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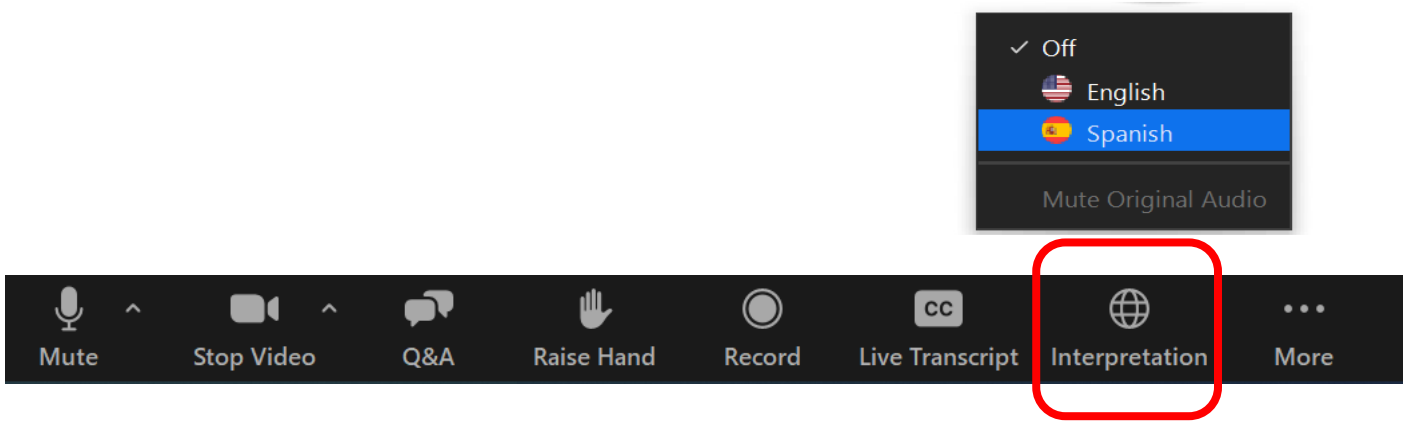
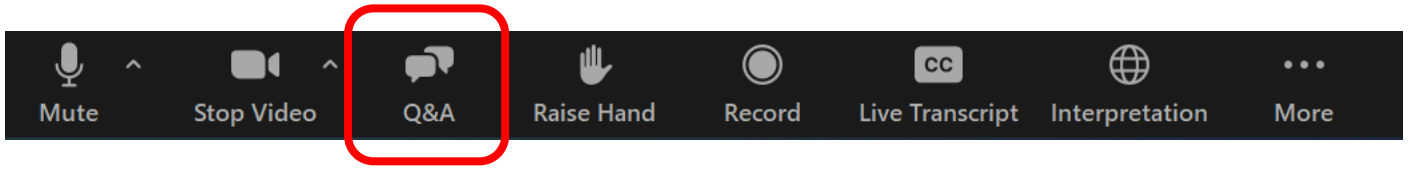


Logistics

- This webinar is being recorded.
- The recording of the presentation will be posted on www.mass.gov/2030CECP afterwards.
- All lines will be muted during the presentation.
- The line will be open for oral comments after the presentation.
- If you have a clarifying question, please type it into the Q&A box.
  If you have a logistical issue, please let us know in the Chat.



Clean Energy & Climate Plan for 2025 and 2030

Limits, Sublimits, & Policies

Executive Office of Energy & Environmental Affairs

Public Hearings

April 14-15, 2022

Overview

- Background
- Key Findings from Pathways Analysis
- Limits & Sublimits for 2025 and 2030
- Key Considerations for Policy Development
- Sector-by-Sector Goals & Strategies
  - Transportation
  - Buildings
  - Electricity
  - Non-Energy and Industrial
  - Natural and Working Lands
- Next Steps
- Explanation of Terms and Acronyms

Background: An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy (Chapter 8 of the Acts of 2021, "2021 Climate Law")

- As required by the 2021 Climate Law, the **Clean Energy and Climate Plan (CECP)** acts as a "roadmap" for how the Commonwealth will achieve its greenhouse gas emissions reduction goals
- Statutory requirements in 2021 Climate Law:
  - **Economy-wide GHG Reduction**
    - Requires ≥50% GHG reduction in 2030; ≥ 75% in 2040; ≥85% and net zero in 2050
    - Also requires emissions limit for 2025, 2035, and 2045
  - **Sector-Specific GHG Reduction**
    - Requires EEA Secretary to set sublimits for electric power, transportation, commercial and industrial heating and cooling, residential heating and cooling, industrial processes, natural gas distribution and service, and "any other sector or source the secretary may designate"
  - **Natural and Working Lands (NWL)**
    - Codifies NWL definition
    - Requires EEA to track NWL carbon flux and goals for reducing emissions and increasing carbon sequestration
  - **Progress Tracking**
    - Requires EEA to set numeric benchmarks and track emissions reduction products, solutions, and improvements used to achieve statewide emissions limits and sublimits

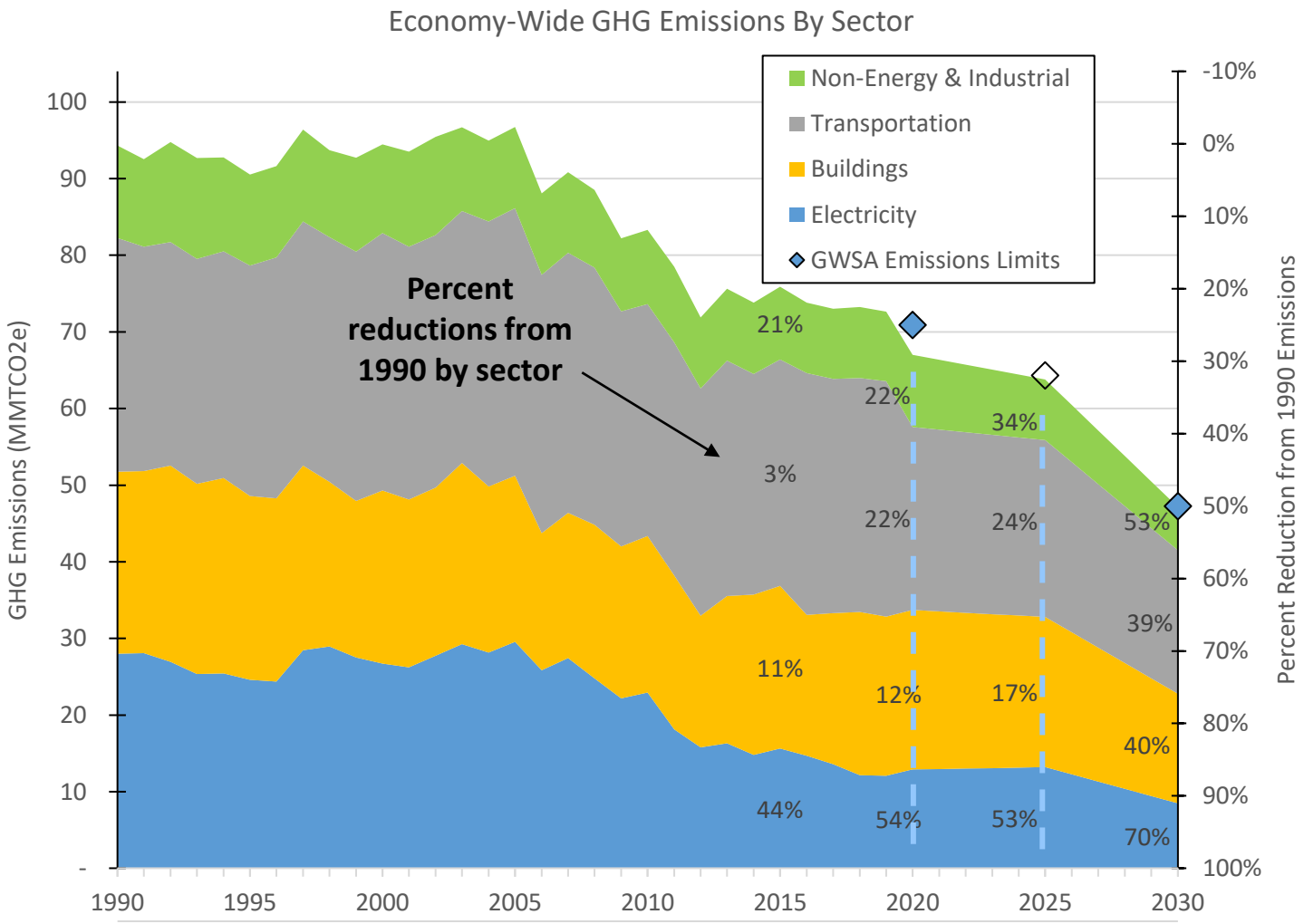
Background: Public Comments on the Interim Clean Energy and Climate Plan for 2030 (Interim 2030 CECP)

- **Over 1,100 written comments received between Jan. 2021 and March 2021 on the Interim 2030 CECP.**
- **Advocates, citizens, municipalities, labor groups, and industries/businesses consistently raised the need for more commitment and specificity around:**
  - Equity and Environmental Justice in policy and support
  - Just transition/workforce development and training programs
  - Funding and financing programs to support decarbonization
- **Transportation:** More commitment for public transit, reduction of light-duty vehicle miles traveled, electric vehicle (EV) incentives for low-and-moderate consumers, and EV charging infrastructure; Broader vehicle electrification.
- **Buildings:** Differing perspectives on Net Zero building codes, pace of phasing out Mass Save incentives for fossil fuel equipment, and electrification vs. fuel blending.
- **Electric Power:** More renewable energy including offshore wind, solar, and additional energy storage; Concerns about land use impact of ground mount solar; No incentives for biomass combustion.
- **Non-Energy:** Concerns about natural gas leaks being undercounted in MassDEP's GHG inventory, compliance with SF_6 regulations with more electricity infrastructure, and waste incineration.
- **Natural & Working Lands:** More urban tree planting; Differing perspectives on forest management and durable wood products.

Background: What has Happened Since the Interim 2030 CECP was Published…

- **Transportation**
  - Put Transportation Climate Initiative program on hold
  - Federal infrastructure funding to MA
  - California updating electric vehicle regulation
- **Buildings**
  - Approved 3-year Energy Efficiency Plan with Energy Transition in Mass Save®
  - Updating Stretch Code, and Net Zero Code
  - Commission on Clean Heat drafting early recommendations
- **Non-Energy & Industrial**
  - Federal action resulting in significant reduction of fluorinated gas emissions (HFCs)
- **Electricity**
  - Additional offshore wind authorization
  - 2021 Climate Law increased Renewable Portfolio Standard to 40% by 2030
  - Municipal Greenhouse Gas Emissions Standard (GGES) established by 2021 Climate Law
  - Uncertainty with New England Clean Energy Connect
- **Natural and Working Lands (NWL)**
  - New estimates for emissions and carbon sequestration from NWL

Key Findings from 2025 & 2030 Pathways Analysis (Updated in 2021-2022)



- Realistic approach: Achieve 32% GHG emissions reduction in 2025; 50% reduction in 2030
- Power sector has decarbonized significantly in the last decade; other sectors need to carry the burden into 2030
- Estimated 2020 Transportation sector GHG emissions reflects COVID effect (down from 42% of statewide GHG emission in 2018)
- Policies to drive emissions down by 2025 are already in action
- Greater reductions are largely left to the second half of the decade unless we can further reduce emissions from electrification of Transportation

Interpretation of 2025 and 2030 Sector Sublimits and CECP Policy Framework

Sublimit (per 2021 Climate Law)	**Subsectors Tracked in MassDEP GHG Inventory**	**Examples of Emitting Resources**	**Examples of Methods to Reduce Emissions**	**Policy Sector in the CECP**
Power (including all building & transportation electricity)	Electricity	Power plants in MA and across NE	Replace fossil plants with renewables	**Electricity**
Transportation	Transportation	Cars, trucks, planes	Replace gas vehicles with electric vehicles	**Transportation**
Residential Heating (& Cooling)	Residential	Residential space and water heating	Envelope efficiency and clean heat technologies such as heat pumps	**Buildings**
Commercial & Industrial Heating (& Cooling)	Commercial	Commercial space and water heating		
	Industrial Energy	Manufacturing	Technical assistance for industrial hygiene best practices; regulations and permitting requirements for key pollutants and sectors	**Non-Energy & Industrial**
Industrial Processes	Industrial Processes	Fluorinated Gases		
Natural Gas Distribution & Service	Natural Gas Leaks	Natural Gas Leaks		
Others (with no sublimits)	Solid Waste	Landfills in MA		
	Wastewater	Deer Island		
	Agriculture	Dairy cows		

Proposed 2025 and 2030 Sector Sublimits

Sector	1990 GHG Emissions $MMTCO_2e$	2020 GHG Emissions $MMTCO_2e$	2025 GHG Emissions Proposed Sublimits $MMTCO_2e$	% change from 1990	2030 GHG Emissions Proposed Sublimits In Interim 2030 CECP	$MMTCO_2e$	% change from 1990
Power* (including all building & transportation electricity)	28.0	12.9	13.2	53%↓	8.5 - 9.4	8.5	70%↓
Transportation	30.5	23.9	23.1	24%↓	22.5 - 22.7	18.7	39%↓
Residential Heating	15.3	12.9	11.4	25%↓	6.1	8.6	44%↓
Commercial & Industrial Heating	14.2	11.7	11.1	22%↓	7.8	7.5	47%↓
Industrial Processes	0.7	4.1	3.6	449%↑	2.5 - 4.4	2.5	281%↑
Natural Gas Distribution & Service	2.3	0.5	0.4	82%↓	0.4	0.4	82%↓
All Other Sources (Waste & Agriculture, no sublimits)	*3.4*	1.2	*1.0*	*72%↓*	*0.9*	*0.9*	*73%↓*
TOTAL	**94.3**	**67.2** (29%↓)	**63.8**	**32%↓**	49.1 – 52.1 (48% – 45%↓)	**47.2**	**50%↓**

Sublimits shown may be updated with additional policy feedback. Modeling will also be updated to reflect proposed changes to MassDEP GHG Inventory protocols.

Key Considerations for Policy Development

- MA is statutorily required to reduce emissions by 50% in 2030. The proposed policies in the 2025 and 2030 CECPs are a cohesive portfolio of policies, combined to reach that goal.

- Economy-Wide Decarbonization Pathway Analysis must meet the following objectives:
  1. Develop the **least-cost approach**
  2. Meet all **energy demands**, including reliability reserves
  3. Meet economy-wide **GHG emissions limits**

- **Policy strategies** are developed to**:**
  1. Enable **transition to a clean energy economy**
  2. Ensure **environmental justice and equity**
  3. Consider significant **stakeholder input** (see additional slide)
  4. Ensure **practicality and feasibility** (reduce admin burden)

Energy supply and delivery

Achieve GHG emission reductions

Consumer costs & benefits

Environmental justice and equity

Stakeholder input

Market transformation

Implementation feasibility

What Does 50% GHG Emissions Reduction by 2030 Look Like?

- **Transportation: 39% ↓** **(Estimated Actual Reduction was 22% in 2020)**
  - Zero Emissions Vehicle (ZEV) sales represent most new passenger vehicle sales and a growing share of medium and heavy-duty vehicles.
  - Massachusetts residents drive a bit less thanks to a combination of better bike and pedestrian infrastructure, more housing near transit, and fewer single occupancy commutes.
- **Buildings (Res. & Com.): 40% ↓** **(Estimated Actual Reduction was 12% in 2020)**
  - A third of homes have tighter building envelope and are heated and cooled by electric heat pumps.
  - Commercial and industrial buildings transition to electric or low carbon heating systems.
  - All building owners and occupants can access clear guidance, technical assistance, and gap funding for Clean Heat solutions.
- **Electricity: 70% ↓** **(Estimated Actual Reduction was 54% in 2020)**
  - More than two-thirds of electricity consumed in Massachusetts comes from renewable and clean energy sources.
  - Solar and offshore wind are established as regional economic powerhouses (initial modeling indicates >16,000 net new jobs by 2030), operating with considerable guidance to ensure grid reliability and avoid ecosystem and land impacts
- **Non-Energy & Industrial: 53%↓** **(Estimated Actual Reduction was 22% in 2020)**
  - More cooling systems use refrigerants that do not damage the ozone layer and are less potent greenhouse gases.
  - Less plastics, mattresses, and organic waste in our trash, and less trash overall.

Transportation Sector

	In Interim 2030 CECP	New for 2025 CECP	New for 2030 CECP
Key Elements of Policy Portfolio ✓ **Ongoing** ✓ **Completed** • **Not Started**	✓ Provide technical assistance for medium and heavy duty (MDHD) fleets ✓ Launch MDHD electric vehicle (EV) Incentive ✓ Adopt California Advanced Clean Cars 2 and Advanced Clean Truck standards. ✓ Explore point of sale rebate ✓ Investigate low-moderate income incentive ✓ Explore residential charging ✓ Propose revised rate structures and time-varying rates. ✓ Rideshare regulation to reduce commute vehicle miles traveled (VMT) by 15% by 2030 ✓ EV ready building codes	• **Proposed in MassTRAC:** ✓ Launch program to electrify school bus fleets • Launch program to electrify vehicles for hire • Launch zero-emission delivery program. ✓ Reform MOR-EV to create a point-of-sale incentive and additional incentive targeting high mileage or low- and moderate-income drivers • Increase support for outreach and education ✓ Build fast charging stations along highways • Create residential charging infrastructure program • Launch program on hard to electrify segments ✓ Implement MBTA Communities and Housing Choice ✓ Fully fund MBTA Bus Modernization Program ✓ Increase support to Shared Streets and Complete Streets Program • Launch E-bike Incentive.	
GHG Emission Sublimits	22.5 - 22.7 $MMTCO_2e$ (26% - 28% below 1990)	23.1 $MMTCO_2e$ (24% below 1990)	18.7 $MMTCO_2e$ (39% below 1990)
Key Targets & Metrics	• 750,000 passenger EVs on road by 2030 • Light-duty-vehicle miles traveled stabilized at 56 billion miles per year	• 200,000 passenger EVs on the road • 15,000+ public, level 2 and direct current fast charging (DCFC) EV chargers installed.	• 900,000 passenger EVs on the road • 50,000 MDHD EVs on the road • 7% reduction in VMT against baseline • 75,000 public, level 2 and DCFC EV chargers installed

Buildings Sector

	In Interim 2030 CECP	New for 2025 CECP	New for 2030 CECP
Key Elements of Policy Portfolio ✓ **Ongoing** ✓ **Completed** • **Not Started**	✓ High-performance stretch energy code for Green Communities opt-in **Mass Save®:** ✓ Limiting fossil fuel heating system incentives in the 2022-2024 Plan ✓ Phase out fossil fuel heating incentives in next plan ✓ State appliance standards by statute • Declining emissions cap on heating fuels by 2023 in consultation with the Commission on Clean Heat regarding the cap structure and levels	• Declining cap on building heat emissions and develop approaches to meet the cap, including a Clean Heat Standard by 2024 • Develop comprehensive Energy Transition approach to enhance Mass Save®, recommendation to legislature by Dec. 2023 • Develop building performance reporting methodology for the State no later than Dec. 2023 • Explore frameworks to provide clear guidance, technical assistance, and financial resources for all relevant state programs • Long-term utility infrastructure planning aligned with decarbonization; balance and mitigate consumer costs by 2024 ✓ Enhance consumer outreach and workforce development programming • Municipal Opt-In building scorecards at point of sales and lease in 2028 *(All above policies are in development based on discussion with the Commission on Clean Heat)*	
GHG Emission Sublimits	10.4 $MMTCO_2e$ (56% below 1990)	19.6 $MMTCO_2e$ (17% below 1990)	14.3 $MMTCO_2e$ (40% below 1990)
Key Targets & Metrics	• Deep weatherization in 20% of stock by 2030 • Electric heating in ~1 million residences • Equivalent effort (300-400 million square feet) in Commercial Sector. • 20% blend for fuel oil, 5% for pipeline gas by 2030	• Deep weatherization in 10% of stock by 2025 • Electric heating in ~500,000 residences: both whole home and hybrid heat (~400,000 households as of 2019) • Equivalent effort (100 million square feet) in Commercial Sector	• All metrics the same as in Interim 2030 CECP, except: • Expanded definition of electric space heating to explicitly include hybrid heating solutions (e.g., a heat pump serving greater than 50% of heating demand, with a back-up fossil fuel system)

Electricity Sector

	In Interim 2030 CECP	New for 2025 CECP	New for 2030 CECP
Key Elements of Policy Portfolio ✓ **Ongoing** ✓ **Completed** • **Not Started**	✓ Execute existing solar programs and offshore wind procurements ✓ Complete the New England Energy Connect project ✓ Develop and coordinate regional planning and market; work with New England states on ISO-New England direction ✓ Raise Clean Energy Standard to 60% by 2030 (MassDEP rulemaking) ✓ Ensure that municipal electricity suppliers are decarbonized on pace ✓ Initiate solar siting and interconnection studies ✓ Make investments in offshore wind industry ✓ Monitor and drive forward distribution system planning and grid modernization	• **Required by 2021 Climate Law:** ✓ Additional offshore wind capacity procurements authorized • Renewable Portfolio Standard raised to 40% by 2030 ✓ Municipal GHG Emissions Standard set into law ✓ Funding allocated to MassCEC for workforce development ✓ Equity and environmental justice required to be included in siting board decisions • All other policy elements progressing incrementally since 2020	
GHG Emission Sublimits	9.4 $MMTCO_2e$ (67% below 1990)	13.2 $MMTCO_2e$ (53% below 1990)	8.5 $MMTCO_2e$ (70% below 1990)
Key Targets & Metrics	• 7 GW of new capacity (including all new solar, hydro, and offshore wind (OSW)) • Project pipeline of 8 GW of additional clean energy projects for 2030 in planning. • Emissions intensity from imported electricity limited to 2 $MMTCO_2e$	• First OSW farm in operation • Various clean energy standard regulation updates completed • Comprehensive planning completed by 2024	• 2.8 GW OSW operating by 2030 + other clean resources in region + project pipeline for 2030's. • 50,000 GWh of clean electricity used by MA customers in 2030 • Preliminary modeling: >16,000 jobs by 2030

Non-Energy & Industrial Sector

	In Interim 2030 CECP	New for 2025 CECP	New for 2030 CECP
Key Elements of Policy Portfolio ✓ **Ongoing** ✓ **Completed** • **Not Started**	✓Hydrofluorocarbon (HFC) prohibitions in MassDEP regulation 310 CMR 7.76 • Explore additional regulations to minimize SF_6 ✓Best practices for limiting waste, wastewater, and agricultural emissions	✓US EPA implementation of international Kigali agreement to gradually reduce the consumption and production of hydrofluorocarbons (HFCs) ✓Implement the 2030 Solid Waste Master Plan, updated in Oct. 2021 • Change approach for Gas System Enhancement Plans to upgrade leaky pipes and evaluate alternatives to replacement in areas with low gas system utilization (e.g., electrification and retirement)	
GHG Emission Sublimits	9.7 $MMTCO_2e$ (19% below 1990)	7.9 $MMTCO_2e$ (35% below 1990)	5.7 $MMTCO_2e$ (53% below 1990)
Key Targets & Metrics	• Emissions from industrial energy consumption, industrial processes, natural gas distribution system, solid waste, insulated switch gears, wastewater, and agricultural practices remain steady. • F-gas emissions kept below 5 $MMTCO_2e$, or even rolled back by 2030.	• HFC emissions below 3.5 $MMTCO_2e$ by 2025 (22% reduction from 2020 levels) • Maintain use and capacity of anaerobic digesters	• 30% reduction in waste disposal by 2030 • HFC emissions below 2.4 $MMTCO_2e$ by 2030 (46% reduction from 2020 levels) • Maintain use and capacity of anaerobic digesters

Natural and Working Lands

	In Interim 2030 CECP	New for 2025 CECP	New for 2030 CECP

Key Elements of Policy Portfolio
 	
✓ **Ongoing**
✓ **Completed**
• **Not Started**
	• Explore incentive programs designed to achieve no-net-loss of forest and farmland
	• Implement and incentivize best soil carbon management practices
	✓ Study of solar siting that minimizes environmental impacts
	• Incentivize the regional use of durable wood products
	✓ Develop measurement, accounting, and market frameworks necessary to support development of a regional carbon sequestration offset market by the end of 2025
		• Propose to MEPA Advisory Board that development projects clearing forest must undergo MEPA environmental impact review
		• Evaluate state-funded construction projects on cost of carbon emissions and prioritize native lumber
		• Require reporting of where cleared trees are milled
		• Study end uses of MA timber, and opportunities and workforce to scale local durable wood market
		• Require no-net-loss of carbon in replicated wetlands
		• Streamlined permitting for wetland restoration and development in outer 50 ft. of wetland buffer zone
		• **Discussed in Resilient Lands Initiative:**
		  • Expand state land acquisition, conservation and planning grants, tree planting, farmland protection, and healthy soils incentives
		  • Launch Forest Resilient & Forest Viability Programs
		  • Designate a portion of the Municipal Vulnerability Preparedness (MVP) grants for greening projects.	

Key Targets & Metrics	N/A	• 28% of NWL in MA permanently protected from conversion • At least 5,000 acres of new tree cover	• 30% of NWL in MA permanently protected from conversion • 20% of private forest & farmlands managed for carbon and resilience • At least 16,100 acres of new tree cover • No net loss of stored carbon in wetlands • 20% of MA wood used as durable wood products in MA

Next Steps

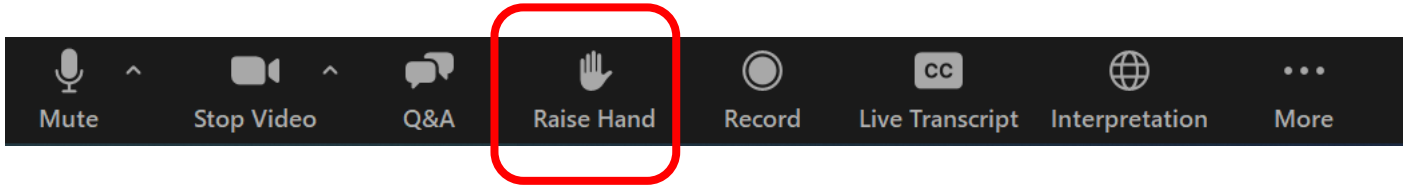
- **Receive oral comments on the proposed emissions limits, sublimits, goals, and policies for the 2025 and 2030 CECP during upcoming public meetings.**
  - Public hearings on April 14th and 15th
- **Receive written comments on the proposed emissions limits, sublimits, goals, and policies for the 2025 and 2030 CECP until April 30, 2022.**
  - Submit written comments at this portal or email gwsa@mass.gov
- **Review and synthesize submitted comments.**
- **Update the proposed emissions limits, sublimits, goals, and policies based on final modeling results.**
- **Submit 2025 and 2030 CECP to Legislature and post on www.mass.gov/2030CECP by July 1, 2022.**

Oral Comments and Questions

- **To provide oral comments:**
  - Click on “Raise Hand” if you’re joining by Zoom—You can unmute yourself once we call on you.
  - Press *9 if you’re joining by phone—You can press *6 to unmute yourself when we call on you.

- **To ask a question, please submit your question in the Q&A box. We may answer the questions if time allows.**

Written comments on the proposed emissions limits, sublimits, goals, and policies are accepted at this form and gwsa@mass.gov until April 30, 2022. Comments in the Q&A box and Chat will not be considered written comments.



Definition of Terms and Acronyms

Explanations of Terms and Acronyms

- **GHG** – Greenhouse gas, such as carbon dioxide (CO_2), methane (CH_4), different types of hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF_6), that trap heat and cause the average global air temperature to rise, thus changing weather patterns globally.
- **GHG inventory** – A list of emission sources and their annual emissions quantified using standardized methods.
- **Fluorinated gas** – Greenhouse gas that have fluorine, such as different types of hydrofluorocarbons (HFCs) and and sulfur hexafluoride (SF_6).
- **$MMTCO_2e$** – Million metric tons of carbon dioxide equivalence. This is a measure of how much greenhouse gas is emitted into our atmosphere. An emission of 1 $MMTCO_2e$ is equivalent to burning 112,523,911 gallons of gasoline.
- **Emission limits** – The level at which greenhouse gas emissions in Massachusetts can not exceed.
- **Emission sublimits** – The level at which greenhouse gas emissions from a specific sector can not exceed.
- **Carbon Sequestration** – The removal and storage of carbon dioxide from the atmosphere, commonly by plants and soil.
- **Fuel blending** – The mixing of gasoline, diesel, or natural gas with different materials to reduce the amount of greenhouse gas emitted from their usage.
- **Biomass** – Organic matter, such as wood, that can be burned to produce electricity and heat.
- **Ground-mount solar** – Solar panels that are set up on the ground to capture energy from the sun to create electricity.
- **Rooftop solar** – solar panels that are installed on top of buildings.
- **Stretch code and Net Zero Code** – These are different standards for energy usage in buildings and tightness of the building shell for which newly constructed buildings must meet.
- **Anaerobic digesters** – Sealed tank that allow microorganisms to break down sewage and organic waste without using oxygen. The process emit methane gas that are captured and burned to create electricity.

Explanations of Terms and Acronyms

- **CECP** – Clean Energy and Climate Plan
- **EEA** – Executive Office of Energy and Environmental Affairs
- **EV** – Electric vehicles powered by battery or hydrogen fuel cell
- **GW** – Gigawatt
- **GWh** – Gigawatt hours is unit of energy that is equivalent to one million kilowatt hours, and often used as a measure of the output of large electricity power stations
- **MassCEC** – Massachusetts Clean Energy Center
- **MassDEP** – Department of Environmental Protection
- **MEPA** – Massachusetts Environmental Protection Act
- **NWL** – Natural and working lands as defined in Chapter 8 of the Acts of 2021.
- **VMT** – Vehicle miles traveled