

Existing Policy

FEDERAL AND CALIFORNIA VEHICLE EFFICIENCY AND GHG STANDARDS

Policy Summary: The EPA and the National Highway Traffic Safety Administration (NHTSA) have set harmonized standards for light-duty vehicle MPG and GHG emissions for model year 2012 through 2016 vehicles. The standard is raised from 27.5 MPG at present to 35.5 MPG in 2016. California has harmonized its standards with the federal standards through 2016, but is expected to propose stricter standards for model year 2017 to 2020 vehicles, and Massachusetts law requires the Commonwealth to adopt the California standards. In combination, the EPA and California standards are forecast to yield a 17 percent reduction in GHG emissions in 2020 (primarily from lower gasoline consumption, but also with some reduced emissions from vehicle air conditioning systems).

Economy-wide GHG emissions reduced in 2020	2.4 million metric tons; 2.6%
Cumulative net benefits discounted, 2012-lifetime of vehicles (fuel savings and other social benefits, less increased vehicle costs)	\$8.0 billion
Jobs gained in 2020 (direct and indirect)	6,200 jobs

Note: benefits are calculated over the lifetimes of vehicles purchased from 2012 through 2020, which extend beyond 2020.

Clean energy economy impacts: The vast majority of spending on motor fuel goes out of state, so reducing those expenditures by billions of dollars means more money can be spent on in-state businesses, stimulating the economy and creating jobs.

Rationale: Federal fuel economy (CAFE) standards were first enacted in 1975 but have been relatively stagnant since the 1980s. Federal law raised them in 2007, but the Obama administration proposed an accelerated schedule through 2016. Improving the fuel economy of vehicles is one of the most effective tools to reduce energy consumption and GHG emissions.

Design issues: The federal regulations continue the practice of having different standards for cars and light trucks, although two-wheel drive SUVs will be reclassified as cars. EPA/NHTSA project the fraction of vehicles sold in the two categories; average MPG and fuel savings could be lower than expected if a higher proportion of light trucks are sold.

GHG impact: 2.4 million tons in 2020 for Massachusetts, based on EPA/NHTSA and California projections.

Other benefits: EPA’s benefit calculations include lower air pollution from vehicles, less time spent refueling, security benefits of lower petroleum imports, and the social value of lower carbon emissions.

Costs: About \$3.4 billion in additional vehicle costs through 2020, far outweighed by \$11.4 billion in reduced fuel costs (all in net present value).

Equity issues: Both higher initial capital costs and subsequent fuel savings will accrue first to purchasers of new vehicles. Lower income drivers more commonly buy used vehicles, and will only be affected in later years as the new models are sold on the used car market.

Experience in other states: The federal regulations are required in all states. Massachusetts and a number of other states have adopted California's stricter standards in the past, with no implementation problems.

Legal authority: The federal government has authority over vehicle efficiency and air emissions. However, there is an exemption under the 1970 Clean Air Act for California to adopt standards stricter than EPA's (if awarded a waiver by EPA) and for other states to adopt California's standards.

Implementation issues: None.

Uncertainty: See discussion under "design issues" concerning the distribution of sales between cars and light trucks.

New Policy

REDUCING GHG EMISSIONS FROM MOTOR VEHICLE AIR CONDITIONING

Policy summary: The California Air Resources Board (CARB) is developing regulations to reduce emissions associated with motor vehicle air conditioning (MVAC).⁶⁰ Massachusetts General Law⁶¹ mandates that the Massachusetts Department of Environmental Protection (MassDEP) adopt CARB’s emission standards for new motor vehicles if they are more stringent than federal standards. CARB’s standard aims to minimize emissions of high GWP refrigerants from MVAC through the adoption of standards for new light-duty vehicles. These standards include measures to reduce direct GHG emissions from MVAC systems, such as by using low GWP refrigerants and reducing leaks, as well as measures to reduce indirect emissions of other pollutants through improvement in the efficiency of the AC system (e.g., more efficient compressors, fans and motors; systems that avoid over-chilling and reheating; and technologies to reduce heat gain in the passenger cabin).

Annual benefits from improved motor vehicle air conditioning

Economy-wide GHG emissions reduced 2020	0.3 million metric tons CO ₂ e; 0.3%
Net cumulative \$ savings statewide 2018-2020 ⁶²	\$50 - \$130 million
Net annual \$ savings per vehicle	\$40 - \$90

Clean energy economy impacts: Several of the measures aimed at reducing refrigerant leakage and making MVAC more efficient also have a positive impact on fuel economy and can be expected to reduce fuel costs for owners. Vehicle owners who pay less for fuel will have more money to spend on other purchases — producing a positive ripple effect on the economy as a whole, including the creation of in-state jobs. Reducing leakage may also reduce the frequency with which vehicles need to be serviced for refrigerant recharge.

Rationale: Transportation is expected to account for close to 40 percent of total GHG emissions in Massachusetts in 2020, and light vehicles by themselves (cars, SUVs, minivans, pickups) are around 28 percent of the total. MVAC emissions account for about 9 percent of GHG emissions from cars and light trucks. Air conditioning use is estimated to account for approximately 5.5 percent to 5.9 percent of vehicle fuel use in the US (although this figure is lower in Massachusetts).

Design issues: CARB is developing draft regulations. After the California rules are finalized and approved by EPA, MassDEP would adopt the CARB regulations if they are more stringent than federal standards.

GHG Impact: 0.27 million metric ton reduction in CO₂e in 2020. The policy applies to new vehicles starting with model year 2017. Since the policy addresses emissions from new motor vehicles, benefits will grow progressively as older vehicles are replaced in the active vehicle stock

⁶⁰ <http://www.arb.ca.gov/cc/hfc-mac/mvac-gwp/mvac-gwp.htm>

⁶¹ <http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleXVI/Chapter111/Section142K>

⁶² Derived from California cost estimates, given in year 2000 dollars.

(average of 10 years), with greater benefits after 2020 once the fleet has been fully replaced with compliant vehicles.

Other benefits: Between 2018 and 2020, the policy is estimated to save vehicle owners \$50 million to \$130 million statewide, or \$40 to \$90 per vehicle per year. In addition, there will be reductions in tailpipe emissions of non-GHG pollutants due to reduced fuel combustion, which will benefit public health.

Costs: Estimated annual per-vehicle costs and savings from MVAC policy (2000\$).

Item	Values in 2020
Alternative refrigerant	\$30 - \$80
Improved system (leak tightness and efficiency)	\$50
Gross incremental cost (\$/year/vehicle)	\$80 - \$130
Annual fuel and refrigerant savings	\$170
Net annual savings	\$40 - \$90

Equity issues: Incremental savings from the policy are expected to be distributed over all classes of vehicles. However, initially the higher upfront vehicle purchase costs will affect higher income drivers more, since lower income drivers tend to buy used cars. But lower income drivers will enjoy the savings only after compliant vehicles become available in the used car market.

Experience in other states: Fourteen jurisdictions use CARB’s auto emission standards, including Maine, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, Oregon, Washington, Arizona, Washington, D.C., and Bernalillo County, New Mexico.

Legal authority: Massachusetts General Law Chapter 111, Section 142K mandates that MassDEP adopt and implement CARB emission standards for new motor vehicles if such standards are more stringent than federal standards.

Implementation issues: Because light-duty vehicle efficiency standards for 2011 through 2020 (CAFE and California’s vehicle GHG standards, both accounted for in existing policies) allow manufacturers to meet the standards partly through voluntarily reducing MVAC emissions, this policy discounted the benefits from MVAC emissions reductions. But manufacturers could choose to voluntarily implement even greater MVAC reductions under CAFE than assumed here, which would result in lower combined benefits of the efficiency and MVAC policies.

The policy calls for measures — in particular the switch to substitute refrigerants — that are still in development. While there are strong incentives to develop and refine the necessary technologies to meet existing requirements (e.g., EU regulations, other CA regulations), there is still a risk that estimated reductions may not be achievable.

Uncertainty: At least one study has highlighted the risk that more stringent emissions standards in selected states may reduce scrapping of used non-compliant cars and/or may result in car manufacturers achieving reductions in adopting states while potentially allowing for larger emissions and less efficient vehicles in other states. If so, these dynamics could reduce the effectiveness of the policy in achieving the projected emissions reductions in the short run.