



Fact Sheet

California Environmental Protection Agency
Air Resources Board

Climate Change Emission Control Regulations

In September 2004 the California Air Resources Board approved regulations to reduce greenhouse gas emissions from new motor vehicles. The Board took this action pursuant to Chapter 200, Statutes of 2002 (AB 1493, Pavley) which directed the Board to adopt regulations that achieve the maximum feasible and cost effective reduction in greenhouse gas emissions from motor vehicles. The regulations, which will take effect in 2006 following an opportunity for legislative review, apply to new passenger vehicles and light duty trucks beginning with the 2009 model year.

Climate Change and California

Climate change is here today. The past century has already seen changes in climate related conditions such as average temperature (up seven tenths of a degree Fahrenheit), sea level (up 3 to 8 inches), spring run-off (decreased by 12 percent), and the timing of snowmelt and spring bloom (advanced by 1 to 3 weeks).

Projected future climate change may affect California in a variety of ways. Public health can suffer due to greater temperature extremes and more frequent extreme weather events, increases in transmission of infectious disease, and increases in air pollution. Agriculture is especially vulnerable to altered temperature and rainfall patterns, and new pest problems. Forest ecosystems would face increased fire hazards and would be more susceptible to pests and diseases. The Sierra snowpack that functions as the state's largest reservoir could shrink by a third by 2060, and to half its historic size by 2090. Runoff that fills reservoirs will start in midwinter, not spring, and rain falling on snow will trigger more flooding. The California coast is likely to face a rise in sea level that could threaten its shorelines. Sea level rise and storm surges could lead to flooding of low-lying property, loss of coastal wetlands, erosion of cliffs and beaches, saltwater contamination of drinking water, and damage to roads, causeways, and bridges.

The State of California has traditionally been a pioneer in efforts to reduce air pollution. California likewise has a long history of actions undertaken in response to the threat posed by climate change. California action specifically to control greenhouse gases is strongly supported by the public. The July 2004 Special Survey on Californians and the Environment, conducted by the Public Policy Institute of California, found that eight in ten Californians support the state law that requires automakers to further reduce the emission of greenhouse gases from new cars in California by 2009.

Motor Vehicle Emission Standards

Greenhouse gases emitted by motor vehicles include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and hydrofluorocarbons (HFCs). Motor vehicle climate change emissions include:

- CO₂, CH₄ and N₂O emissions resulting directly from operation of the vehicle,
- CO₂ emissions resulting from operating the air conditioning system,
- HFC (refrigerant) emissions from the air conditioning system due to either leakage, losses during recharging, or release from scrappage of the vehicle at end of life, and
- Upstream emissions associated with the production of the fuel used by the vehicle.

The climate change emission standards incorporates all of these elements. The standards are expressed in terms of “CO₂-equivalent” emissions, which take into account the fact that different pollutants vary in the severity of their climate change impact. Staff elected to incorporate the greenhouse gas emission standards into the current Low-Emission Vehicle (LEV) program, along with the other light and medium-duty automotive emission standards. Accordingly, there is a CO₂-equivalent fleet average emission requirement for the passenger car/light-duty truck 1 (PC/LDT1) category, and another for the light-duty truck 2 (LDT2) category, just as the LEV program currently has fleet average NMOG emission requirements for both categories of vehicles. This approach was taken to ensure that manufactures can meet the standards while continuing to provide the full range of vehicles available today.

The standards adopted by the Board phase in during the 2009 through 2016 model years. When fully phased in, the near term (2009-2012) standards will result in about a 22 percent reduction as compared to the 2002 fleet, and the mid-term (2013-2016) standards will result in about a 30 percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The specific standards, by vehicle type and model year, are as follows:

Tier	Year	CO ₂ -equivalent emission standard (g/mi)	
		PC/LDT1 (Passenger cars and small trucks/SUVs)	LDT2 (Large trucks/SUVs)
Near-term	2009	323	439
	2010	301	420
	2011	267	390
	2012	233	361
Mid-term	2013	227	355
	2014	222	350
	2015	213	341
	2016	205	332

Cost to Consumers

The technical modifications needed to meet the standards will increase the cost of new vehicles. However, because these technology improvements will also reduce the operating cost of the vehicles, staff estimates that the average consumer will save money. The estimated increase in initial cost is shown below:

Tier	Year	Average cost of control	
		PC/LDT1 (Passenger cars and small trucks/SUVs)	LDT2 (Large trucks/SUVs)
Near-term	2009	\$17	\$36
	2010	\$58	\$85
	2011	\$230	\$176
	2012	\$367	\$277
Mid-term	2013	\$504	\$434
	2014	\$609	\$581
	2015	\$836	\$804
	2016	\$1,064	\$1,029

This initial cost will be more than offset by operating cost savings. For example, staff evaluated the potential increase in monthly loan payments over a typical 5-year loan versus the monthly decrease in operating cost. Using the average increase in vehicle prices associated with the fully phased-in regulation (2016), and an assumed fuel price of \$1.74 per gallon, staff calculated that the increased vehicle payment minus the reduction in operating cost would result in a monthly savings of about \$3.50 to \$7.00.

Emission Reductions

Staff estimates that the proposed regulation will reduce climate change emissions from the light duty passenger vehicle fleet by an estimated 87,700 CO₂-equivalent tons per day statewide in 2020 and by 155,200 CO₂-equivalent tons per day in 2030. This equates to an 18% reduction in climate change emissions from the light-duty fleet in 2020 and a 27% reduction in 2030. In addition, staff estimates that the proposed regulation will reduce “upstream” smog-forming emissions of hydrocarbons and oxides of nitrogen by approximately 6 tons per day in 2020 and 10 tons per day in 2030.

To provide additional insight into the impact of the regulation, staff evaluated what would happen if consumers postpone the purchase of new vehicles due to their higher cost, or increase their driving due to the reduced cost of operating the vehicle. In both cases staff found that the effect on emissions is relatively small.

Economic Impacts

The steps that manufacturers will take to comply with the regulatory standards are expected to lead to price increases for new vehicles. Many of the technology options that manufacturers will employ to comply with the regulation are also expected to reduce operating costs. These two responses to the regulation have combined positive and negative impacts on California businesses and consumers.

Based on the staff analysis, the net effect of the regulation on the California economy is expected to be small but positive. It is very likely that savings from reduced vehicle operating costs will end up as expenditures for other goods and services. These expenditures would flow through the economy, causing expansion or creation of new businesses in several sectors.

Staff's economic analysis shows that as these expenditures occur, jobs and personal income increase. Jobs increase by 3,000 in 2010, by 53,000 in 2020, and by 77,000 in 2030 as compared to the baseline economy without the proposed regulation. Similarly, income grows by \$170 million in 2010, by \$4.7 billion in 2020, and by \$7.3 billion in 2030. There is no impact on the ability of California business to compete with businesses in other states. State and local agencies will not be adversely affected and are likely to realize a net reduction in their cost of fleet operations.

Environmental Justice

Staff evaluated the effect of the regulation on low-income and minority communities. This analysis indicated that businesses in such communities will benefit from the regulation, because much of the operating cost savings will be spent in other sectors of the economy and will result in increased jobs overall. Staff also considered the potential effect of the regulation on consumers. Because the vehicle price increases caused by the proposed regulation may, over time, increase the price of used vehicles that low-income households tend to purchase, staff focused on analyzing the potential impacts of the vehicle price increase on low-income purchasers of used vehicles. Staff calculated that the increased vehicle payment minus the reduction in operating cost would result in a monthly cost savings of about \$4.50 to \$6.00.

Conclusion

Greenhouse gas emissions from California light duty vehicles are a small fraction of the global total. Thus the California regulation, viewed in isolation, will not wholly mitigate the potential consequences of climate change in California. Nevertheless, there are several compelling reasons to move forward, even while recognizing that by itself a California regulation will not solve the global climate change problem. First of all, the regulation is a “no regrets” policy that reduces climate change emissions from vehicles while providing economic benefits to the state. Second, California is not acting in isolation. Other states in the United States, and other countries, have already taken or are contemplating steps to reduce greenhouse gas emissions from a variety of sectors and sources. Finally, the longstanding technology-forcing role of California regulation should not be understated. There have been many instances where other jurisdictions have adopted motor vehicle controls that were pioneered in California. Thus there is potential for the regulation to spread to other jurisdictions and thereby add momentum to the existing initiatives that are underway around the globe.

For More Information

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