



2050 Roadmap: Building Solutions to Address Climate Change in the Commonwealth

March Public Meetings



Agenda

- Welcome and logistics
 - Audio from meeting is being recorded and will be posted online
- GWSA and Integrated Climate Solutions
- GHG Emissions Inventory
- New Goal: Net-Zero Emissions by 2050
- 2050 Decarbonization Roadmap Study
- 2050 Preview: Decarbonization and Net-Zero Emissions
- Audience Feedback

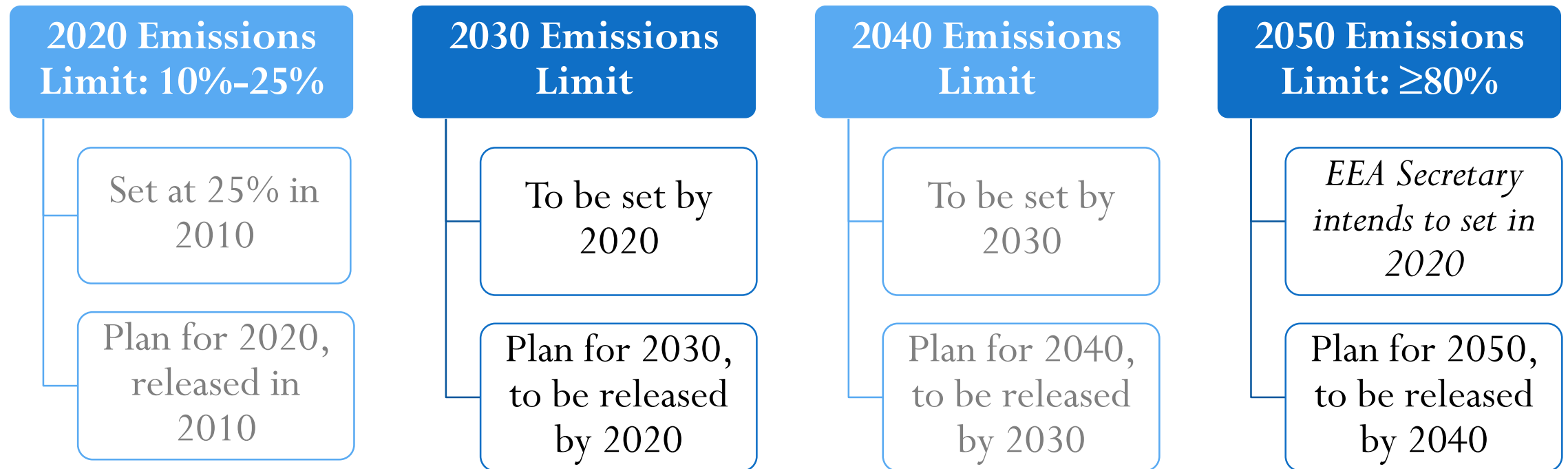
GWSA and Integrated Climate Solutions

Global Warming Solutions Act (GWSA)

- The GWSA “was passed to address the grave threats that climate change poses to the health, economy, and natural resources of the Commonwealth. The act is designed to make Massachusetts a national, and even international, leader in the efforts to reduce the greenhouse gas emissions that cause climate change.” *NEPGA v. DEP* (2018)
- Requires a comprehensive, science-based approach – “evaluate the total potential costs and economic and noneconomic benefits of various reduction measures to the economy, environment and public health, using the best available economic models, emissions estimation techniques and other scientific methods” G.L. c. 21N § 4(d)

Global Warming Solutions Act (GWSA)

- GWSA requires 10-year emissions limits (percentage of 1990 baseline level) together with implementation plans to achieve them:



- Emissions limits are legally binding. *Kain v. DEP* (2016)

Integrated Climate Solutions

Executive Order 569

Section 1

“ensure that efforts to meet greenhouse gas emissions limits are consistent with and supportive of efforts to prepare for and adapt to the impacts of climate change and extreme weather events”



GWSA

Section 10(a)

"policies and strategies for ensuring that adaptation and resiliency efforts complement and do not conflict with efforts to reduce greenhouse gas emissions and contribute to meeting statewide emission limits" and include "strategies that conserve and sustainably employ the natural resources of the commonwealth."

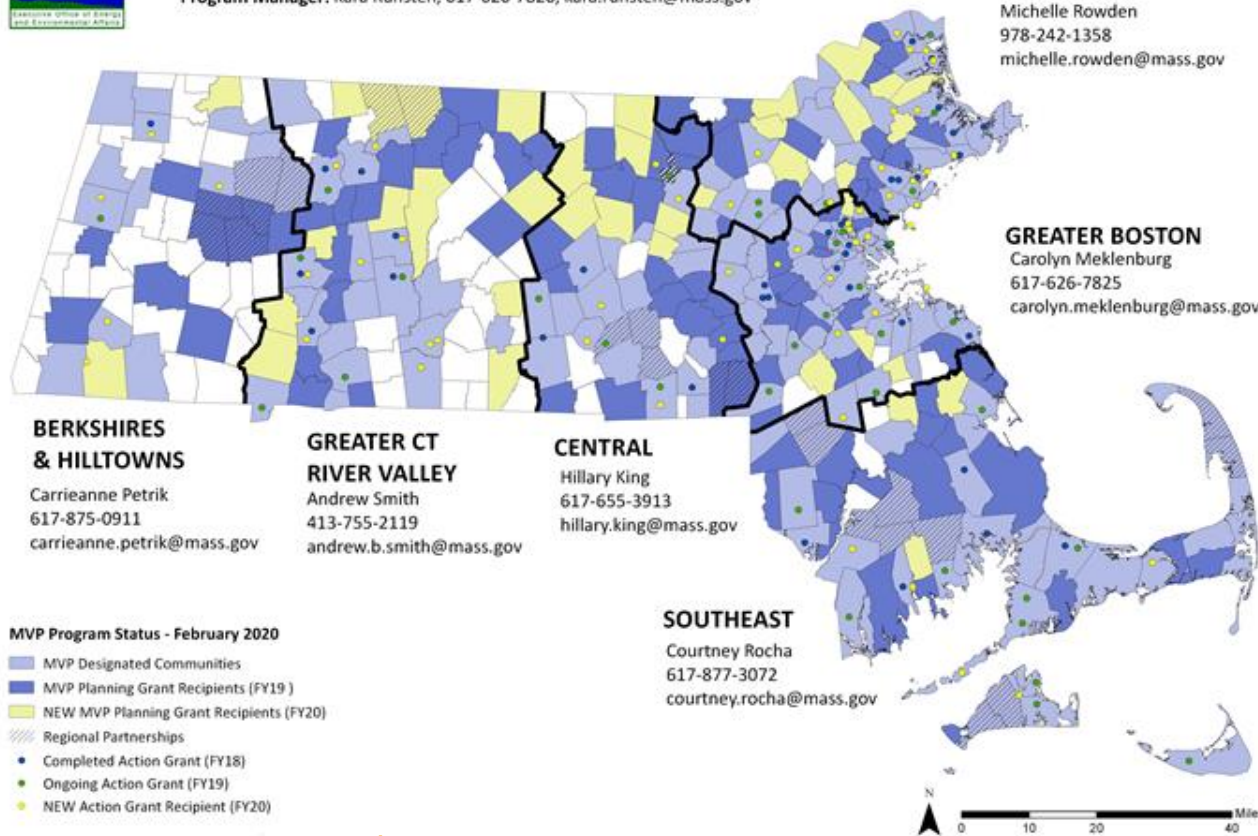
Building a Climate-Resilient Commonwealth

Local partnership



Municipal Vulnerability Preparedness (MVP) Program

Program Manager: Kara Runsten, 617-626-7826, kara.runsten@mass.gov



www.mass.gov/municipal-vulnerability-preparedness-program

Leading by Example

RMAT: Resilient MA Action Team

Responsible for the **State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)** implementation, monitoring, and maintenance, with representatives from each Secretariat and key state agencies



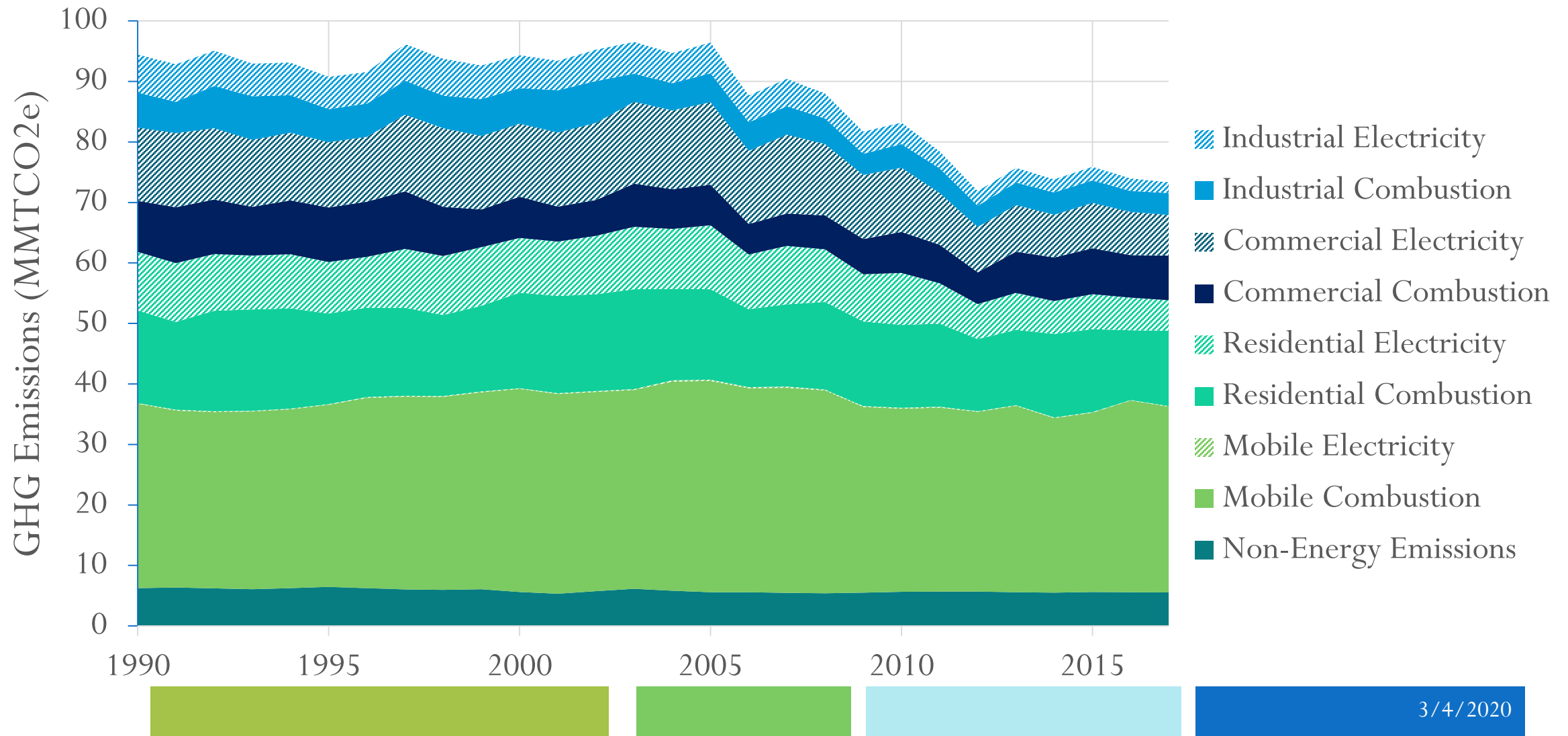
First year initiatives

- State Hazard Mitigation and Climate Adaptation Plan Action Tracker (www.resilientma.org)
- Development of climate resilience standards and capital planning evaluation tools for agencies

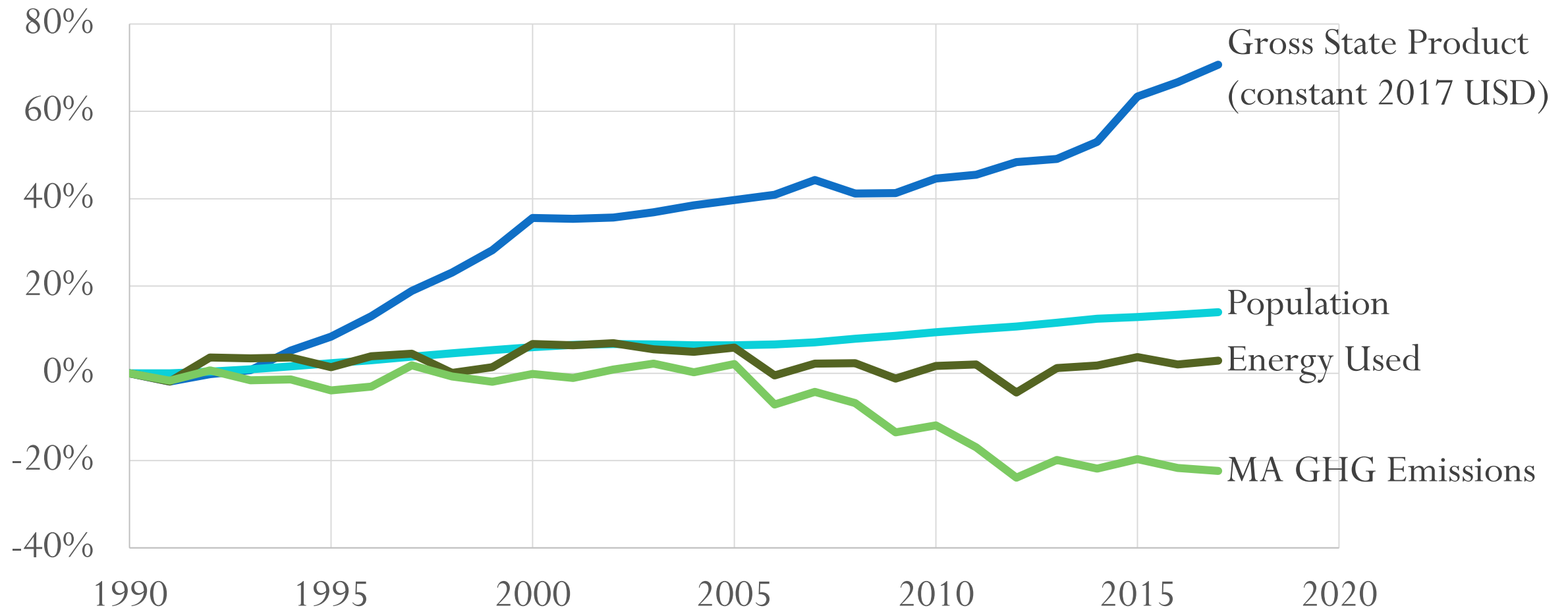


Greenhouse Gas (GHG) Emissions Inventory

Historical GHG Emissions in MA by Major Sectors



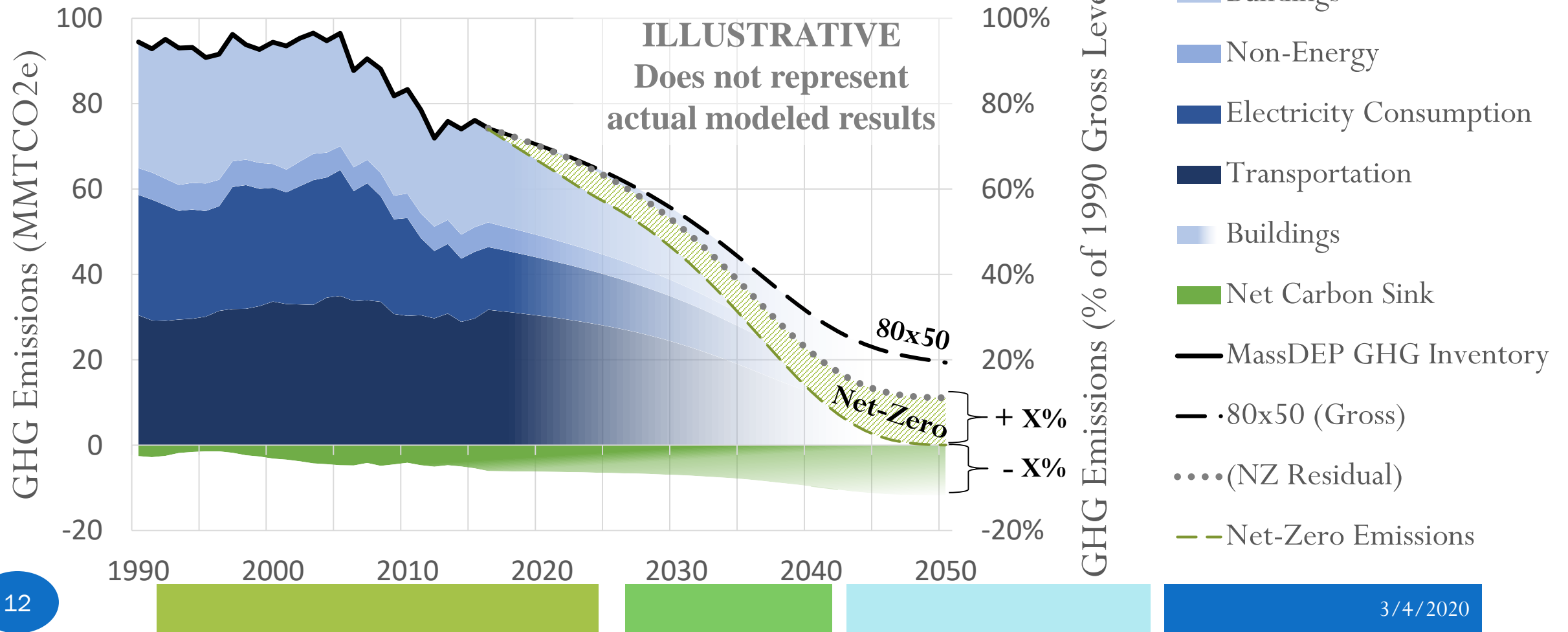
MA Economy Grows Even As Emissions Decrease



New Goal: Net-Zero Emissions by 2050

What is Net-Zero Emissions?

MA Historical & Hypothetical Future GHG Emissions

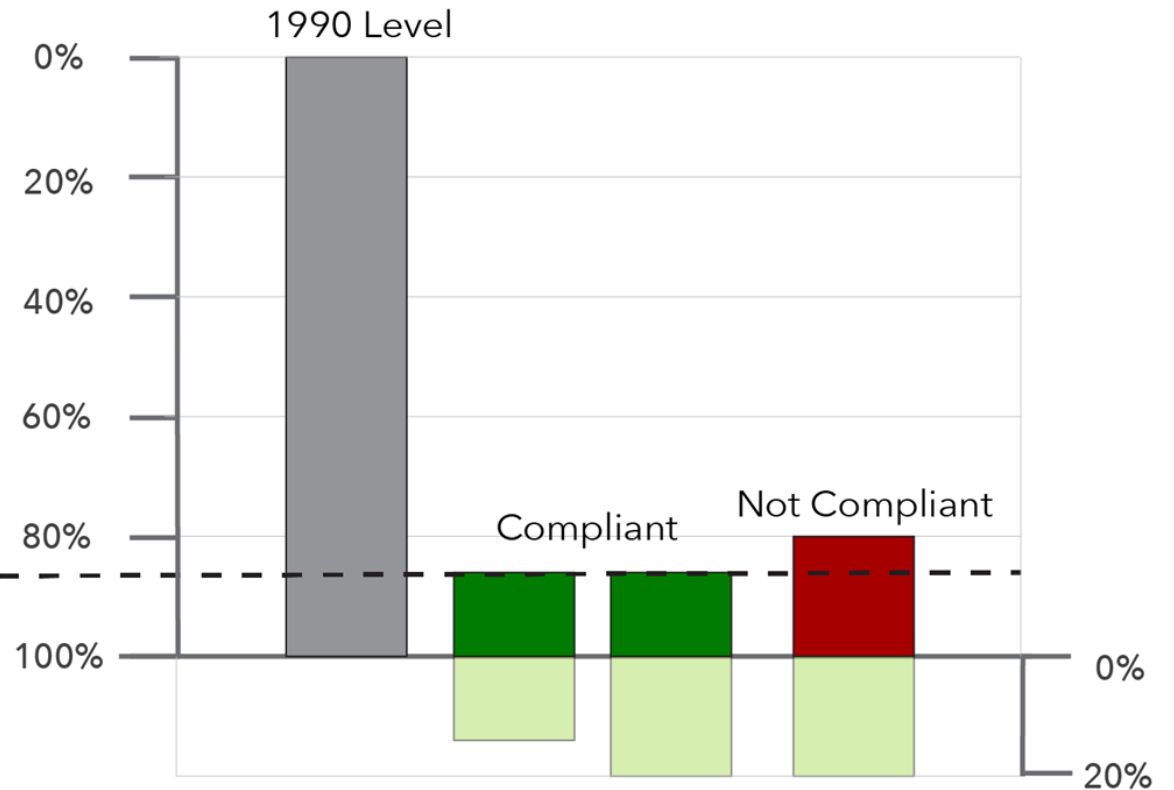


2050 Emissions Limit: Submit Comments at www.mass.gov/2050Roadmap by 4/10/2020

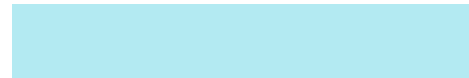
A level of statewide greenhouse gas emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of emissions be greater than a level that is [80, 85, 90]% below the 1990 level.

Maximum Allowable Emissions

REDUCTION IN EMISSIONS



CARBON EQUIVALENT REMOVED AND STORED



3/4/2020

The “2050 Roadmap”

Roadmap to a Decarbonized MA

- **GOAL:** Identify the strategies, policies, and implementation pathways for MA to achieve at least 80% GHG reductions by 2050, and the priorities to achieve an interim goal by 2030.
- The Study will characterize impacts of policy implementation, including but not limited to:
 - GHG emissions
 - Costs and benefits
 - Socioeconomic equity
 - Public health impacts

- Outputs include:

Roadmap to a Decarbonized MA by 2050
(and 5 technical reports)

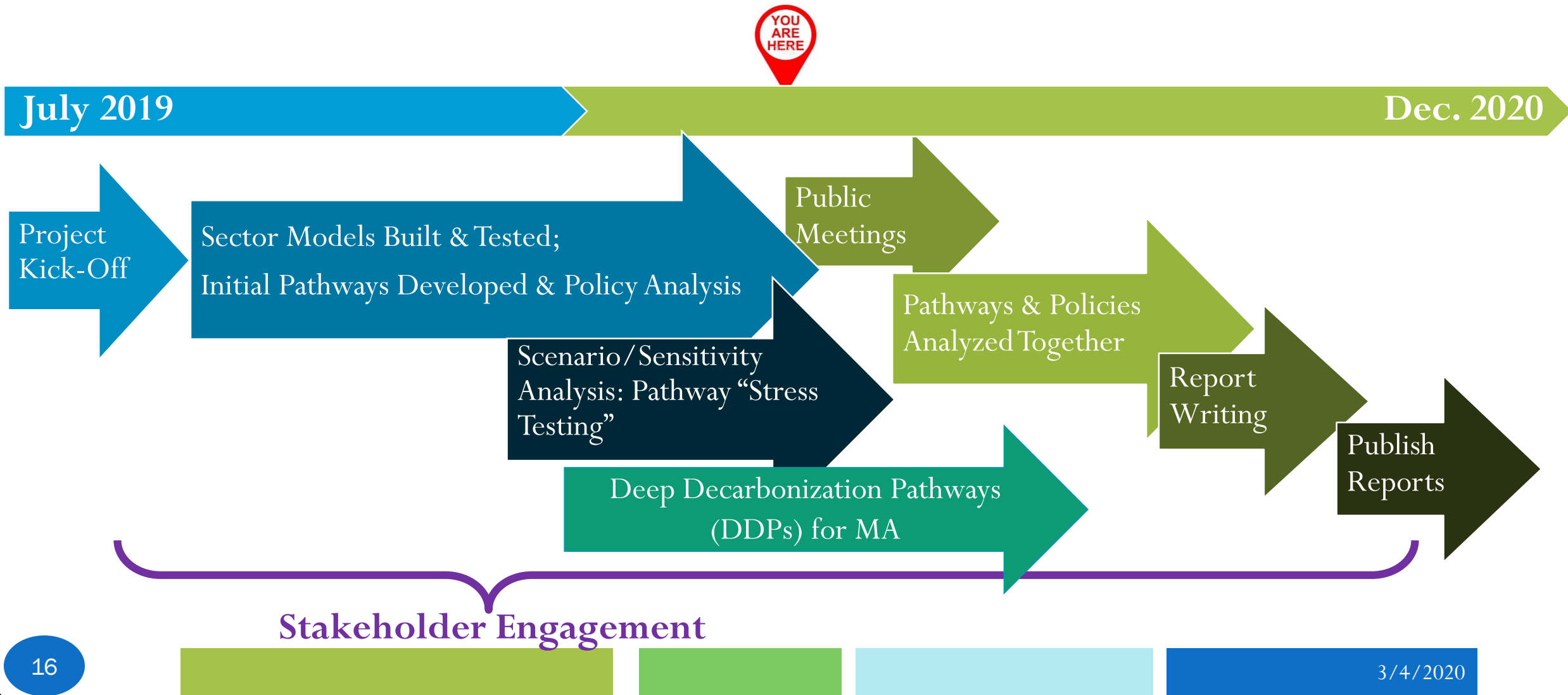


2030 GHG emissions limit
(to be set by EEA Secretary)

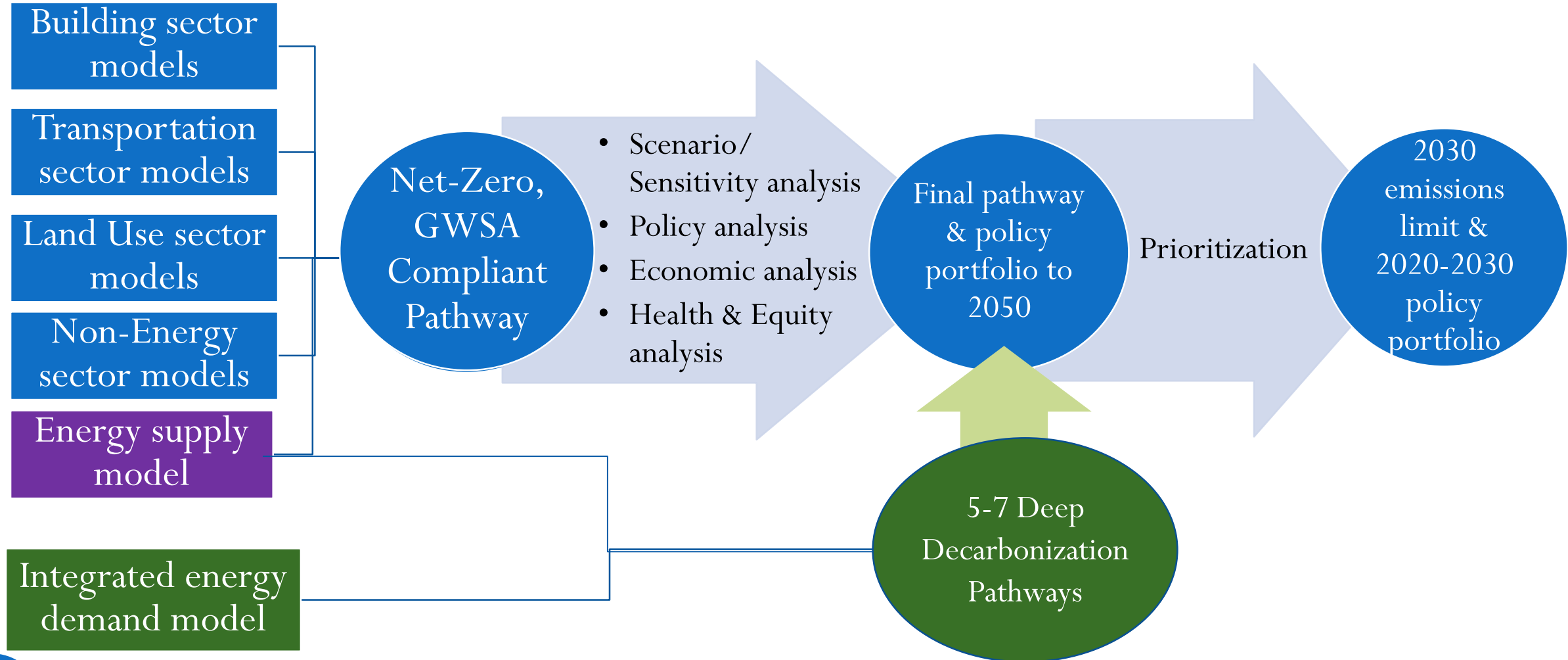


MA Clean Energy and Climate Plan for
2030

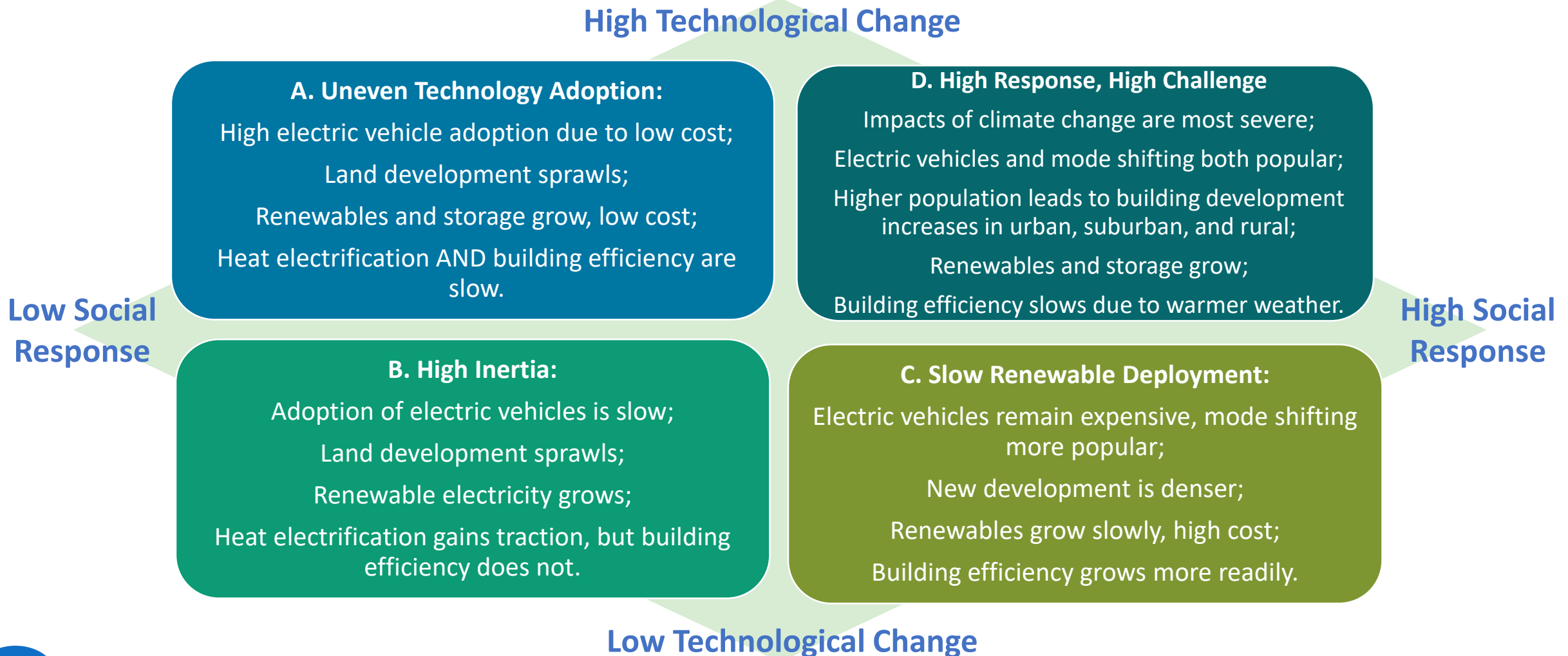
Project Components and Timeline



Analytical Process



Scenario/Sensitivity Analysis



2050 Preview: Decarbonization and Net-Zero Emissions

Pillars of Decarbonization & Net-Zero



Increase Energy Efficiency:

Building weatherization, passive house construction, etc.



End-Use Fuel Switching:

Electric cars, hydrogen trucks, heat pumps, biofuels, etc.



Expand Clean Energy:

Renewable electricity, grid storage, advanced biofuels, etc.



Increased Carbon Sequestration:

Conserving natural lands, best management practices



Icons made by [Freepik](https://www.freepik.com) from www.flaticon.com

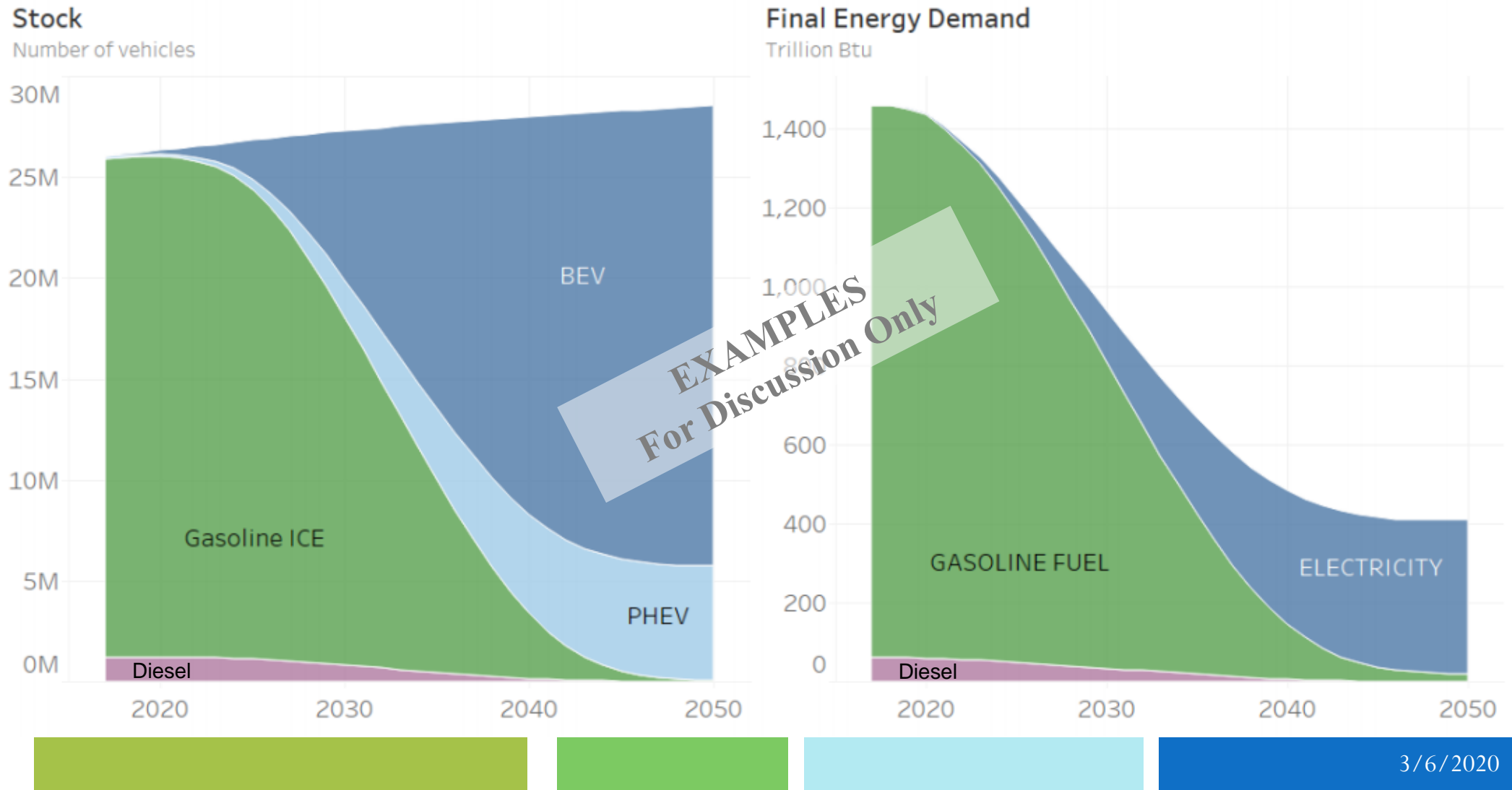
Massachusetts in 2050



Image Credit: [Renewable Energy World](#)

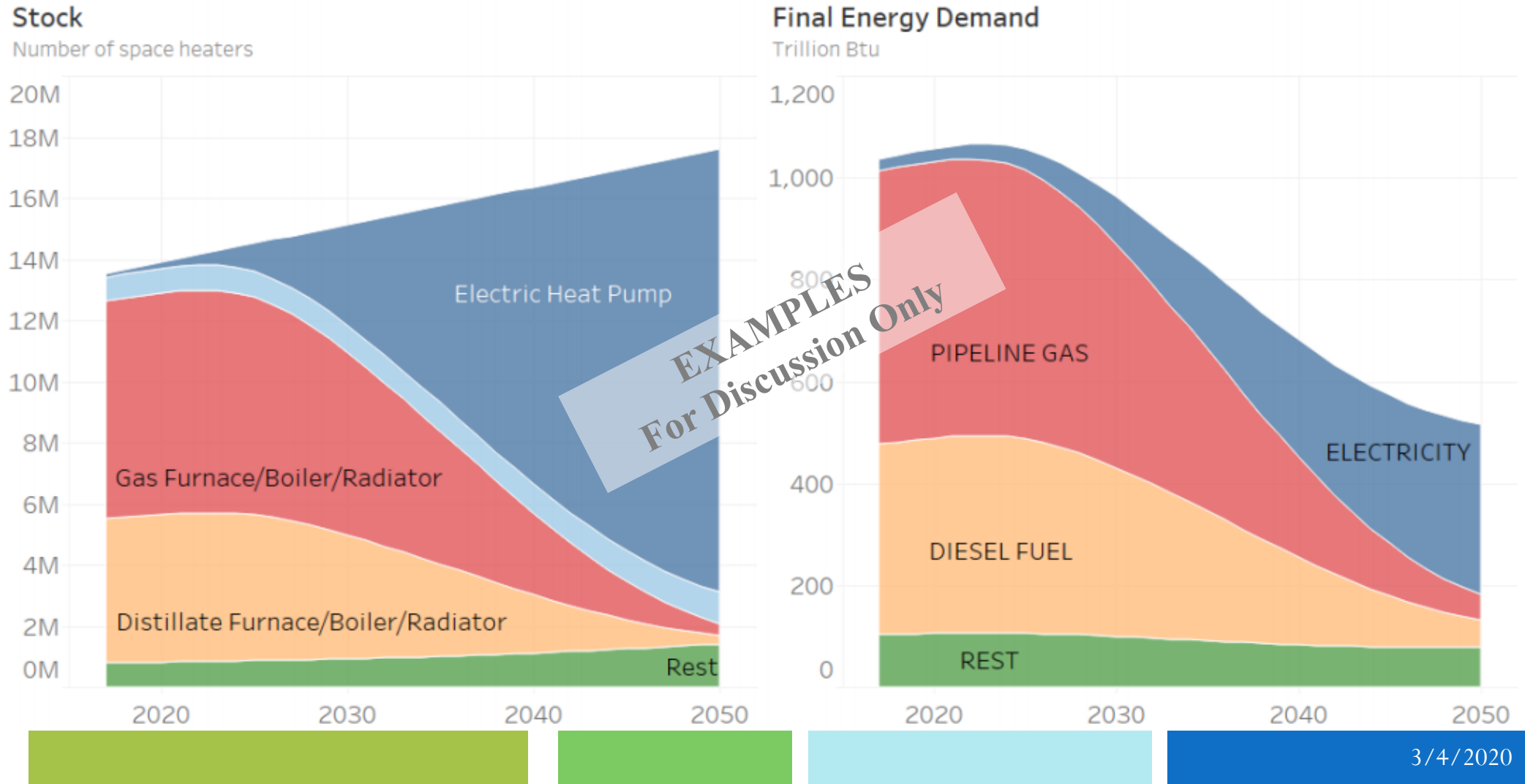
Personal vehicles: moving from gasoline to electric

Source: [Northeast Deep Decarbonization Study \(2018\)](#)

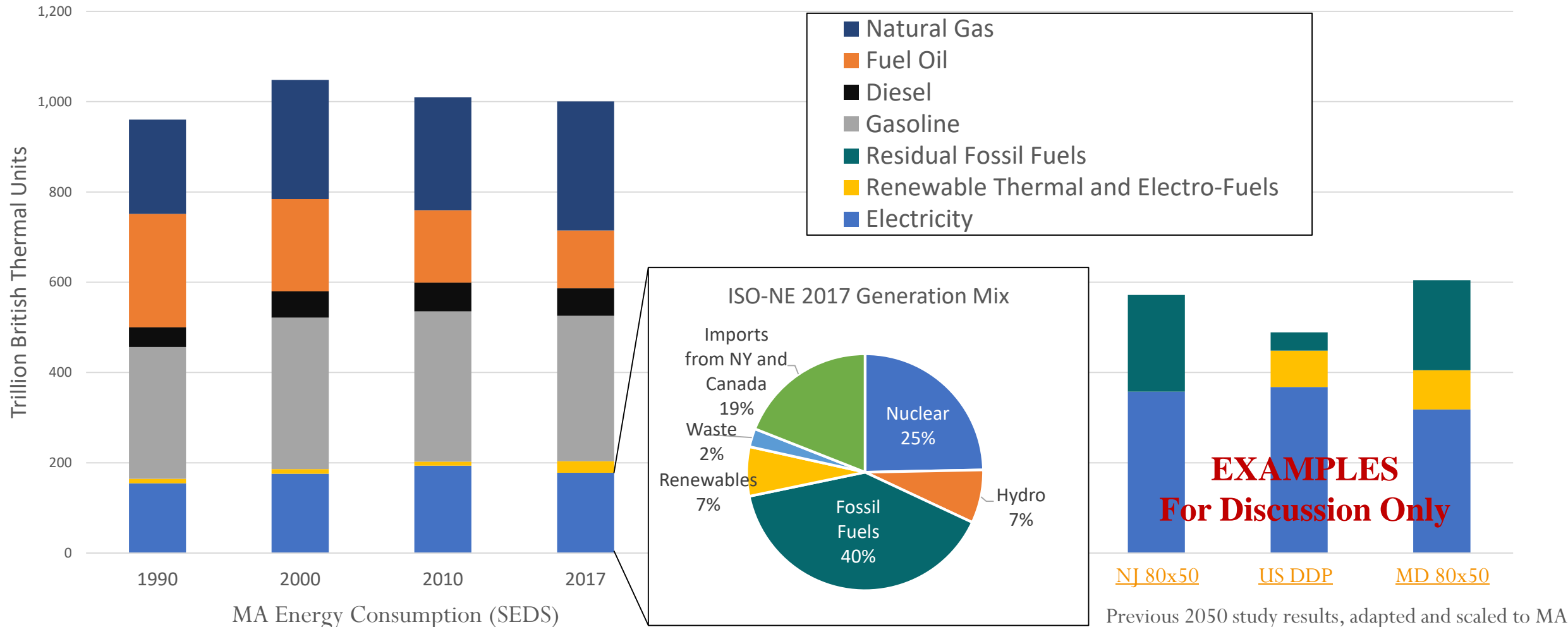


Transforming how buildings are heated

Source: [Northeast Deep Decarbonization Study \(2018\)](#)

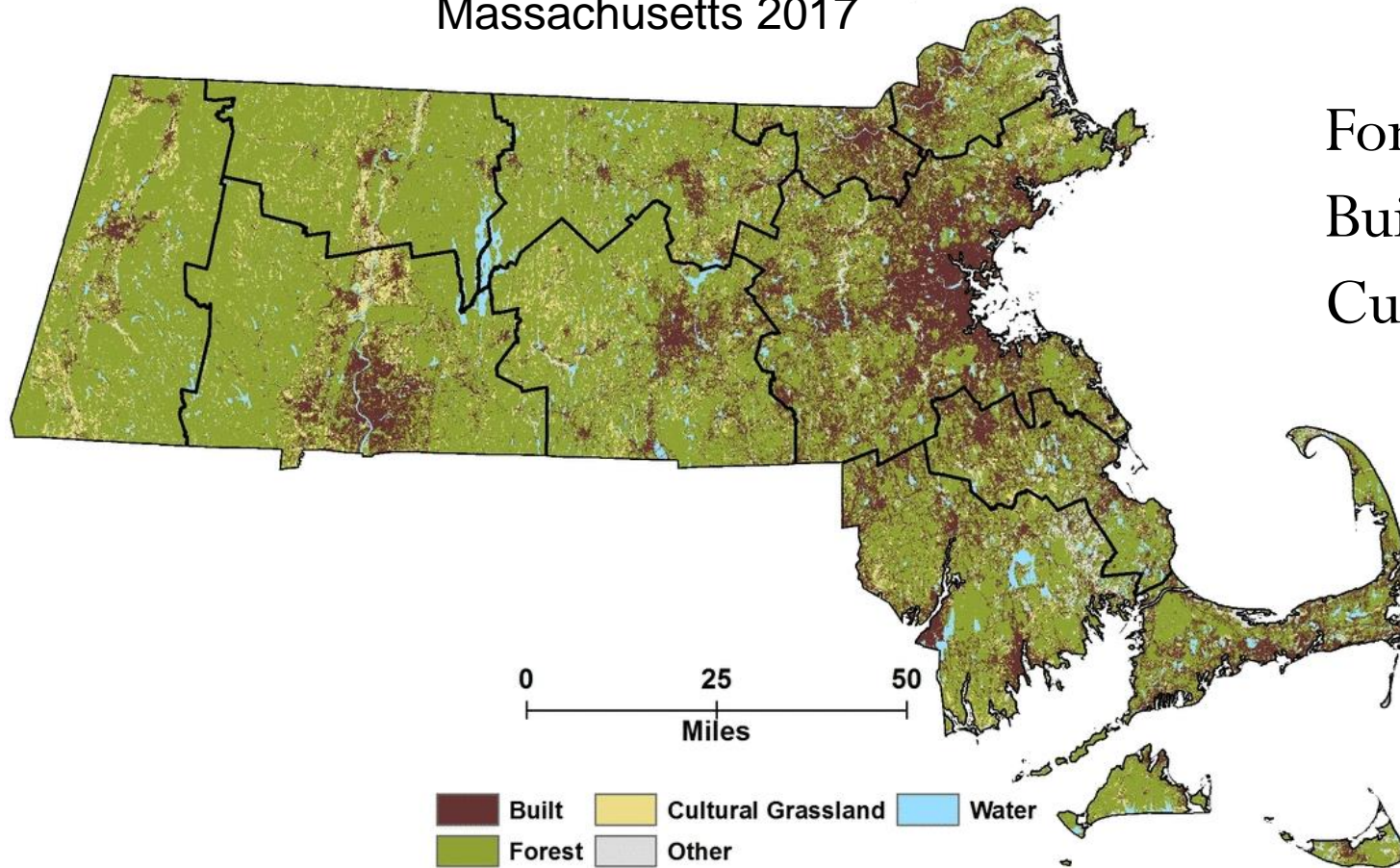


Energy resources needed to support these transformation & increased energy demand



MA's Land Cover Distribution

Massachusetts 2017



Forest: 3.3 million acres

Built: 1.1 million acres

Cultural Grassland: 0.3 million acres

1.4 million acres of natural
lands conserved to date

Source: Harvard Forest (2019)

See yourself in 2050



Image Credit [Renewable Energy World](#)

Audience Feedback

- Please come up to the microphone and provide feedback on any of the information presented this evening, including, but not limited to:
 - The proposed emissions limit for 2050
 - Suggestions for implementation pathways, policies, programs, etc. to consider for greenhouse gas mitigation
 - Feedback on the anticipated systems transformations for achieving net-zero emissions
- Please limit your remarks to 3 minutes to allow time for everyone to speak

THANK YOU

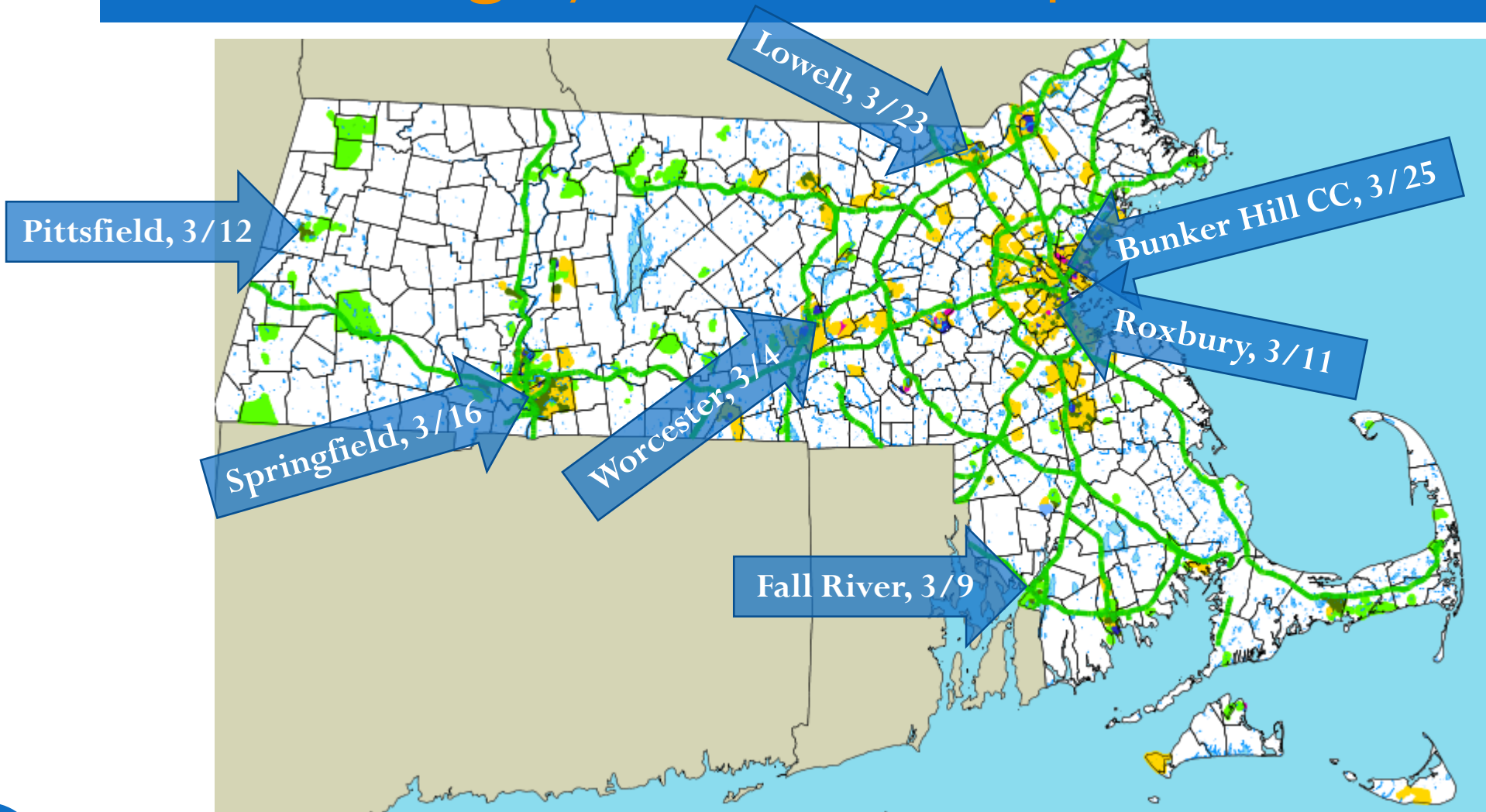
Please feel free to provide written feedback on the 2050 emissions limit or the study more broadly at

www.mass.gov/2050Roadmap

EXTRA SLIDES

2050 Roadmap Public Meetings

www.mass.gov/2050Roadmap



Study Team

Stakeholders

- State Agencies & Governor's Office
- GWSA Implementation Advisory Committee (IAC)
- Technical Steering Committee
- Focus Groups
- Community Members

Research Team

- Cadmus Group
- ARUP
- Evolved Energy Research
- Harvard Forest
- VEIC
- RSG
- AEG
- Converge Strategies
- Dr. Jonathan Krones*
- Dr. Wendy Jacobs*

*Independent Consultant

Sector Models and Analytical Process

