GWSA IAC Meeting

February 15, 2018

Executive Office of Energy and Environmental Affairs

Meeting Agenda

- Updates
- Discussion on Transportation Listening Sessions feedback
- Discussion on approach to setting 2030 emissions limit
  - Focus: Transportation Sector vehicles and fuels
- Discussion on draft policy framework
- Subcommittee report out

Transportation Listening Sessions Feedback

Response: Overview

- Over 1100 comments (oral and written) received:
  - ~40% of comments received came from letter-writing campaign coordinated by Union of Concerned Scientists (UCS)
  - Affiliation of commenters not participating in UCS campaign:
    - 62% NGOs, incl. small local advocacy groups (e.g., Bike Belmont);
    - 19% residents, incl. those identifying as private citizens or giving no affiliation;
    - 14% private sector rep., incl. industry trade assoc.;
    - 5% gov't rep., from the U.S. EPA to Cambridge City Hall.

Next Steps

- Publish summary paper in the spring.
- Work with TCI-member states on regional approach.
- Work with Commission on the Future of Transportation.

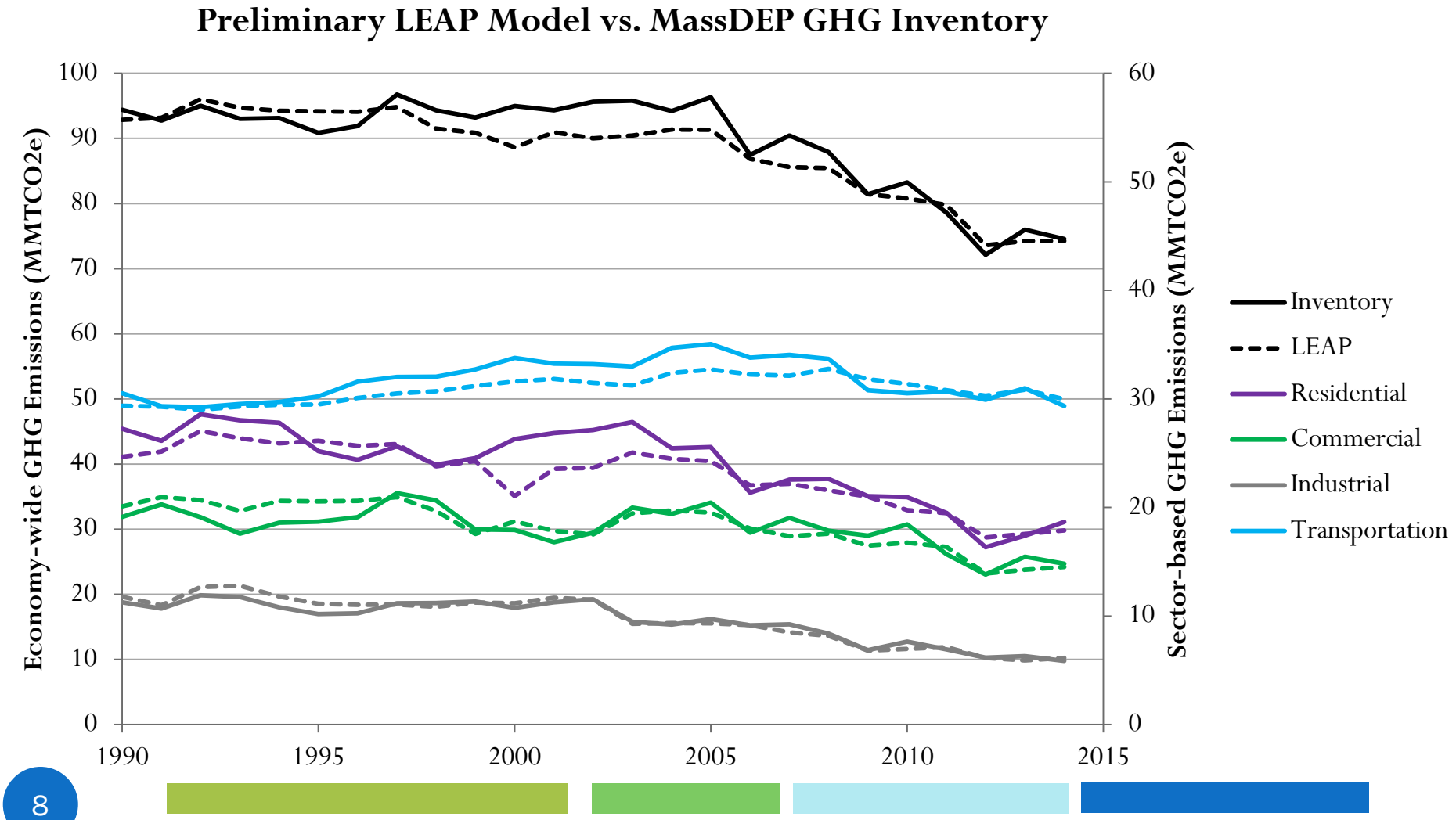
Preparations for setting 2030 emissions limit

Transportation Sector vehicles and fuels

Approach to setting 2030 emissions limit

- **Approach**
  - Scenario analysis to 2050 in LEAP
  - Sector-specific modeling/analyses to feed into scenario analysis
  - Cost study to estimate costs associated with potential policies or strategies
  - Results from scenario analysis will inform EEA Secretary of feasible range for 2030 emissions limit that will position MA to meet the 2050 emissions limit
- **Components of Scenario Analysis**
  - Reference Case: scenario consisting of only existing policies
  - Policies Scenarios: various scenarios that represent expansion of existing policies or addition of new policies
- **Timeline**
  - 2018: Reference Case
  - 2018-2020: Policy scenarios, sector-specific modeling/analyses
  - 2019-2020: Cost study

Model Calibration



Reference Case

- Reference Case is a scenario consisting of only existing policies
  - Aims to answer: Without new policies or expansion of existing policies, what will GHG emissions in MA look like in 2050?
- Includes some global assumptions about ongoing non-policy trends, some examples:
  - Decrease in annual HDDs as the climate warms.
  - Gradual changes in housing stock as population grows and new housing units are built.
  - Ongoing fuel use trends in the Commercial, Industrial, and Non-Highway Transportation sectors.

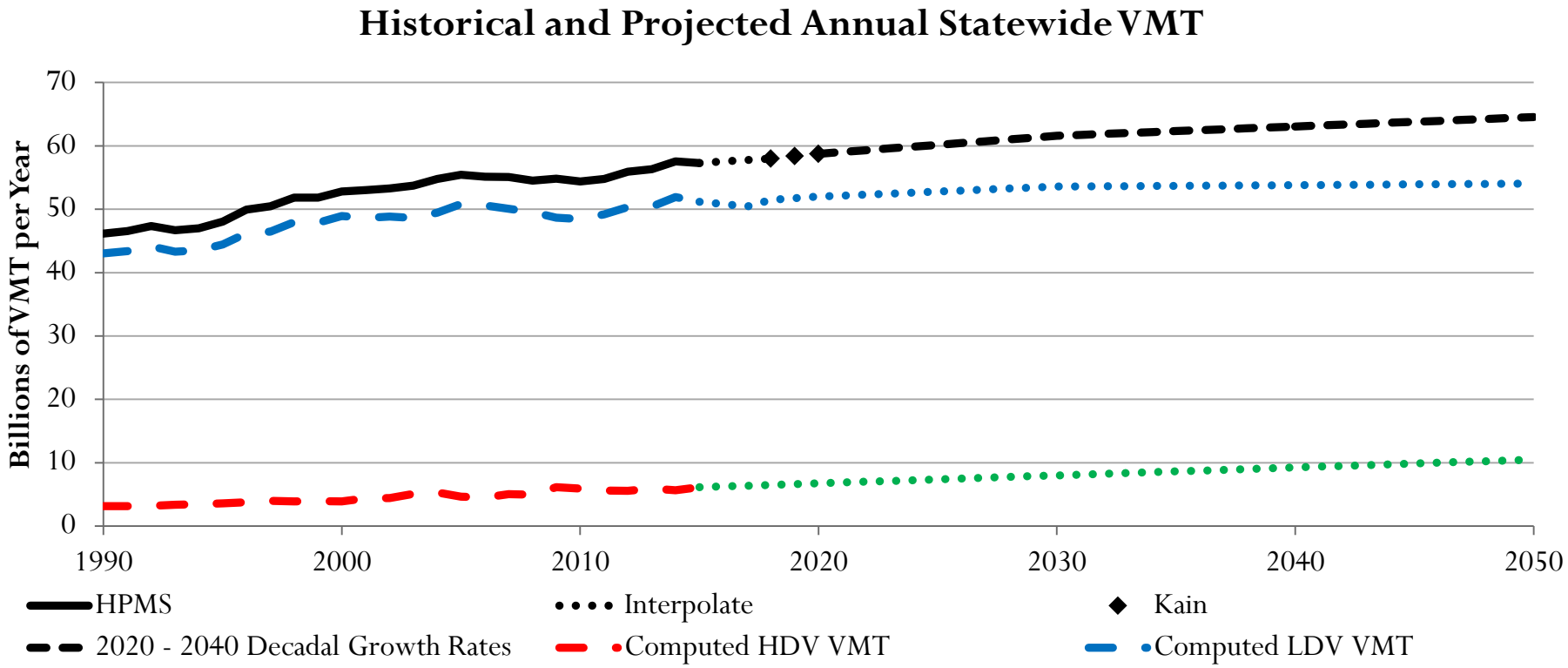
Reference Case Policies

- 310 CMR 7.40
  - ZEVs represent an increasing percentage of annual new car sales, reaching 22.5% of sales in 2025 and 22.5% of the fleet by 2050 due to turnover.
- 8-State MOU
  - Total ZEV fleet at least 300,000 vehicles by 2025.
- CAFE/Pavley Fuel Economy Standards
  - New light-duty vehicle (LDV) fuel economies match the U.S. EPA's on-road emission standards for 2017 – 2021 (and tentative standards for 2022 – 2025).
- Transportation Improvement Plans
  - VMT forecasts include MassDOT's projected impacts from statewide and regional plans, representing "possible outcomes within a range of land-use, development, and transportation scenarios dependent on numerous other influencing factors."

Reference Case: Data Sources

Category	Variable	Years	Unit	Source
VMT	Total VMT	2003 – 2015	miles	MassDOT/HPMS
	Total VMT	2018 – 2020	miles	MassDEP 60.05 Rulemaking
	Total VMT	2020 – 2040	% growth	MassDOT/HPMS
	HDV / LDV VMT Ratio	1990 – 2014	miles	Calculated from EIA, EPA, and MassDEP data.
Counts	Car Counts	2000 – 2014	vehicles	Calculated from MA DOR Excise Records and MassDEP I&M Reports
	Light Truck Counts	2000 – 2014	vehicles	Calculated from MA DOR Excise Records and MassDEP I&M Reports
	Car Counts	2017	vehicles	RMV Database
	Light Truck Counts	2017	vehicles	RMV Database
Fuel Economy	LDV Avg. Fuel Economy	2009 – 2014	MPG	MAPC Vehicle Census
	LDV New Fuel Economy	2017 – 2025	MPG	Federal CAFE standards / California LEV regulations
	EV Fuel Economy	2015 – 2025	MPG	EIA Energy Outlook
EV Sales & Fleets	EV Fleet	2011 – 2017	Vehicles	MassDEP Quarterly Log
	EV Sales	2018 – 2025	Vehicles	310 CMR 7.40

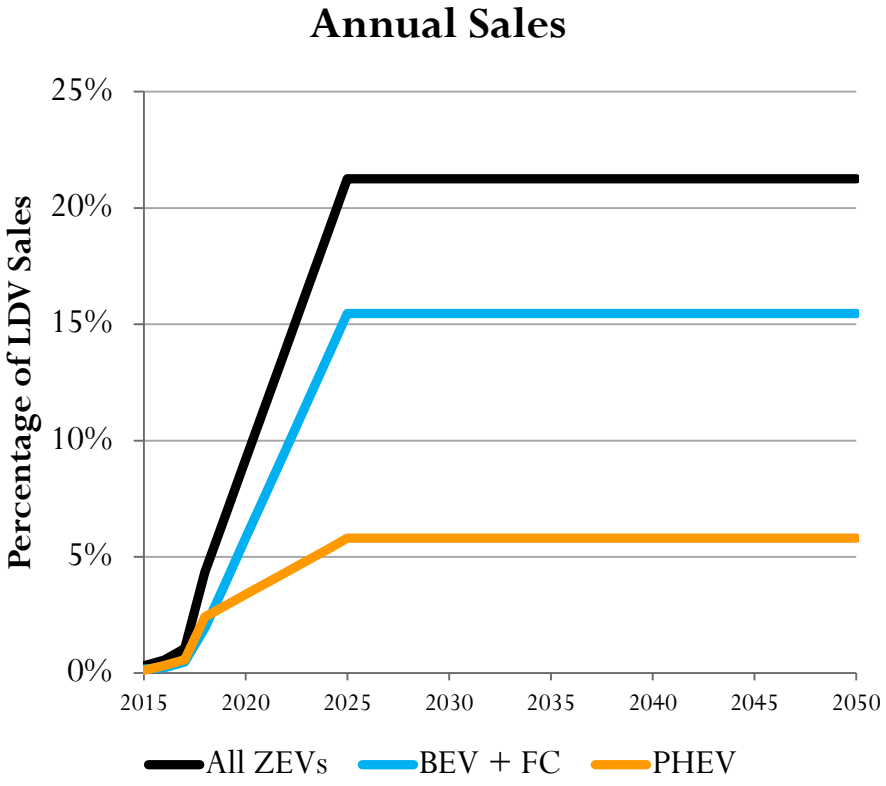
Reference Case Assumptions: Annual Statewide VMT

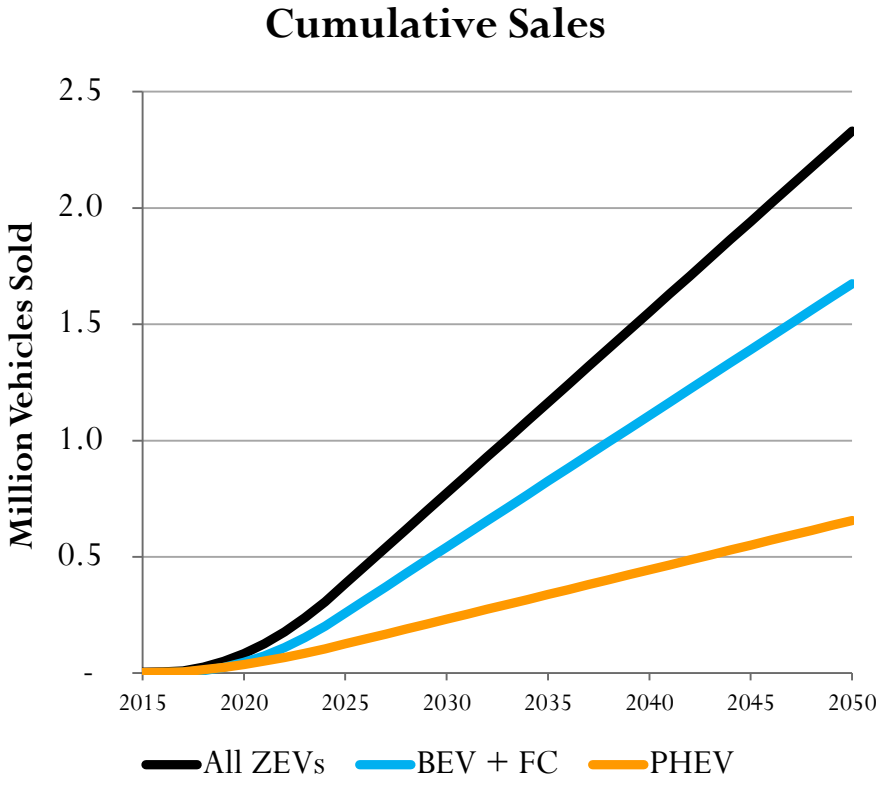


Major Assumptions

Annual VMT matches forecasted values from MassDEP 310 CMR 60.05 rulemaking for 2018-2020. From 2020, VMT grows according to MassDOT's 2020, 2030, and 2040 growth rates. The 2040 growth rate is extended through 2050.
HDV VMT 2015 – 2050 is extrapolated linearly (R^2>0.9); LDV VMT is the difference between total and HDV VMT.

Reference Case Assumptions: Minimum Compliance ZEV Regulation

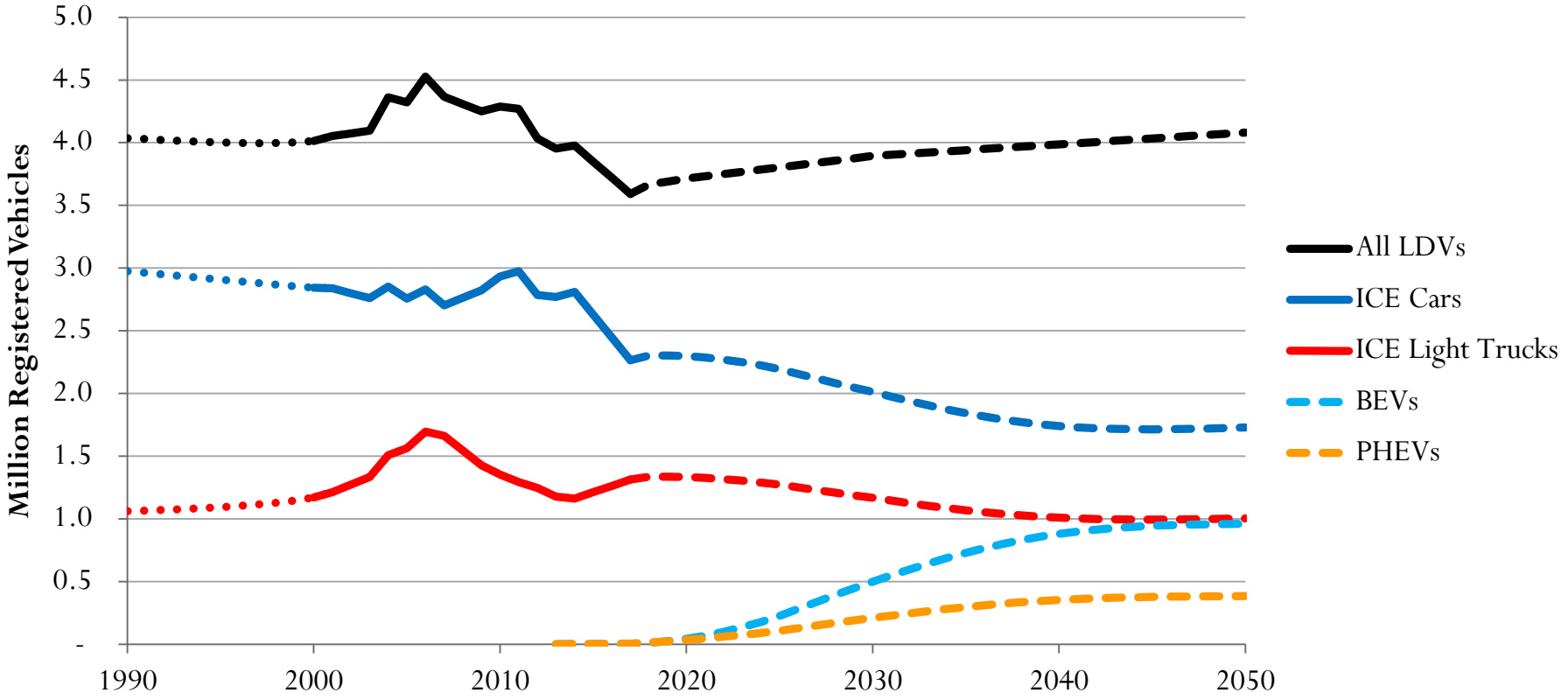




Major Assumptions

BEV and PHEV sales assumed to achieve requirements under 310 CMR 7.40, which increases to 22.5% of all new annual sales in 2025 and thereafter.

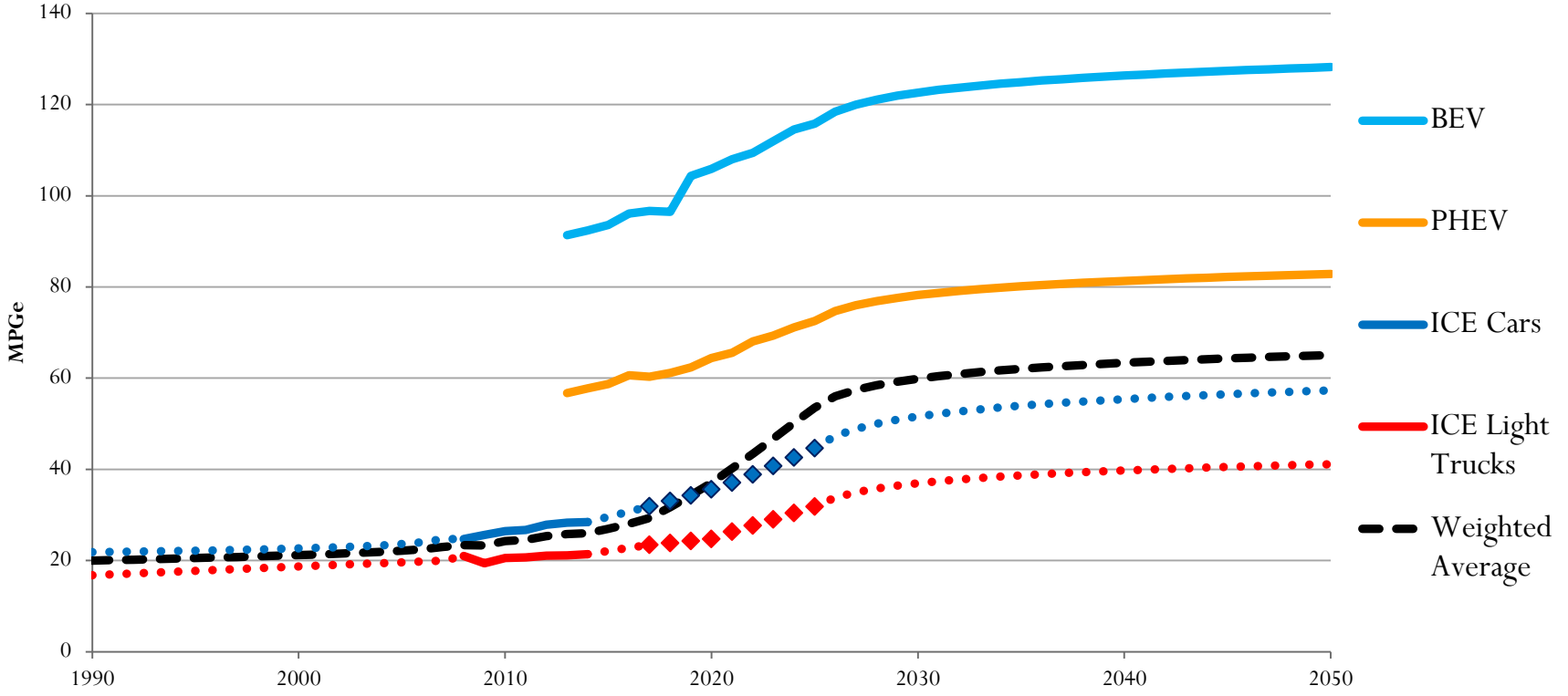
Reference Case Assumptions: LDV Fleet Growth and Turnover



Major Assumptions

Total LDV growth aligns with MassDOT's projected VMT growth. EV fleet growth based on EV sales. Assumes stock turnover (i.e., some percentage of cars are retired each year, according to their age). ICEs make up the difference, with the ratio of cars to trucks being held constant after 2017.

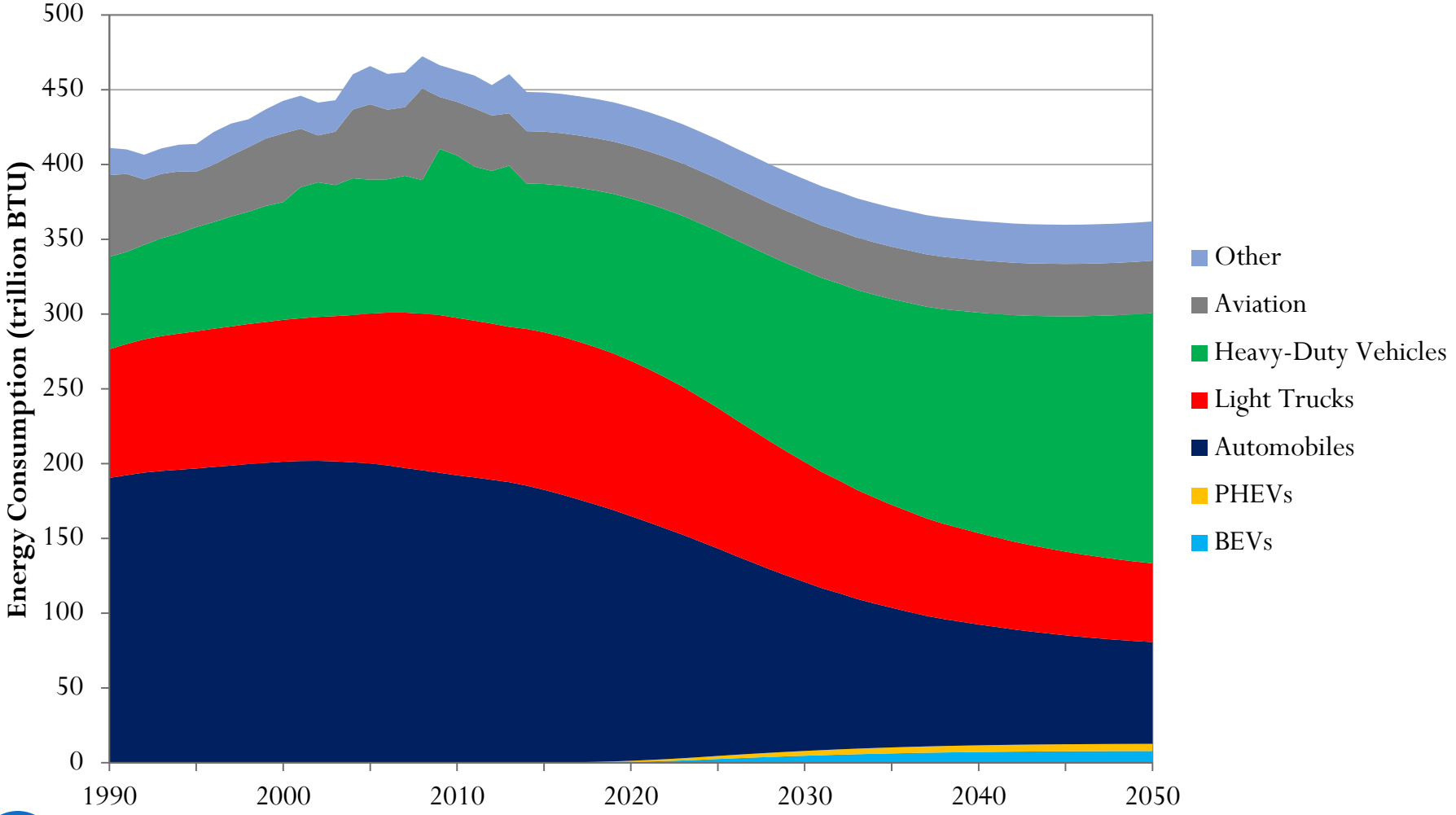
Reference Case Assumptions: New LDV Fuel Economy



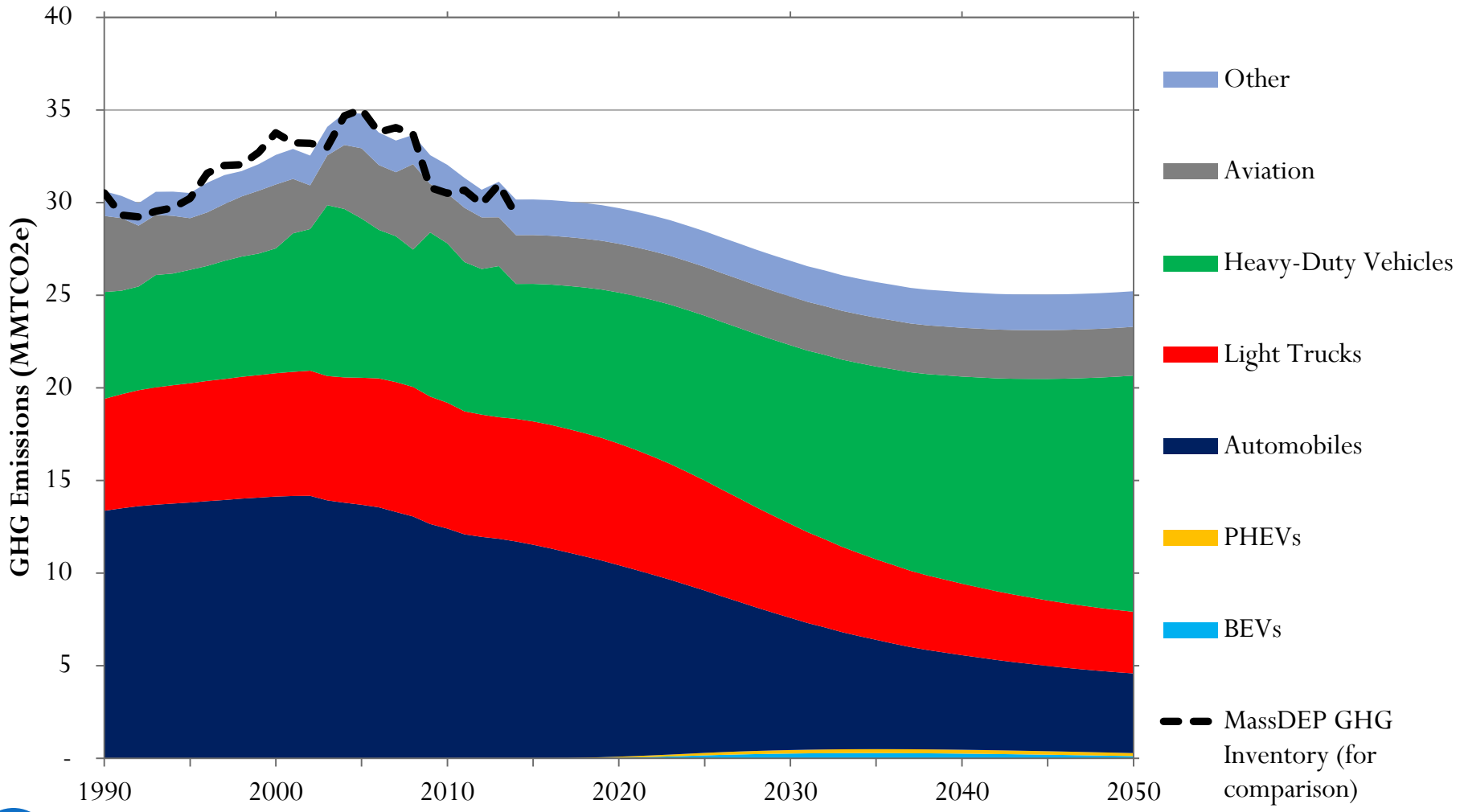
Major Assumptions

ICE new vehicle fuel economy derived from MAPC Vehicle Census for 2008-2014 (solid red and blue lines). ICE new vehicles meet CAFE/Pavley fuel economy standards (on-road adjusted values) for 2017-2025 (diamonds). EVs meet EIA projected fuel economies through 2025. After 2025, all fuel economies increase according to a logarithmic growth curve. Fleetwide average weighted by annual shares of new vehicle sales (Slide 14)

Reference Case Preliminary Results: Transportation Sector Energy Use



Reference Case Preliminary Results: Transportation Sector GHG Emissions



Potential Policy Scenarios

- Potential scenarios focusing on additional policies for:
  - Electrification of personal and non-personal, light-duty and medium/heavy-duty vehicles
  - Vehicle efficiency
  - Fuel decarbonization
  - Decreased VMT from mode shift
  - Market-based mechanisms as add-on to each scenario to estimate additional GHG reductions in each policy scenario.

IAC Discussion

- Feedback & suggestions for:
  - Approach?
  - Reference case?
  - Policy scenarios?

Policy Framework for 2030 Plan

Draft Policy Framework for 2030 Plan

- Screening criterion:
  1) Technologically feasible within desired timeframe
- Scoring criteria based mostly on GWSA and EO 569 requirements:
  2) GHG reduction estimates
  3) Cost
  4) Equitable distribution of impacts
  5) Diversify energy sources
  6) Consider minimizing leakage of GHG emissions outside of MA
  7) Improve adaptive capacity of built and natural environments
  8) State influence on implementation
  9) Policy feasibility

IAC Discussion

- Feedback on these proposed policy evaluation criteria?
- Are there additional criteria that EEA should consider?

Subcommittee Report Out