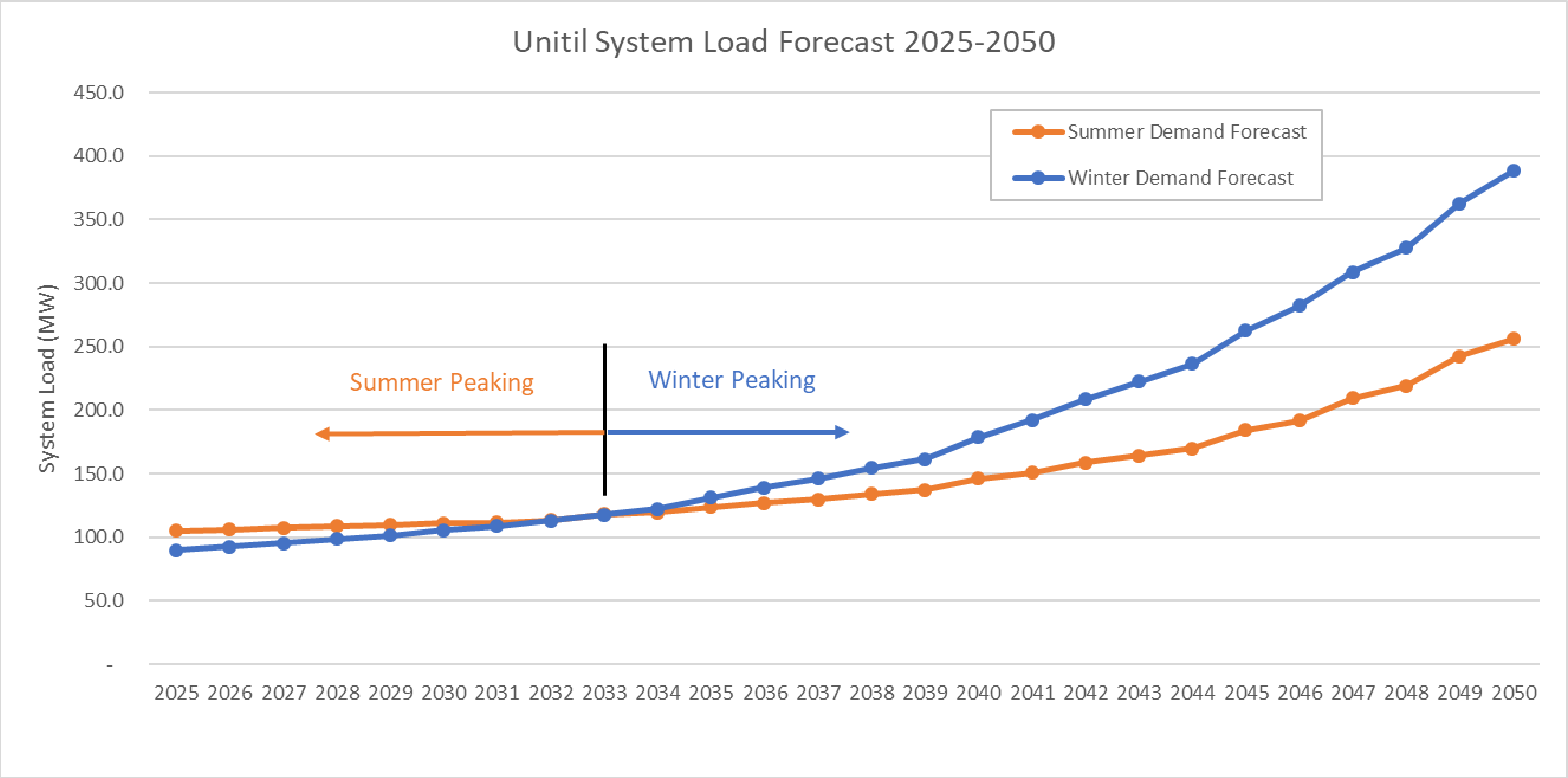
Energy Efficiency



Distributed Energy Resources
(Source: National Renewable Energy Laboratory)

Volt-Var Optimization
(Source: General Electric)

Load Forecast: Unitil



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Electric Sector Modernization Plans, the Grid Modernization Advisory Council, & Grid Modernization

August 25, 2025

Presented by
Aurora Edington, Deputy Director of Grid Modernization

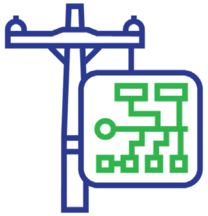
Agenda

- Introduction to Grid Modernization & Distribution System Planning
- ESMP and GMAC Background and History
- ESMP Process and Outcomes
- What Else is Happening?
- Closing Thoughts

What is grid modernization and distribution system planning?

Grid Modernization

- The term “**Grid Modernization**” has shifted in meaning over the last several years in Massachusetts.
- Before 2024, grid modernization had a narrower definition, and referred to specific **customer-facing** and **grid-facing** investments.
  - In 2022, the DPU approved $1.6 billion dollars over 4 years for grid modernization investments for the three EDCs in the Commonwealth.
- Today, grid modernization encompasses the process of enabling the electric grid to support the evolving needs of the economy and climate, including decarbonization and other drivers of increasing demand for electric capacity, and heightened system resilience.



Distribution System Planning

- A planning cycle for maintenance and development of the utility grid. The goal is to maintain safe, reliable, and affordable service while also efficiently operating the existing electrical facilities that make up the grid.
- Elements of DSP include:
  - Load forecasts from transportation and building electrification
  - DER adoption forecasts
  - Distributed energy resource (DER) interconnection processes
  - Electric vehicle infrastructure investments and programs
  - And more

Policy and Regulatory Changes in the Grid Space

1997

Electricity Restructuring Act

- Removed resource adequacy planning requirement from utilities
- Established Annual Reliability Reports = annual informational filing on state of distribution grid and needs

2008 - 2018

2008 Global Warming Solutions Act

- Energy Efficiency Advisory Council established & EE efforts result in a decade of reductions in energy use and peak demand
- Establishment of GHG emissions reduction targets and early solar incentive programs (SREC)
- EE hides BTM solar interconnections

2019 - 2022

DG Interconnection Dockets: 19-55 & 20-75

- Solar PV experiencing interconnection constraints
- Resulted in CIPs, solar working groups, and long-term planning investigation

2022 - Today

2022 Climate Law

- New Councils established to increase coordination in electric grid and EVs
- Electric Sector Modernization Plans (ESMPs) and Grid Modernization Advisory Council (GMAC) established for grid planning and stakeholder engagement
- EV Infrastructure Coordinating Council (EVICC) established for EV infrastructure planning and coordination

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

What are the ESMPs?

The ESMPs are strategic plans created by the 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 GMAC?

The GMAC is an 18-member stakeholder council 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).

ESMP & GMAC Process

2022	2023	2024	2025	2026	2027	2028	2029	2030
2022 Climate Law ESMPs and GMAC established								

ESMP & GMAC Process: 2023

2022	2023	2024	2025	2026	2027	2028	2029	2030
2022 Climate Law ESMPs and GMAC established	Monthly summer GMAC meetings							
	9/01: EDCs submit draft ESMPs to GMAC							
	GMAC review							
	11/20: GMAC provides feedback on ESMPs to EDCs (80 days to review)							

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ESMP & GMAC Process: 2023

2022	2023	2024	2025	2026	2027	2028	2029	2030

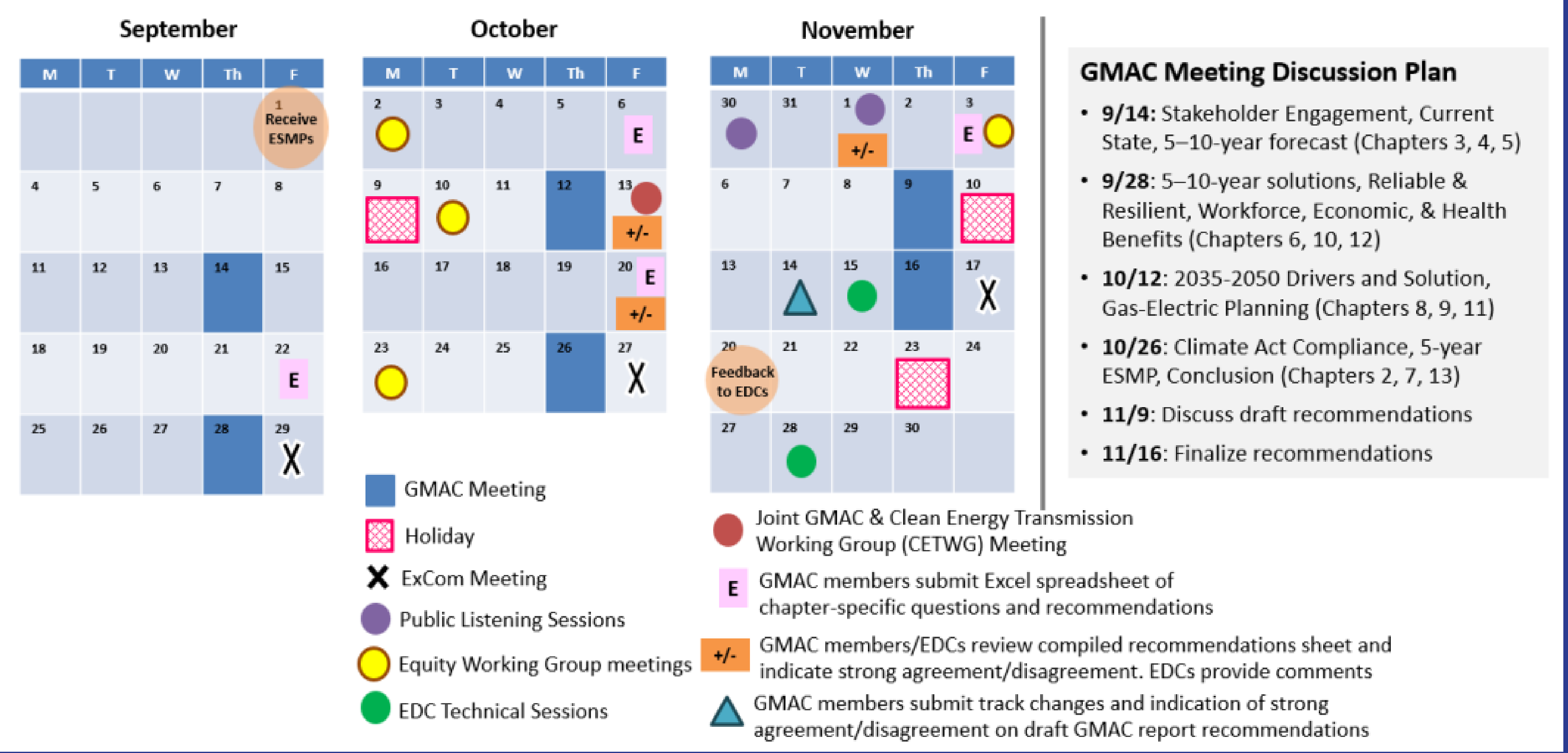
2022 Climate Law ESMPs and GMAC established

Monthly summer GMAC meetings

9/01: EDCs submit draft ESMPs to GMAC

GMAC review

11/20: GMAC provides feedback on ESMPs to EDCs (80 days to review)



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ESMP & GMAC Process: ESMP Phase I

2022	2023	2024	2025	2026	2027	2028	2029	2030
2022 Climate Law ESMPs and GMAC established	Monthly summer GMAC meetings	**1/29:** EDCs file revised ESMPs with the DPU that include EDC responses to GMAC comments						
	9/01: EDCs submit draft ESMPs to GMAC	ESMP Phase I docket process						
	GMAC review	**8/29:** DPU ESMP Phase I Order approving the ESMPs as strategic plans						
	11/20: GMAC provides feedback on ESMPs to EDCs (80 days to review)							

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ESMP & GMAC Process: ESMP Phase II

2022	2023	2024	2025	2026	2027	2028	2029	2030
2022 Climate Law ESMPs and GMAC established	Monthly summer GMAC meetings	**1/29:** EDCs file revised ESMPs with the DPU that include EDC responses to GMAC comments	ESMP Phase II docket process	**ESMP Term 1:** July 1, 2025 – June 30, 2030				
	9/01: EDCs submit draft ESMPs to GMAC	ESMP Phase I docket process	**6/13:** DPU ESMP Phase II Order approving subset of ESMP investments	**Reporting:** EDCs submit 2 reports per year (9/30 and 3/31) to DPU and Massachusetts Joint Committee on Telecommunications, Utilities and Energy on deployment of approved investments in accordance with any performance metrics.				
	GMAC review	**8/29:** DPU ESMP Phase I Order approving the ESMPs as strategic plans	Monthly GMAC meetings on ESMP topics					
	11/20: GMAC provides feedback on ESMPs to EDCs (80 days to review)	GMAC monitors ESMP docket						
		12/18: EDCs file ESMP Phase II on cost recovery						

ESMP & GMAC Process: Looking ahead

2022	2023	2024	2025	2026	2027	2028	2029	2030
2022 Climate Law ESMPs and GMAC established	Monthly summer GMAC meetings	**1/29:** EDCs file revised ESMPs with the DPU that include EDC responses to GMAC comments						
	9/01: EDCs submit draft ESMPs to GMAC	ESMP Phase I docket process	ESMP Phase II docket process				**2/12:** EDCs submit draft Term 2 ESMPs to GMAC	ESMP docket process
	GMAC review	**8/29:** DPU ESMP Phase I Order approving the ESMPs as strategic plans	**6/13:** DPU ESMP Phase II Order approving subset of ESMP investments				GMAC review	4/11: DPU to issue ESMP Order
	11/20: GMAC provides feedback on ESMPs to EDCs (80 days to review)	GMAC monitors ESMP docket	Monthly GMAC meetings on ESMP topics				**6/18**: GMAC provides feedback on ESMPs to EDCs	
		12/18: EDCs file ESMP Phase II on cost recovery	2026 GMAC Workplanning				**9/11:** EDCs file revised ESMPs with the DPU	

ESMP Term 1: July 1, 2025 – June 30, 2030

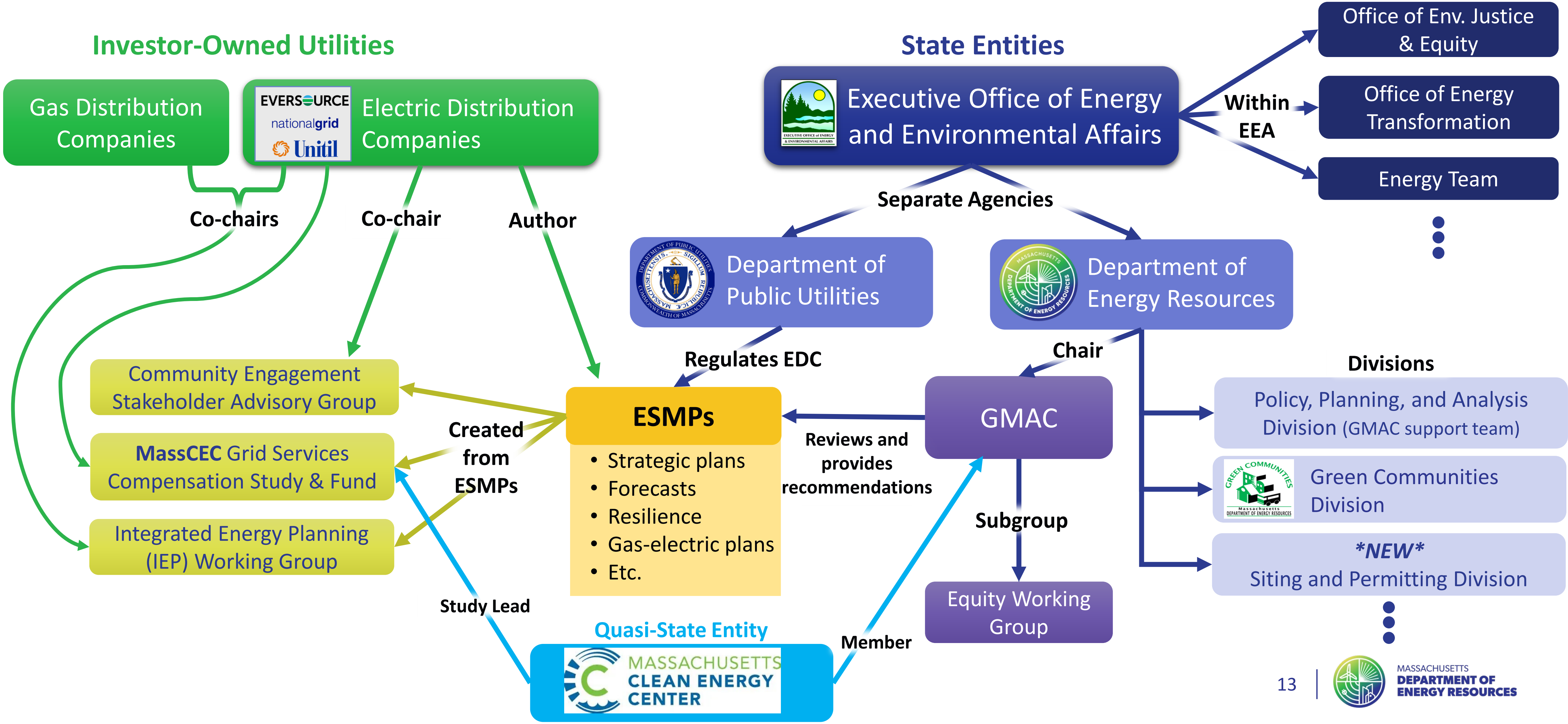
Reporting: EDCs submit 2 reports per year (9/30 and 3/31) to DPU and Massachusetts Joint Committee on Telecommunications, Utilities and Energy on deployment of approved investments in accordance with any performance metrics.

GMAC meetings – likely monthly

GMAC collaboration with EDCs on ESMP Term 1 implementation, per statutory duties, and in preparation for ESMP Term 2

Stakeholders Involved in ESMPs

Players within the grid planning landscape collaborate across many different topics, including gas and electric system planning, interconnection, stakeholder engagement, and ratepayer programs.



Where are we today?

What was approved in the ESMPs?

- Phase I ESMP Order (August 2024): approved the EDCs' 2025-2030 ESMPs as *strategic plans*.
- Phase II ESMP Order (June 2025):
  - ➢ Established an interim, annually reconciling cost recovery mechanism for ESMP investments.
  - ➢ States that "grid modernization and resiliency planning must ultimately become a part of each company's standard business practices".
- To Come:
  - ➢ Order on biannual reporting requirements and near-term reporting metrics (before the first report due September 30, 2025).
  - ➢ DPU investigation into long-term cost recovery (comment deadline upcoming over next several months).

Electric Company	Proposed Company Spending	Approved Company Spending	Denied Company Spending
Eversource	$336 Million	$144 Million	$192 Million
National Grid	2,153 Million	698 Million	1,455 Million
Unitil	51 Million	21 Million	30 Million

Approved

- Technology hardware upgrades for improved network operations and system management
- VPPs and DERs for grid services; clean energy customer portals
- Platform investments to leverage data to optimize infrastructure and better serve customers
- Targeted resiliency upgrades for undergrounding, reconductoring, & storm hardening
- Integrated energy planning
- CESAG implementation
- 3 National Grid EV highway charging substation projects

Denied

- Reduced **Eversource** resiliency investment due to lack of rationale for increased undergrounding investment
- **National Grid** and **Unitil** substation and distribution feeder projects
- **National Grid** private fiber expansion & analog replacement projects, TVR billing engine, medium- and heavy-duty fleet vehicles projects

What else is happening?

	2025	2026	2027	2028	2029	2030	2031

ESMP

ESMP Term 1 (July 2025-June 2030)

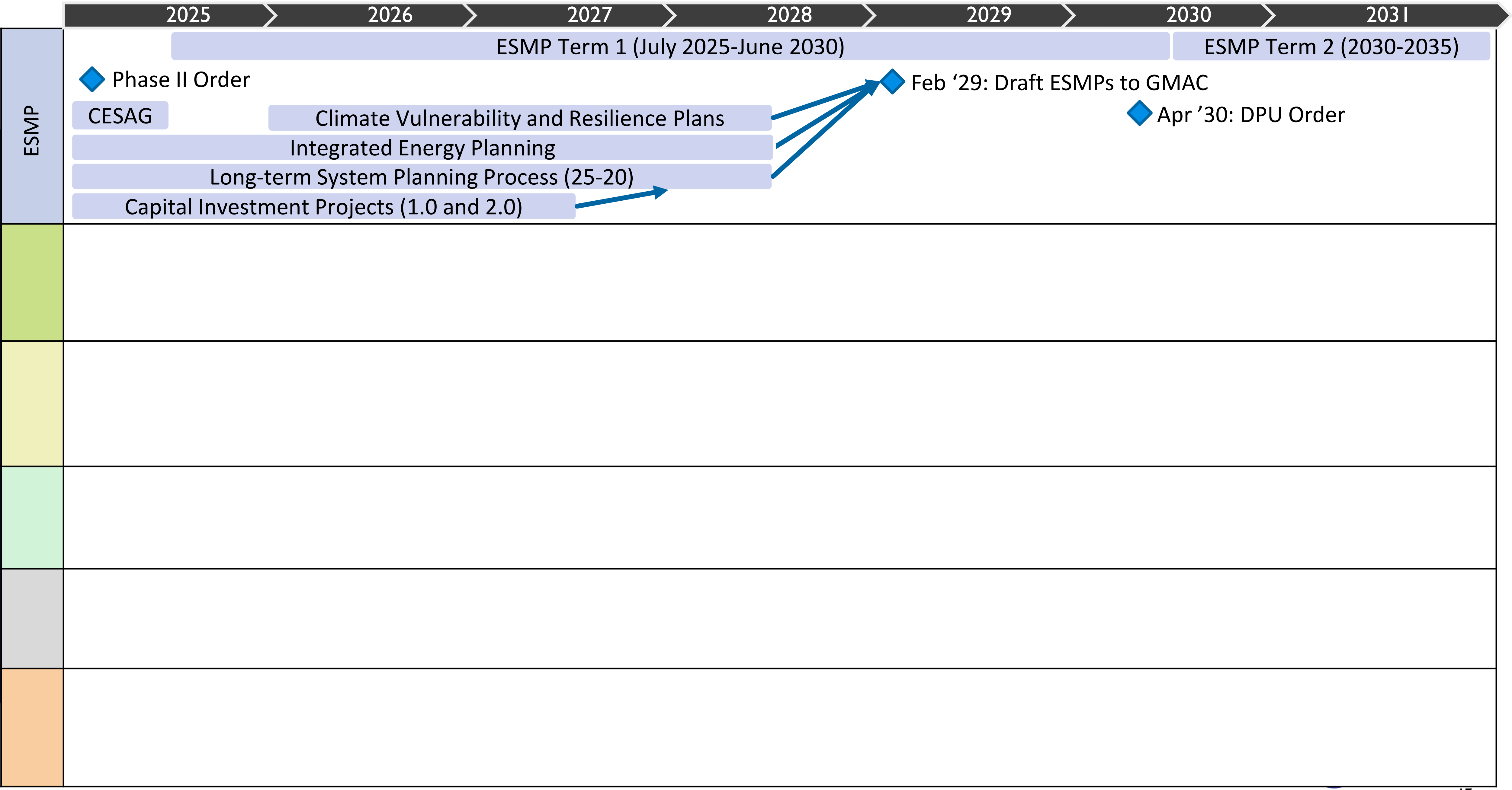
ESMP Term 2 (2030-2035)

Phase II Order

Feb ‘29: Draft ESMPs to GMAC

Apr ’30: DPU Order

What else is happening?



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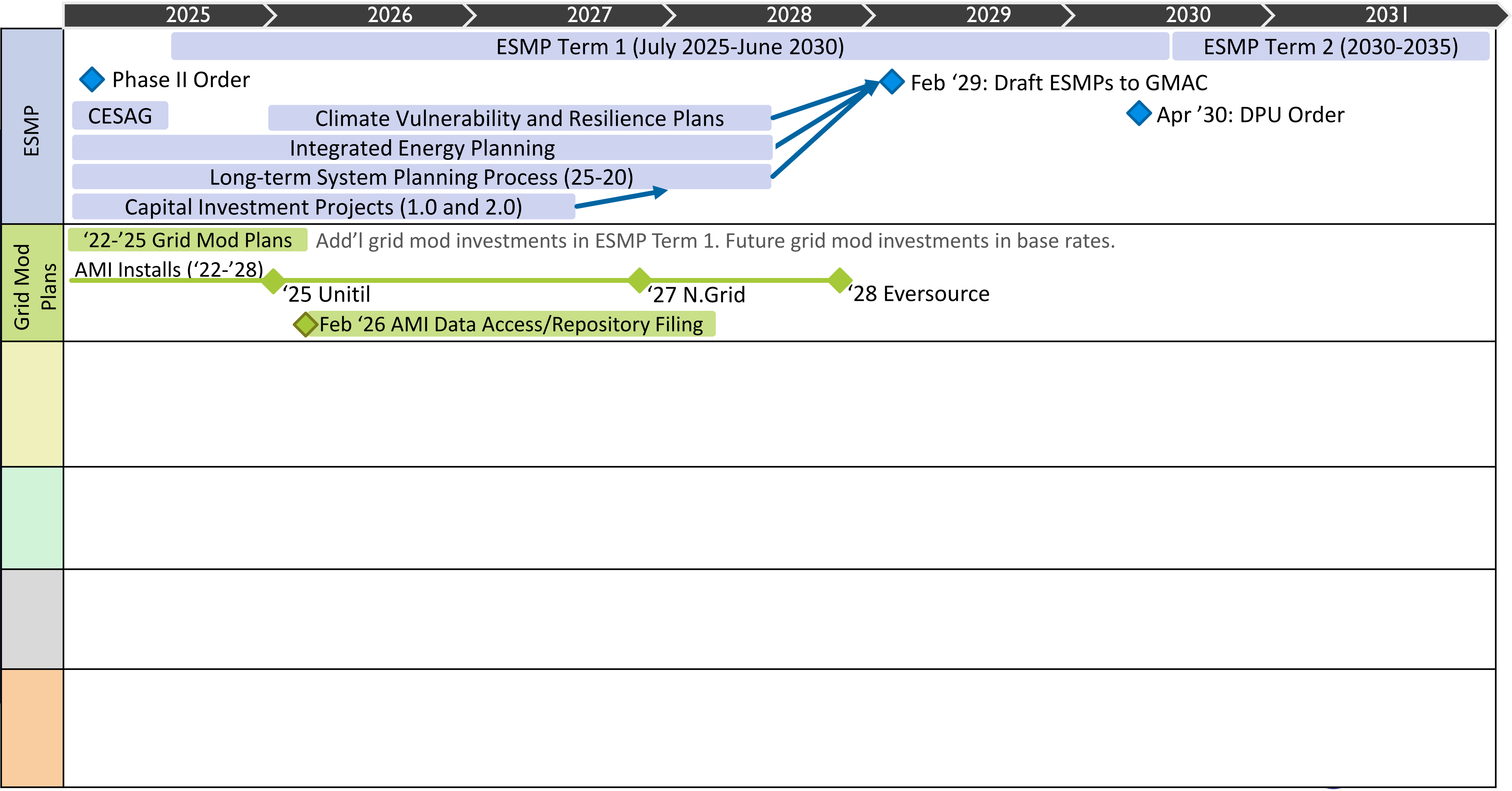

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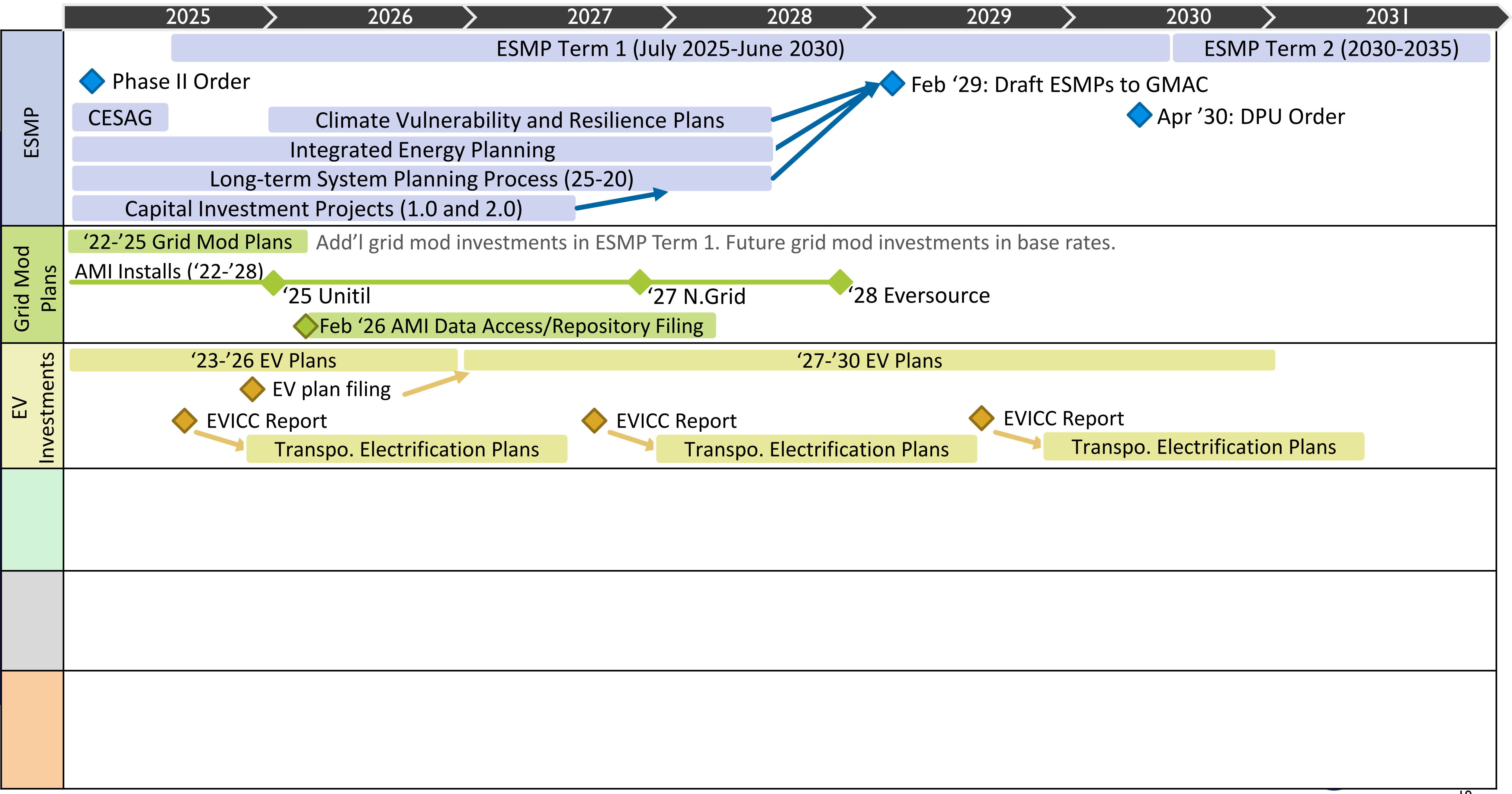

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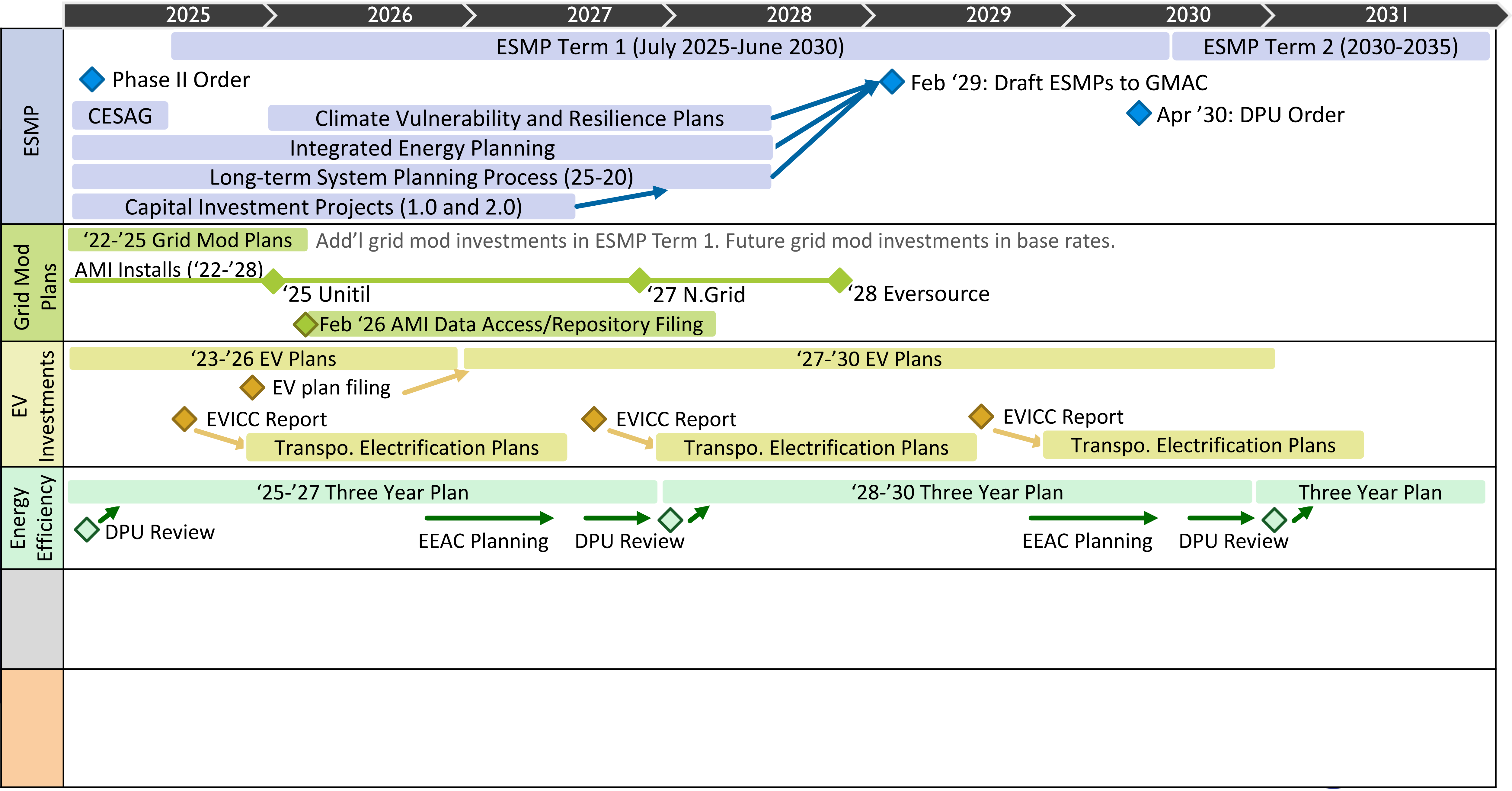

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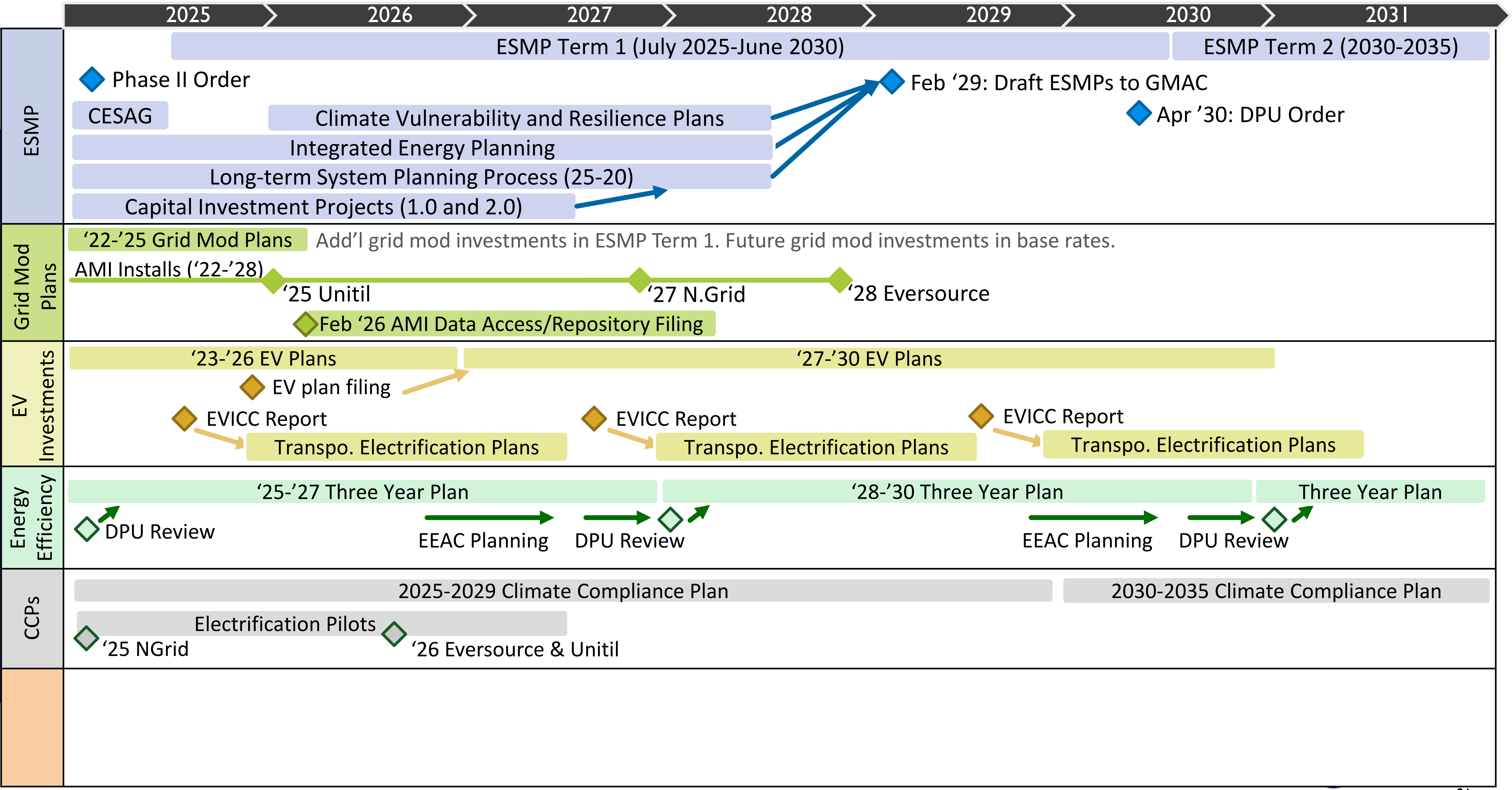

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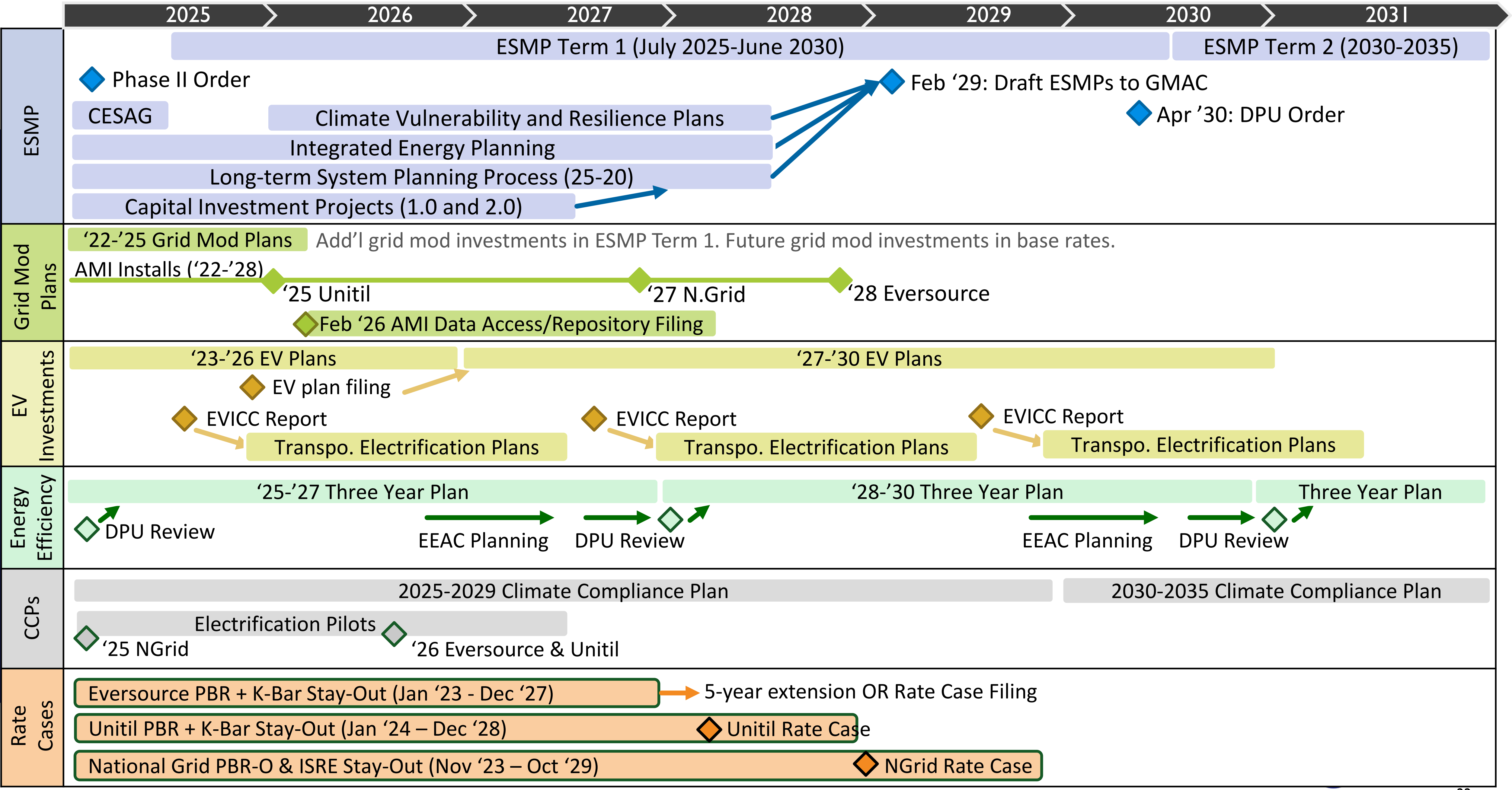

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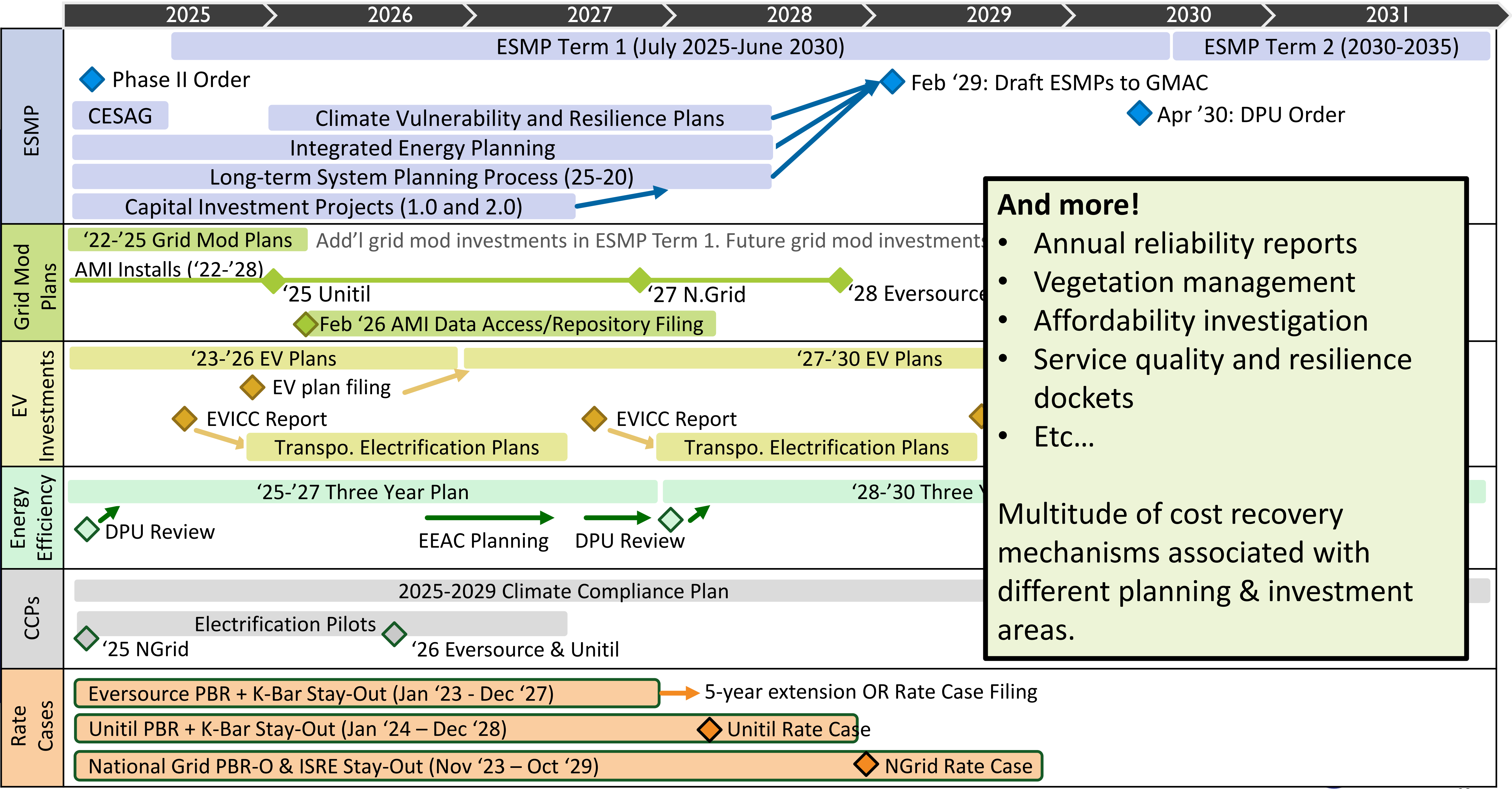

And more!

- Annual reliability reports
- Vegetation management
- Affordability investigation
- Service quality and resilience dockets
- Etc…

Multitude of cost recovery mechanisms associated with different planning & investment areas.

Closing Thoughts

- **Currently in a "messy middle"**
  - Complex grid planning and grid modernization landscape with many stakeholders and processes
  - Multiple cost recovery mechanisms challenge transparency and affordability objectives
- **We've learned a lot**
  - Non-EDC or non-regulator stakeholders have more access to grid planning and modernization knowledge than before
  - ESMPs, GMAC, IRWG, and RTF workstreams continue to develop stakeholder knowledge and access
- **Opportunities ahead**
  - Conclusion of Rates Task Force and next steps
  - DPU investigation on cost recovery
  - GMAC 2026 workplanning and ongoing ESMP process
  - DPU clear direction on plans to better align grid planning, investments, and cost recovery mechanisms.
  - Governor Energy Affordability Bill with provisions requiring greater streamlining

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Thank You!

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Massachusetts' Energy Transition: Innovation for Electric Utility Regulation

Presentation to the Massachusetts Electric Rate Task Force

Daniel Stuart

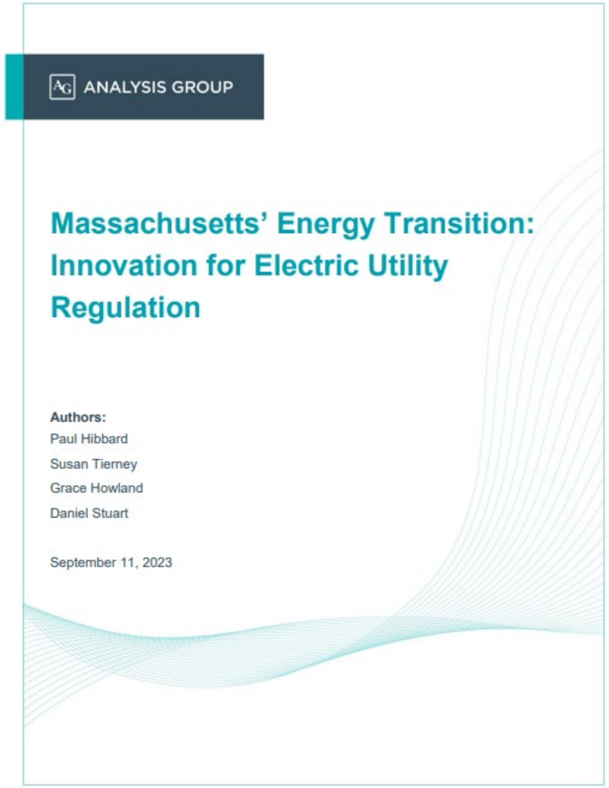
Manager, Analysis Group, Inc.

August 25, 2025

Introduction and Context

Electric Utility Regulation to Achieve State Decarbonization Mandates

- Utility regulation is typically viewed as a substitute for competitive forces in an industry dominated by natural monopolies.
- The traditional goal of rate regulation is to ensure reliable electric service at the lowest reasonable cost.
- State-level decarbonization mandates fundamentally change the role of public utility commissions. The appropriate goal is now: “reliable electric service at the lowest reasonable cost while ensuring an economy-wide transition from fossil fuel-fired technologies.”
- Public utility commissions must now balance traditional regulatory criteria like “used and useful” and “prudence” against their statutory mandate to enable economy-wide decarbonization.
- Public utility commissions already have experience with the types of policies needed to enable decarbonization, but proactive and aggressive action is needed to ensure adequate levels of private investment.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Massachusetts’ Energy Transition: Innovation for Electric Utility Regulation

Authors:
Paul Hibbard
Susan Tierney
Grace Howland
Daniel Stuart

September 11, 2023

Available at:
https://www.analysisgroup.com/globalassets/insights/publishing/2023_ma_energy_transition-innovation_for_electric_utility_regulation.pdf

Key Themes of the Paper

1. During the energy transition, electric rates will increasingly reflect a shift from volatile fuel charges associated with electric generation to recovery of up-front, anticipatory capital investment.
2. With appropriately designed electric rates, household's or business' non-electric expenditures will likely decline due to lower out-of-pocket costs for transportation and building heating fuels, offsetting potential increases in electricity payments.
3. The energy transition will require substantial near-term investments that show up in the utility's cost-of-service today, but which also provide long-term benefits by supporting the higher electricity needs of a decarbonized economy.
4. Massachusetts' regulatory framework needs to provide utilities clear incentives to enable the levels of infrastructure build-out required to both signal grid readiness for the widespread deployment of new technologies and to meet the higher levels of load in a decarbonized economy.
5. Absent regulatory innovation, utility risks associated with the under-recovery or delayed recovery of invested capital could form an insurmountable barrier to the level of distribution system capital investment required to enable decarbonization.

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Illustrative Impacts of Decarbonization Policy on the Distribution System

Decarbonization Policy Lever	Impact on the Electric Grid
Clean Electric Power: Buildout of new utility-scale renewable generation and storage resources	- Interconnection from location of new generation resources to load centers - Shifting supply patterns associated with variable renewable energy
Transportation: Electrification of vehicle fleet	- Increased load and peak demands - Shifting load shapes/patterns, including increased demand response
Buildings: Electrification of heating systems and other fossil end-use technologies	- Increased load and peak demands - Shifting load shapes/patterns, including increased demand response
Distributed Energy Resources: Increased adoption of residential and commercial DERs, predominantly BTM solar and storage systems	- Bi-directional flow capability in the distribution system - Interconnection of DERs - Increased potential for demand response and flexible loads
Energy Efficiency: Increased adoption of high-efficiency end-use technologies	- Management of growth in load and peak demands - Shifting load shapes/patterns

Resulting Types of Distribution System Upgrades Required

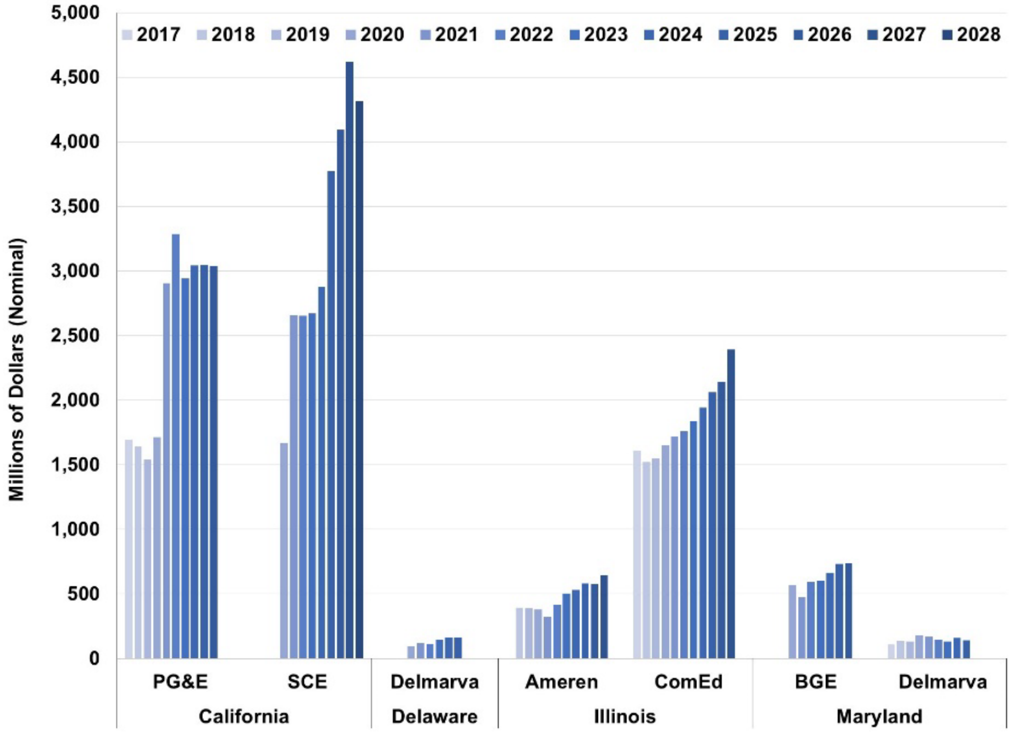
- Upgraded circuits and feeders
- Upgraded and/or new substations
- Buildout of local distribution network to support interconnection
- Grid Modernization, for example:
  - Advanced Metering Infrastructure (“AMI”)
  - Integration of DERs (more technical controls and communication systems to give local grid operators visibility into local demand)
- Buildout of public EV charging infrastructure
- Removal of barriers and technical process delays hindering the above distribution system upgrades

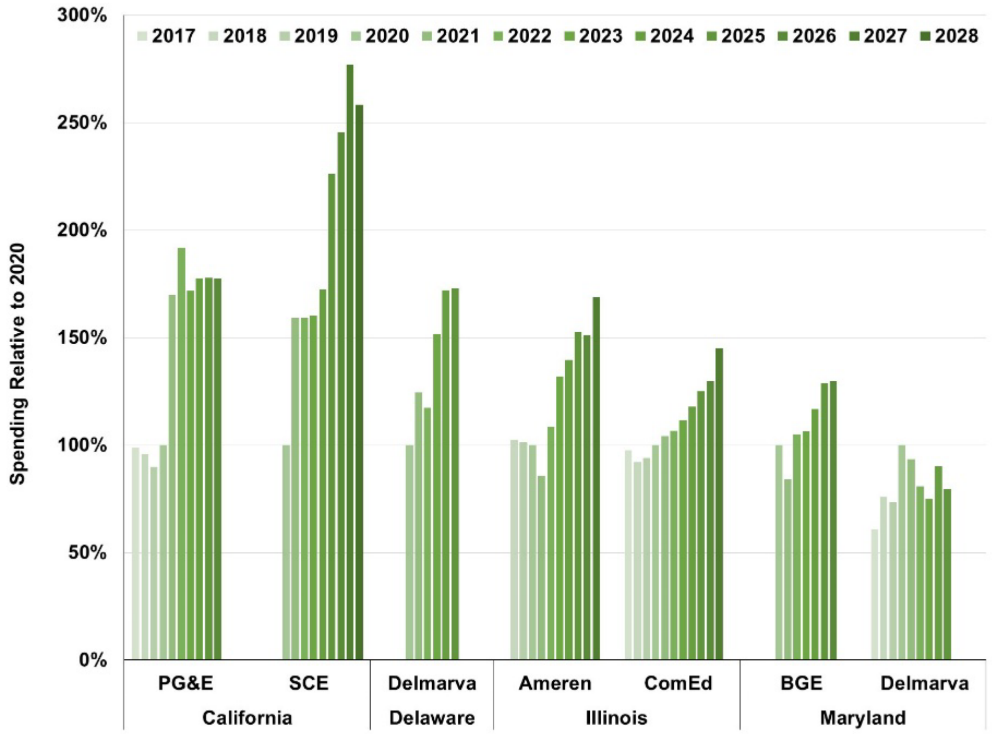
Illustrative Timeline for Massachusetts' Energy Transition

	2025	2030	2035	2040
Industry Context	▪ Electric vehicles (EV) – moderate growth from vehicle standards & policy incentives ▪ Heating pumps (HP) – continued growth from policy incentives ▪ Renewables + DERs – continued growth ▪ Low natural gas growth and modest customer migration	▪ EVs– strong growth from consumer interest, standards, & incentives ▪ HPs – continued growth and increased customer migration from cost declines & strong incentives ▪ Renewables + DERs – continued growth ▪ Low to flat natural gas growth and moderate customer migration	▪ EVs – majority ownership trend from consumer interest & standards, moderate increase in MDVs and HDVs ▪ HPs – all new installs and strong customer migration from cost declines & stronger incentives ▪ Renewables + DERs – continued growth ▪ Declining natural gas demand and moderate/strong customer migration	▪ EVs– near full ownership trend, majority of MDVs and HDVs trend ▪ HPs – heating system of choice for new installs and replacements ▪ Renewables + DERs – continued growth ▪ Sharply declining natural gas demand and moderate/strong customer migration
Electric Demand	▪ Modest growth from EVs & traditional load growth ▪ Remains summer peaking	▪ Moderate/strong growth from EVs ▪ Modest growth from HPs ▪ Summer to bi-seasonal peaks	▪ Moderate/strong growth from EVs and HPs ▪ Bi-seasonal to winter peaks	▪ Moderate EV growth, strong HP growth ▪ Winter peak firmly established – double 2025 magnitude ▪ Net load shape fundamentally different
Electric Revenue Requirement	▪ Start of major grid distribution investments for DER support & EV demand readiness ▪ Revenue requirement growth outpaces historic trends	▪ Continued growth in grid distribution investments for DERs, EVs, & now HPs ▪ Revenue requirement growth accelerates ▪ Rate impacts are highly challenging ▪ Disproportionate impacts challenge rate design	▪ Rapid increase in grid distribution investments for DERs, EVs, & HPs ▪ Revenue requirement growth continues to accelerate ▪ Highly challenging rate impacts ▪ Disproportionate impacts challenge rate design	▪ Investments and planning challenges moderate from EV demand approaching saturation & HP demand moderating ▪ Revenue requirement growth begins to moderate ▪ Equity/fairness issues remain from elevated rate levels

Outside of Massachusetts, Electric Distribution Utilities Are Embarking on a Significant Investment Program to Meet State Decarbonization Targets

Historic and Planned Distribution System Capital Expenditures in States with Legally Binding Decarbonization Targets (Outside of Massachusetts), 2017-2028





Note: [1] To ensure comparability across utilities, capital spending related to wildfire mitigation is not included for PG&E.

Innovation for Electric Utility Regulation

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Electric Utility Regulatory Levers to Support Decarbonization

- ***Integrated Distribution System Planning***
- ***Pre-Authorization with Budget Caps and/or Performance Incentives***
- ***Capital and Cost Trackers***
- ***Mechanisms to Amortize Significant Costs***
- ***Future Test Years***
- ***Multi-Year Rate Plans***
- ***Highly Differentiated Rate Designs***

Electric Utility Regulatory Levers to Support Decarbonization

Integrated Distribution System Planning

Regulators require the utility to carry out comprehensive distribution system planning processes to forecast demands on their system well in advance of need and take steps to plan for and ensure development of any needed changes in infrastructure.

Pre-Authorization with Budget Caps and/or Performance Incentives

Capital and Cost Trackers

Mechanisms to Amortize Significant Costs

Future Test Years

Multi-Year Rate Plans

Highly Differentiated Rate Designs

Electric Utility Regulatory Levers to Support Decarbonization

Integrated Distribution System Planning

Pre-Authorization with Budget Caps and/or Performance Incentives

Regulators review and pre-authorize investments with a formal commitment to not revisit the prudence of the electric companies’ decision to proceed with such investments, but with regulators maintaining the ability to review the prudence of the electric companies’ implementation of these investments. Each electric company recovers costs for eligible investments through rate factors incorporated into its customers’ monthly bills.

Capital and Cost Trackers

Mechanisms to Amortize Significant Costs

Future Test Years

Multi-Year Rate Plans

Highly Differentiated Rate Designs

Electric Utility Regulatory Levers to Support Decarbonization

Integrated Distribution System Planning

Pre-Authorization with Budget Caps and/or Performance Incentives

Capital and Cost Trackers

Capital and cost trackers allow the utility to recover expenditures on an on-going basis by adjusting rates on a quarterly or biannual basis for certain categories of costs. Such an approach allows for the reduction of regulatory lag, because utilities do not have to wait for the next general rate case to recover such costs.

Mechanisms to Amortize Significant Costs

Future Test Years

Multi-Year Rate Plans

Highly Differentiated Rate Designs

Electric Utility Regulatory Levers to Support Decarbonization

Integrated Distribution System Planning

Pre-Authorization with Budget Caps and/or Performance Incentives

Capital and Cost Trackers

Mechanisms to Amortize Significant Costs

In instances where very large increases have occurred in utilities' expenses or investment, regulators sometimes require that such cost increases be amortized or phased-in over a multi-year period. With provisions that the utility can ultimately recover its carrying charges (*e.g.,* interest or financing costs), such approaches can allow for more gradual changes in rates and electricity bills for consumers.

Future Test Years

Multi-Year Rate Plans

Highly Differentiated Rate Designs

Electric Utility Regulatory Levers to Support Decarbonization

Integrated Distribution System Planning

Pre-Authorization with Budget Caps and/or Performance Incentives

Capital and Cost Trackers

Mechanisms to Amortize Significant Costs

Future Test Years

Future test years base rates on projected investments, expenses, and sales for a future year rather than actual investments, expenses, and sales in a recent historic year. Future test years are employed in nearly half of all states in the U.S.

Multi-Year Rate Plans

Highly Differentiated Rate Designs

Electric Utility Regulatory Levers to Support Decarbonization

Integrated Distribution System Planning

Pre-Authorization with Budget Caps and/or Performance Incentives

Capital and Cost Trackers

Mechanisms to Amortize Significant Costs

Future Test Years

Multi-Year Rate Plans

Electric company revenue requirements are set for multiple years in advance and based on forecast efficient levels of expenditures rather than the historic cost of service. Multi-year rate plans reduce the frequency of rate reviews, typically to once every 3-5 years. Multi-year rate plans are often coupled with an attrition relief mechanism to escalate the revenue requirement or target revenues between rate plan periods to address cost pressure such as inflation, economic productivity, and/or growth in number of customers independently of the electric company’s own cost.

Highly Differentiated Rate Designs

Electric Utility Regulatory Levers to Support Decarbonization

Integrated Distribution System Planning

Pre-Authorization with Budget Caps and/or Performance Incentives

Capital and Cost Trackers

Mechanisms to Amortize Significant Costs

Future Test Years

Multi-Year Rate Plans

Highly Differentiated Rate Designs

Rate designs reflect a range of purposes and principles, including economic efficiency, revenue sufficiency, equity and fairness, simplicity and stability, and support for public policies, including sufficient recovery of costs. Rate elements (*e.g.,* customer charges, variable charges, and other fixed charges) can be used to send efficient price signals while collecting sufficient revenues from the overall customer base. Fixed charges can be highly differentiated by income and/or usage levels. Time-of-use rates are used to better match customer volumetric charges with short-run marginal costs, with critical peak pricing designed to charge higher prices during the few days or hours of the year when demand is the highest.

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Conclusion

Concluding Thoughts

- Grid readiness is a necessary *precursor* to timely decarbonization of the electric sector and electrification of the building and transportation sectors.
  - Distribution utilities will need to build ahead to both meet future load growth from electrification and signal grid-readiness to enable electrification (*i.e.,* the "chicken-and-egg" problem of new technology adoption).
- Strict application of historic regulatory principles and precedent could deter the necessary levels of near-term distribution-system investment needed for the larger energy-system transformations required by law in Massachusetts.
- Massachusetts regulators already have experience with many of the anticipatory policies needed to enable decarbonization.
  - For example, the review and preauthorization of capital spending plans associated with grid modernization and EV charging stations.
- Pre-authorization of capital investments and future test years, coupled with the amortization or phased-in recovery of anticipatory capital investment over multiple years to lessen rate impacts, may offer a promising path forward if paired with appropriate budget caps and performance incentives.

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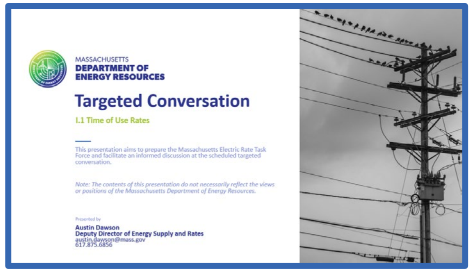
Next Steps

Targeted Conversation

September 3, 2025, 2-4pm

- Will serve as a deliberative space following related expert presentations to prompt informed discussion on policy questions and priorities

Illustrative Presentation



Optional Office Hours

August 27, 2025, 2-4pm

- Optional office hours for further conversation, serving as a structured opportunity to work towards common understandings and positions. We also encourage participants to have discussions amongst each other beside formal Task Force sessions
- Please reach out to **chris.connolly2@mass.gov** to request an invitation.