Implementation Advisory Committee

July 15, 2026

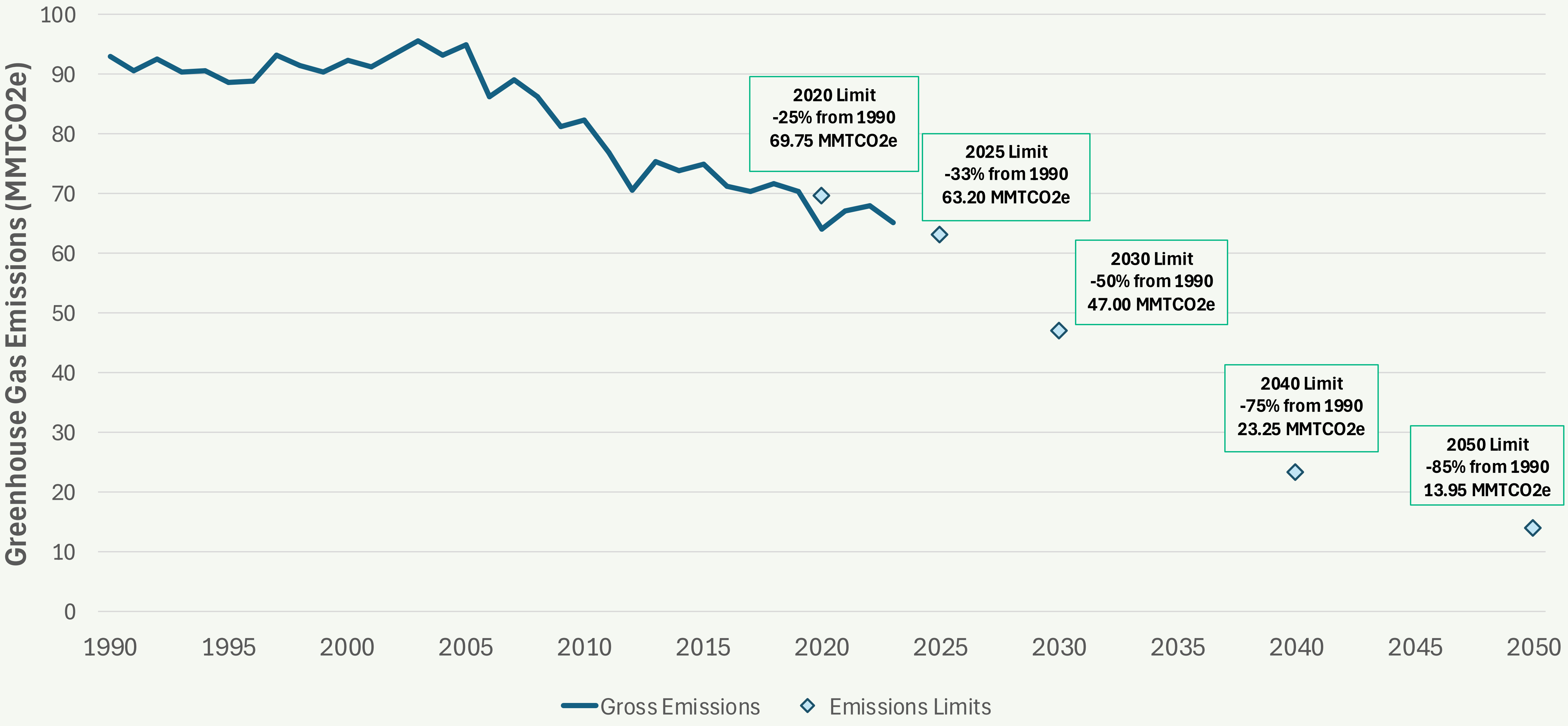
Welcome & General Updates

Agenda

2:30 pm	**Welcome & General Updates** *Undersecretary Katherine Antos*
2:40 pm	**2035 CECP Updates** *EEA* • Refresher on objectives • Progress to date • Forthcoming work
2:50 pm	**CECP Modeling Approach** *EEA and CBI*
4:10 pm	**Next Steps**
4:15 pm	**Public Comment**
4:30 pm	**Adjourn**

2035 CECP Updates

Refresher:
Massachusetts has Statutorily Required Emissions Reductions (“Limits”)



Refresher:
The CECPs Set the Roadmap to Achieve Them

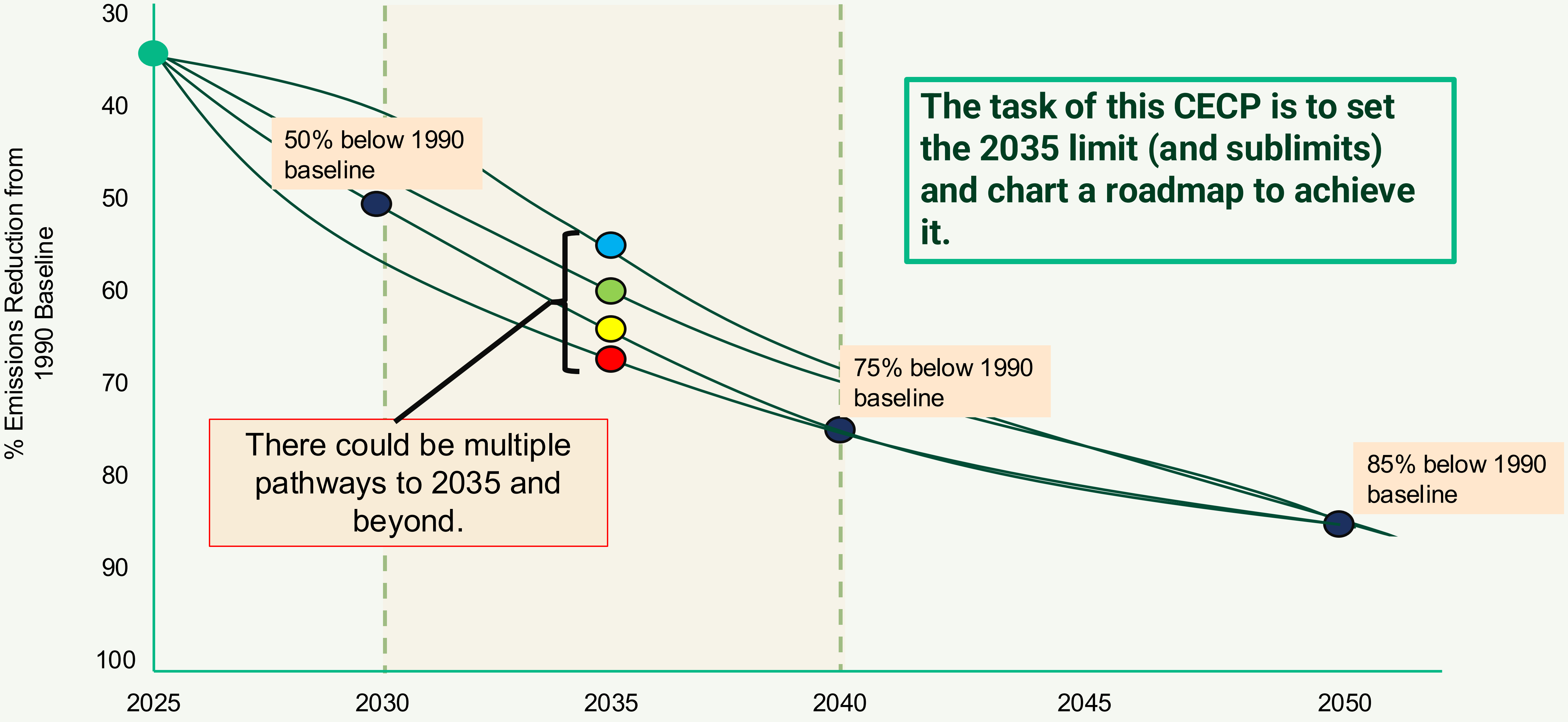
The Clean Energy and Climate Plan (CECP) is a roadmap set to be produced at regular intervals that must "indicate for each sector how, to what extent, and when the commonwealth will act to reduce its emissions in order to realize the 2050 statewide greenhouse gas emissions limit"

- Chapter 21N of MA General Law - Section 5: Contents of Roadmap Plan

Among other requirements, it must also demonstrate consideration of how those actions "are equitable and minimize costs and maximize the total benefits to the commonwealth."

Refresher:

Unlike 2030, 2040 and 2050, the 2035 Emissions Limit is Not Statutorily Preset



The task of this CECP is to set the 2035 limit (and sublimits) and chart a roadmap to achieve it.

Note: scenarios on this slide are meant to be illustrative examples and do not reflect actual modeled results

CECP Progress to Date

Scope Objectives

- ✓ Conducted 41 **stakeholder interviews**
- ✓ Identified **cross-cutting priorities** underscored by statute to co-solve for along with emissions reductions

We heard a strong desire for this plan to:

- Translate to clear implementation
- Demonstrate prioritization and sequencing
- Identify tradeoffs in viable pathways
- Integrate core priorities essential to enable decarbonization

CECP Progress to Date

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Assess Landscape

- ✓ Identified key areas of **sector-specific and cross-sector transformation,** compiling relevant literature and context. This formed the Decision-Making Framework (DMF).

We organized the universe of information we want to assess and structured it in an interpretable way in the Decision-Making Framework (DMF).

CECP Progress to Date

We **developed the "lever" based modeling approach** and integrated transformation areas into model-able levers.

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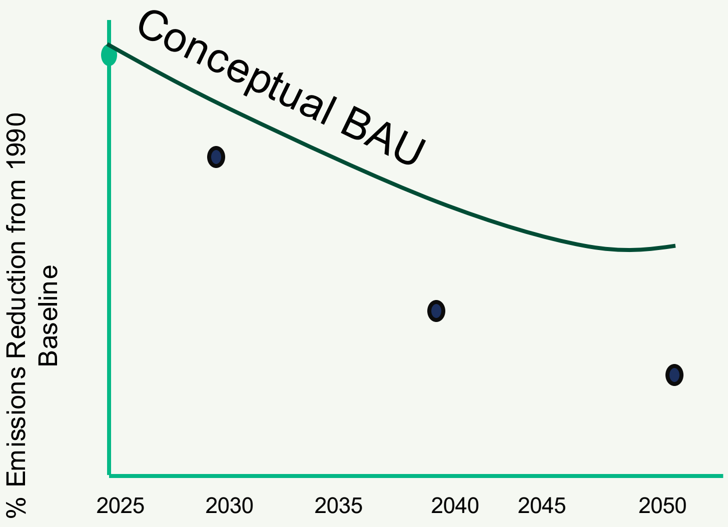
Translate to Model

- ✓ Translated transformation areas into **policy levers and uncertainties** to explore in the modeling (with survey input)

A “Lever-Based” Modeling Approach

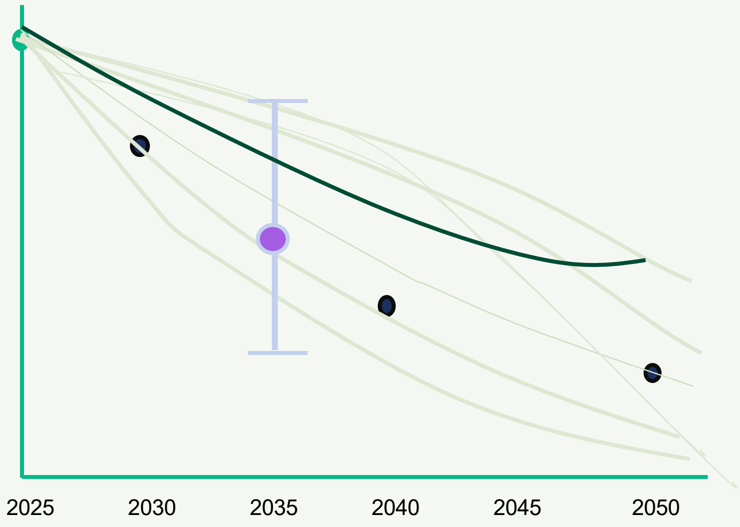
Step 1:

Start with business as usual (BAU)



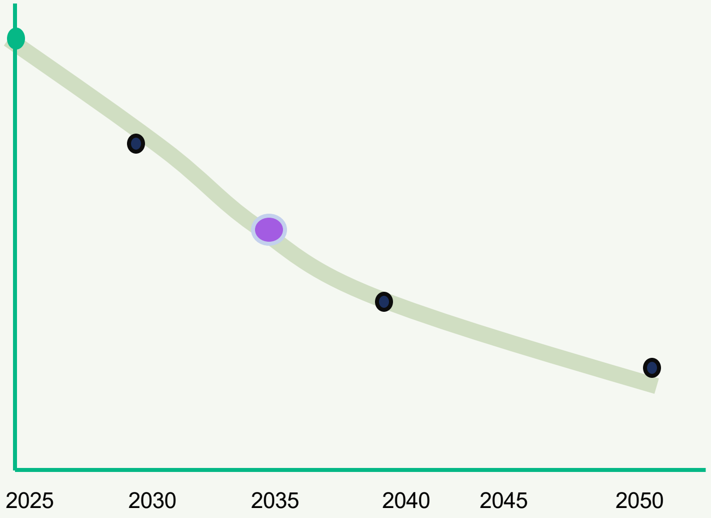
Step 2:

Modify levers to see how the curve varies. Identify performance of different scenarios on cross-cutting priorities (equity, affordability, etc.)



Step 3:

Identify pathway based on alignment around priorities and actions



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Validate Model Assumptions

- ✓ Ground-truth translation between policy inputs and model outputs with experts

TODAY
(and the past month)

Where We'll Go From Here

Validate Model Assumptions

- Ground-truth translation between policy inputs and model outputs with experts

TODAY

July – early Sept

Build Model

- Develop tunable "dials" for each lever, with emissions impacts and other quantitative outputs
- Descriptions and/or flags to clarify additional qualitative and quantitative impacts across priorities

Fall 2026 – Winter 2026

Workshops & Pathway Selection

- Facilitated discussions on CECP policy pathways and key implementation considerations
- Modeling refinement
- Designation of CECP pathway

Spring – Summer 2027

Plan Draft & review

- Plan writing
- Public comment

January 1st, 2028

Final Plan

To Note

This deck is designed to facilitate discussions on modeling assumptions to be integrated into the 2035 CECP process.

Sourced from stakeholder input, the policies in this presentation represent a variety of interventions the state could consider when choosing the best emissions reduction pathway to 2035. They will be further evaluated as part of the CECP and do not reflect the Commonwealth’s chosen pathway.

The ranges of values for different interventions may represent levels more extreme than likely. They are selected to assess an illustrative range of impacts.

Today’s conversation is not about which policy interventions are better than others. It is about ensuring the information we include for each lever is as informed as it can be.

Modeling Approach

Defining Policy Levers and Uncertainties

1. **Policy Levers:** Model input variables intended to represent actions the state could take to affect our decarbonization trajectory. These are levers we're evaluating and do not represent commitments at this time.

   Example: Level of investment in light-duty electric vehicle incentives, broken down by recipient income level and vehicle-miles traveled

   Note – these levers are not intended to mirror granular design of existing policies or programs, but rather are meant to translate the effects of a certain type of policy or program into our model

2. **Uncertainties:** Model input variables that represent actions or factors that are, at least in part, outside of state control that could similarly affect our decarbonization trajectory

   Example: Outcome of Advanced Clean Cars II / Advanced Clean Trucks Litigation

   Note – while we cannot anticipate nor model all relevant uncertainties, we've selected a subset that intend to capture "known unknowns" with significant potential impacts on our emissions trajectory

Illustrative Example** of How to Use Levers to Build a Pathway

Policy Examples

What levers does the state have available to influence policy?

Participant Inputs

Participants can modify participatory tool inputs to investigate the impacts of levers on metrics such as investment decisions, emissions, and costs

Model Outputs

Estimate the impact of participant selections on resource investment, timing, and location, emissions, and costs

Metrics

Show the impact of choices on key metrics. Allow comparison between participant choices

Transit service frequency

The systemwide average reflects targeting of frequency increases to bus and rail routes where it is most practical and needed to increase ridership

Systemwide service frequency increase

0% 10% 20% 30% 40%

Active transportation infrastructure

New infrastructure includes a mix of facility types most appropriate to the project context, and targeted towards areas with higher mode shift potential

Miles of new shared-use paths, bike lanes, & sidewalks

0 500 1,000 1,500 2,000

Pricing (per mile) including VMT fee and fuel price uncertainties

VMT pricing is applied statewide, to all travel. Fuel costs also impact running costs

Running Costs (cents/mile)

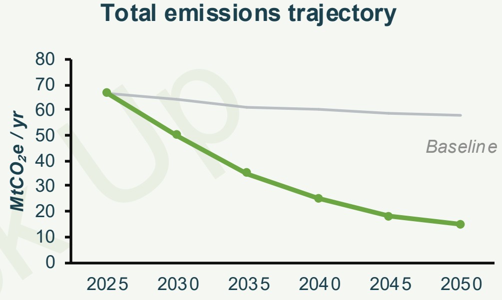
1 2 3 4 5

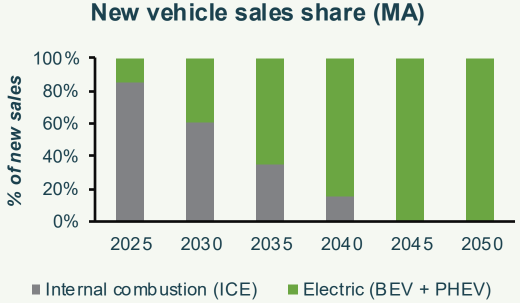
Pricing (congestion)

Congestion pricing is applied to trips entering the Boston core area during peak travel times

Congestion fee ($/trip)

$1 $2 $3 $4 $5





Annual cost of vehicle ownership

$9,200 ↓ $1,600

Selected
Baseline

vs $10,800 baseline

Energy burden · low-income household

7.5% ↓ 2 pp

Selected
Baseline

vs 9.5% baseline

Annual VMT per capita

7,800 mi ↓ 1,700

Selected
Baseline

vs 9,500 mi baseline

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Illustrative Mock Up

Initial Thinking on Modeling Co-Priorities

1. Affordability
2. Equity
3. Workforce & Economic Development
4. Public Health
5. Environmental Protection

- **Modeled impacts**
  - Costs and savings
  - "Energy wallet" impacts for average and low-income families
  - Public health impacts and costs
  - Additional quantitative outputs based on model capacities
- **Additional contextual data integrated into the tool**
  - Quantitative "snapshots" and qualitative descriptions of policy impacts across priorities
- **Internal facilitated dialogue**
  - Facilitation to prompt discussion on priorities when reflecting on tool findings

Note: priorities established by stakeholders and grounded in statute

Modeling Approach Example: Load Management

Active vs. Passive Load Management

Passive

Definition: Measures that reduce energy demand in all hours of the year

Examples: Energy efficient new building construction and efficiency retrofits

Active Load Management:

Definition: Measures that reduce demand during specific hours

Examples: Managed EV charging and time of use electric rates to incentivize shifting load

Why the focus on load management now?

- Electrification of buildings and transportation – a key tenet of the state's climate strategy – increases electrical demand and load on the grid
- Effective passive and active load management can reduce peak electrical demand, minimizing the need to invest in additional energy infrastructure and the associated costs passed along to ratepayers

Passive Load Management in the Modeling

Building Sector Policy Levers

- $ Investment in energy efficiency
- Retrofit package availability*
- Building performance standard
- Clean heat standard
- Geothermal network development

Uncertainty

- Rate of specialized energy code adoption

1. We are designing the model to be able to adjust and evaluate each of these levers and uncertainties
2. Adjusting these levers and uncertainties will determine the rate of adoption of various building technologies (e.g., HVAC systems, appliances, and weatherization)
3. Specific effects of each lever determined by using building owner policy adoption model (Massachusetts Building Energy Strategies Tool - MassBEST) to determine weatherization and electrification uptake
4. Adoption of those items will then inform the electrical and fuel demand of the state's building stock in the integrated energy model
5. That electrical demand will then inform the model's decisions re: energy infrastructure investments to provide adequate supply

*air source heat pumps, ground source heat pumps, deep weatherization, hybrid systems, distributed energy resources

Detailed Example

Represents the range of exploration for the lever

Input Lever	Variable Type	Minimum Value	Maximum Value	Modeling Mechanics
$ per year invested in energy efficiency	Continuous	50% of Mass Save budget ($314M / year + inflation	200% Mass Save Budget ($1,259/year) + inflation	The Massachusetts Building Energy Strategies Tool (MassBEST) will be run to determine the elasticities of technology adoption to investment Results then translated into integrated energy model to determine load and optimize energy supply investments
Retrofit packages available	Discrete options*	N/A	N/A	MassBEST run with varied technology packages available to produce varied rates of adoption, GHGs avoided, and costs depending on how attractive packages are for building owners. Results then translated into integrated energy model.

*air source heat pumps, ground source heat pumps, deep weatherization, hybrid systems, distributed energy resources

Active Load Management in the Modeling

Cross-Sector Policy Levers

- % of LD ZEV charging load able to shift off-peak
- % of MHDV charging load able to shift off-peak
- % of residential building load able to shift off-peak
- % of commercial and industrial building load able to shift off-peak
- % of data center load able to shift off-peak

1. We are designing the model to be able to adjust and evaluate each of these levers
2. Adjusting these levers affects the load shapes in the integrated energy model according to DOER Peak Potential Study

Power Sector Policy Levers

- Deployment of distributed energy storage
- Deployment of grid-scale energy storage

1. We are also designing the model to be able to require deployment of certain levels of distributed and grid-scale storage
2. The integrated energy model will take into account the load shapes resulting from shifting building and transportation loads off peak, as well as the peak shaving services provided by the required storage deployment, to inform remaining energy infrastructure investments

Detailed Example

Input Lever	Variable Type	Minimum Value	Maximum Value	Modeling Mechanics
% of LD ZEV charging load able to shift off-peak*	Continuous	15% (+0% able to discharge to grid via vehicle-to-grid)	75% (+50% able to discharge to grid via vehicle-to-grid)	The integrated energy model is provided inputs regarding the assumed underlying load shape for flexible loads, such as EVs (e.g., % of stock that can respond flexibly and how far the underlying shape can be advanced or delayed) This load is then used to inform the integrated energy model's decisions re: energy infrastructure investment.
% of MHD ZEV charging able to shift off-peak*	Continuous	15% (+0% able to discharge to grid via vehicle-to-grid)	50% (+90% able to discharge to grid via vehicle-to-grid)	

*The ranges of managed charging and V2G participation being explored are based on assumptions used for the Department of Energy Resources Peak Potential reports

Discussion

Group Discussion

- Questions?
- What’s your reaction to the modeling approach for load management?
    - *What do you like? What could be improved?*
- What are the reflective questions, contextual data, or potential flags that you would want decision-makers to consider when engaging with the load management lever?
- Are there other levers you have specific feedback or questions on?
    - *Consider the proposed modeling approach as well as reflective questions, contextual data, or potential flags*

Next Steps

Next Steps

- Any additional written comments welcome until end of day, Friday July 17th
- EEA will spend coming months building out participatory modeling tool and workshops
- Next IAC meeting in the Fall

Public Comments

Appendix

- Summary of results from lever survey
- tables of sector policy levers and uncertainties

Summary of External Lever Survey Results

45 total Responses:

	Transportation	Buildings	Electric Power	Natural & Working Lands	Cross-Sector
Top Ranked Proposed Levers:	Electric vehicle charging infrastructure investments *Weighted Average Score (1-5): 4.10*	Geographically targeted electrification and efficiency incentives *Weighted Average Score (1-5): 4.16*	Investment in distributed energy resources *Weighted Average Score (1-5): 4.45*	Land use and conservation policies that reduce NWL conversion *Weighted Average Score (1-5): 4.21*	Efforts to shift load off-peak *Weighted Average Score (1-5): 4.24*
Common Themes of Suggested Levers	• Public transit improvements (11X) • EV charging and infrastructure access improvements (5X) • Transit-oriented development (4X) • Fuel & VMT pricing mechanisms (4X)	• Building codes and new construction requirements (5X) • Alternative financing approaches (4X) • Address landlord / tenant split incentives (3X)	• Active demand management (e.g., VPPs, storage) (7X) • Distributed energy resources & resilience (6X) • Data center load management (2X)	• Conservation (3X) • Smart / efficient land use (3X) • Climate-smart land management (2X)	• Equity evaluation (4X) • Integrated energy planning (4X) • Alternative financing approaches (3X)

Transportation Policy Levers

Note that levers are incorporated for evaluation and will not necessarily be pursued as part of the final chosen pathway

Area of Focus	Model Lever	How it Works	Sticky Issue(s) Addressed

LD EV Adoption Incentives	$ investment in low-income incentives
	$ investment in non-low-income incentives
	$ investment in super-driver incentives
		Affects # of EV / ICE** vehicles on the road via impact on sales shares	Value of LD EV incentives over time and focus on low-income & high-mileage recipients

LD EV Charging Infrastructure Investments / Incentives	$ investment in public DCFCs
	$ investment in public level 2 chargers
	$ investment in private multi-family building chargers
		Affects # of EV / ICE** vehicles on the road via impact on sales shares	Relative value of different LD EV charging infrastructure investment priorities

MHD EV Charging and Adoption Incentives	$ investment in MHD EV charging and adoption incentives*	Affects # of EV / ICE** vehicles on the road via impact on sales shares	Impact of incentives on MHD EV adoption rates and resulting emissions and cross-cutting priority impacts
Efforts to Affect Vehicle-Miles-Traveled	$ investment in active transportation infrastructure Transit service frequency Congestion price Vehicle-miles-traveled fee Fuel surcharge	Affects modeled travel behavior (VMT)	Value of strategies to reduce vehicle-miles traveled relative to one another and other transportation-sector strategies
Fuel Standard	Low carbon fuel standard	Affects modeled travel behavior (VMT) & # of EV / ICE vehicles on the road	Potential effectiveness of a low-carbon fuel standard
Registration Fee	$ price of registration fee for ICE vehicles	Affects # of EV / ICE vehicles on the road	Potential effectiveness of ICE registration fees

*Investment in MHD ZEV incentives will not distinguish between vehicle purchase vs. charger incentives

**Internal Combustion Engine (ICE)

Buildings Policy Levers

Note that levers are incorporated for evaluation and will not necessarily be pursued as part of the final chosen pathway

Area of Focus	Model Lever	How it Works	Sticky Issue(s) Addressed
Efficiency and Electrification Incentives	$ investment in electrification	Affects pace of technological adoption, load shapes, fuel consumption, and grid investment costs	Value of efficiency as passive load management, cost savings associated with geotargeted incentives, and relative impacts of retrofit package offerings
	$ investment in energy efficiency		
	% of electrification and energy efficiency that is geospatial targeting		
	Available retrofit package selection		
Geothermal Network Deployment	# of distinct geothermal networks		Potential role of geothermal networks in the thermal transition
	Network efficiency		
	Network cost		
Clean Heat Standard	# of heat pumps required by year		Impact of building decarbonizations standards in isolation and relative to one another
	Greenhouse gas emissions avoided by year		
Building Performance Standard	Presence of energy-use–based BPS		
	Presence of emissions-based BPS		
Clean Appliance Standard	% share of new heating appliances that are heat pumps required by year		

Electric Power Policy Levers

Note that levers are incorporated for evaluation and will not necessarily be pursued as part of the final chosen pathway

Area of Focus	Model Lever	How it Works	Sticky Issue(s) Addressed
Utility Scale Generation Deployment	MW deployment of specified resources by year (e.g., offshore wind, onshore wind (Maine), nuclear)	Affects state procured resources included in supply mix, associated remaining resource mix, power generation, and land use implications (e.g., for solar)	Tradeoffs (e.g., land use, cost) between different utility-scale generation technology deployment
Utility Scale Storage Deployment	MW deployment of medium, long, and multi-day duration storage by year		Value of grid-scale storage as a load management resources
Distributed Energy Resource Deployment	MW deployment of distributed solar by year	Affects resources included in supply mix, power generation, and land use implications (e.g., for solar)	Trade-offs (e.g., land use, cost) between DER and utility scale resource deployment
	MW deployment of distributed battery storage by year		
Transmission	MW of increased electric transmission capacity between specific ISO and neighboring regions	Affects buildout of supply mix and power generation by adjusting constraints on interregional transmission and energy sales	Role of transmission expansion in reducing energy costs and accelerating clean resource deployment
	MW of increased gas transmission capacity between specific ISO and neighboring regions		Role of transmission expansion in reducing energy costs

Natural and Working Lands Policy Levers

Note that levers are incorporated for evaluation and will not necessarily be pursued as part of the final chosen pathway

Area of Focus	Model Lever	How it Works	Sticky Issue(s) Addressed
Land Management	Alternative forest management regimes, emphasizing reserves, climate-oriented forestry, and/or local wood production	Affects sequestration capacity of existing forests	Impact of carbon-friendly stewardship relative to other NWL strategies (both in terms of decarbonization and other priorities)
Reforestation and Tree Planting	% of suitable rural open space reforested % of suitable urban area with tree planting	Affects rates of land conversion and associated sequestration capacity	Impact of reforestation and tree planting relative to other NWL strategies (both in terms of decarbonization and other priorities, such as public health)

Cross-Sector Policy Levers

Note that levers are incorporated for evaluation and will not necessarily be pursued as part of the final chosen pathway

Area of Focus	Model Lever	How it Works	Sticky Issue(s) Addressed
Coordinated Electrification	% of electrification and efficiency investment targeted (pipeline retirement, EJ communities, grid capacity, electric resistance)	Affects cost efficiency (e.g., avoided gas system investments)	Value of managed electrification projects and avoided gas system investment
Land Use / Conservation Policies	Toggle one of three land use policy scenarios (business as usual, missing middle, transit-oriented design)	Affects zoning capacity and development in transit-proximate locations as well as conservation restrictions	Cross-sector impacts of land use / development patterns (e.g., VMT, NWL sequestration capacity)
Active Load Management	% peak active demand management potential realized for MHD ZEVs % peak active demand management potential realized for LD ZEVs % peak active demand management potential realized for residential buildings % peak active demand management potential realized for commercial & industrial buildings % of data center load growth able to shift off-peak	Affects % of peak load able to shift off-peak	Value of active load management strategies (e.g., managed charging, TOU rates) as a means of reducing required generation deployment and associated grid investments
Carbon Pricing	$ price on carbon	Applied throughout model – varied effect on behavior and technological adoption rates across sectors	Value and trade-offs associated with an economy-wide carbon price

Uncertainties

Area of Focus	Uncertainty	How it Works	Sticky Issue(s) Addressed
Advanced Clean Cars II / Advanced Clean Trucks	Implementation of ACCII & ACT (subject to litigation)	Affects # of ZEV and ICE vehicle on road by constraining sales shares	Highlight effectiveness of ACCII / ACT and need for alternative action in their absence
Data Centers	MWhs of data-center load growth by year	Affects required generation resource deployment to meet load and demand curves	Highlight data-center load growth impact
Federal Support	Level of decarbonization support from future federal administrations	Affects clean resource deployment and technological adoption via subsidization	Underscore the weight of federal support (or lack thereof) and its impact on our decarbonization trajectory
Clean Technology Cost Curves	% decrease in clean technology generation and storage deployment costs	Affects mix and cost of supply resources	Highlight impact of cost curves on pace, scale, and cost of the transition
Natural and Working Lands Disturbance	Hurricane occurrence	Affects forest carbon stores and flow	Highlight impact of extreme weather on NWL sequestration
Building Energy Code Adoption	Rate of municipal stretch and specialized code adoption	Affects pace of technological adoption, load shapes, fuel consumption, and grid investment costs	Highlight value of municipal energy code adoption and avoided grid costs
Workforce, Supply Chains, Permitting, and Interconnection	Constraints on the pace of energy generation deployment	Limits annual deployment capacity of generation technologies	Highlight importance of addressing barriers to deployment