

FEBRUARY 20, 2019

Assessing California's Climate Policies

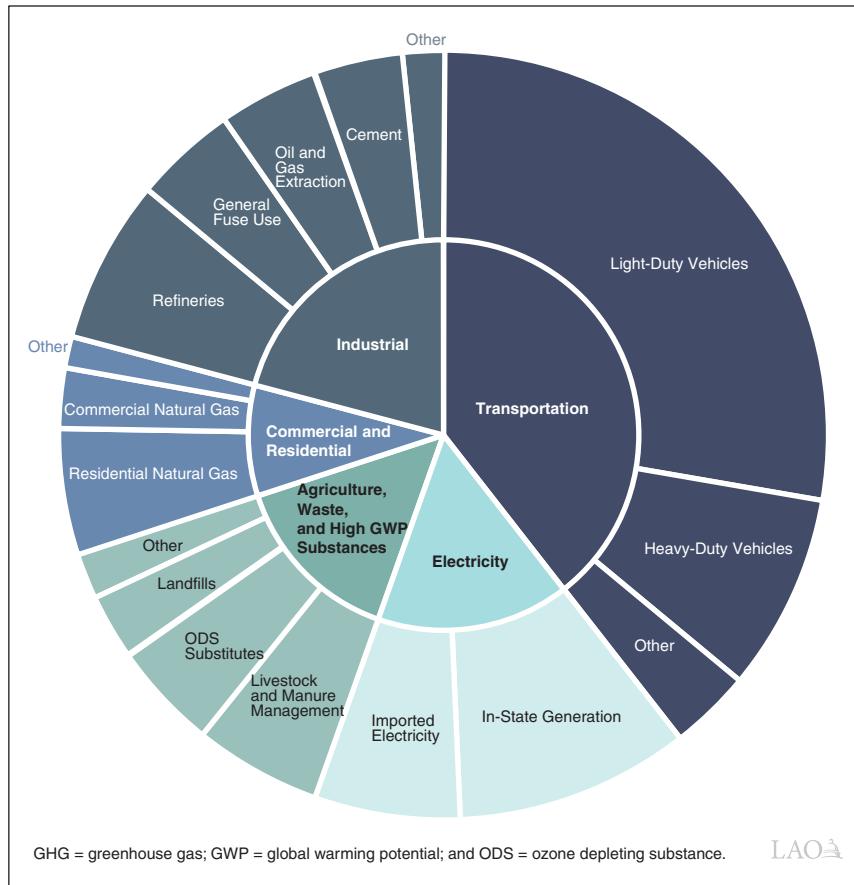
PRESENTED TO:

Senate Environmental Quality Committee
Hon. Benjamin Allen, Chair



LEGISLATIVE ANALYST'S OFFICE

Greenhouse Gas (GHG) Emissions Come From a Wide Variety of Sources



State Law Establishes GHG Limits

State Law Establishes Statewide 2020 and 2030 GHG Limits

- Chapter 488 of 2006 (AB 32, Núñez/Pavley) established the goal of limiting GHG emissions statewide to 1990 levels by 2020.
- Chapter 249 of 2016 (SB 32, Pavley) extended the limit to 40 percent below 1990 levels by 2030.

California Air Resources Board (CARB) Required to Develop and Update Scoping Plan

- Plan outlines how state will achieve statutory GHG limits.

State Has a Wide Variety of Policies to Reduce GHG Emissions

Major Policies to Meet Statewide Greenhouse Gas Limits

Cap-and-Trade. Regulation that establishes a “cap” on overall emissions from large emitters by issuing a limited number of permits (also known as allowances). Allowances can be bought and sold (traded), which creates a market price for allowances and an incentive for lowest cost reductions.

Short-Lived Climate Pollutants. Regulations and incentives intended to reduce certain types of emissions from dairies, landfills, and refrigeration equipment.

Renewable Portfolio Standard. Regulations that require utilities to provide a certain percentage of electricity from qualifying renewable sources, such as wind and solar.

Energy Efficiency. Regulations and financial incentives to encourage more efficient energy use in commercial buildings, homes, and manufacturing facilities.

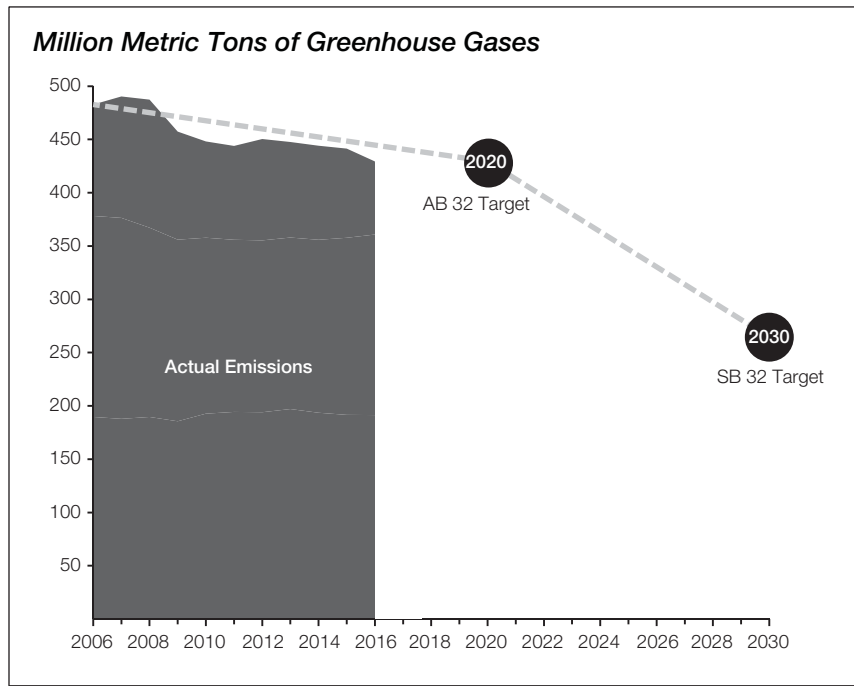
Low Carbon Fuel Standard. Regulation that requires transportation fuel suppliers to reduce the amount of greenhouse gases per unit of fuel used in California—also known as carbon intensity of fuels.

Vehicle-Related Programs. Regulations and incentives to encourage more efficient light- and heavy-duty vehicles, as well as promote certain types of technologies such as electric vehicles.

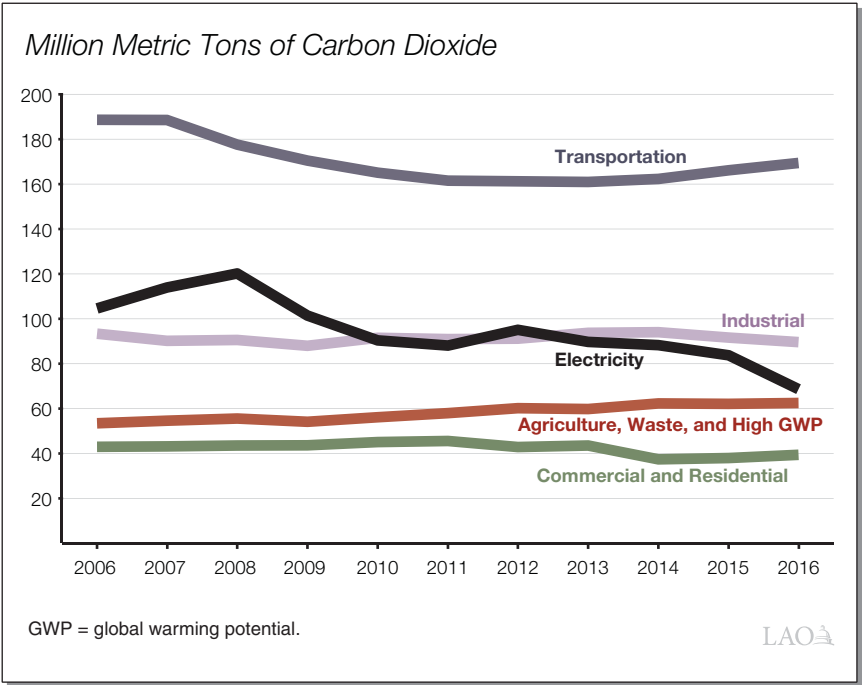
Vehicle Miles Traveled. Planning strategies and financial incentives intended to reduce the amount of light-duty vehicle use through such things as increased transit and changes to land use.



Met 2020 Target Early, but 2030 Target More Ambitious



Electricity Sector Has Been Biggest Driver of Emission Reductions



CARB 2017 Scoping Plan Estimates Emission Reductions

CARB Estimates Cumulative Reductions of 621 Million Metric Tons Carbon Dioxide Equivalents Through 2030

- 236 million tons (38 percent) from cap-and-trade.
- 217 million tons (35 percent) from short-lived climate pollutant policies, such as reducing methane emissions from dairies and reducing the use of certain refrigerants.
- 64 million tons (10 percent) from mobile source policies, such as additional incentives and regulations for low- and zero-emission vehicles.
- 64 million tons (10 percent) from regulations and incentives for energy efficiency.
- 25 million tons (4 percent) from increased use of transportation biofuels, primarily driven by the Low Carbon Fuel Standard (LCFS).
- 16 million tons (3 percent) from the state's 50 percent Renewable Portfolio Standard. (This analysis was done before the state increased the goal to 60 percent in 2030.)

Cumulative Emission Reductions Are Not the Same as Annual Statewide Limits

- Although there is a scientific basis for focusing on *cumulative* GHG emissions, state targets are expressed in *annual* terms.

Scoping Plan Identifies Cap-and-Trade as Policy That Ensures State Achieves Its Emissions Targets

- Conceptually, program serves as “backstop” to ensure cumulative emissions do not exceed a certain level.



LAO Assessment:

Overall Effects of Climate Policies

Chapter 135 of 2017 (AB 398, E. Garcia) required our office to report annually on the economic impacts and benefits of California's GHG targets. In December 2018, we issued two companion reports pursuant to this requirement. One report, *Assessing California's Climate Policies—An Overview*, described the general types of effects of state climate policies.

Overall Effects of State Climate Policies So Far Are Unclear

Climate Policies Have a Wide Variety of Effects

- Benefits can include GHG reductions and co-benefits, such as improved regional and local air quality.
- There are a variety of different types of costs associated with actions taken to reduce emissions. These include (1) direct financial costs, such as paying for more expensive sources of energy, and (2) “implicit” costs, such as reduction in household comfort associated with using less air conditioning or heating because energy is more expensive.
- Costs are ultimately borne by households through higher consumer prices, lower wages, lower shareholder returns, and/or higher taxes and fees.
- Economic transfers—which primarily have distributional effects, not net economic costs—are sometimes the most visible policy effects. For example, households and businesses pay—either directly or indirectly—for cap-and-trade allowances sold by the state or utilities. However, the revenue generated from the sale of those allowances is then used to benefit certain households and businesses.

Key Challenges in Estimating Policy Effects

- Accounting for factors unrelated to state climate policy that still impact emissions trends, such as economic conditions and technological advancements.



LAO Assessment: Overall Effects of Climate Policies

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- Assessing GHG effects that are not part of CARB’s formal GHG monitoring system, such as “upstream” emissions from imported goods and emissions leakage into other jurisdictions.

- Measuring implicit and indirect effects.

- Considering interactions between different state and federal policies. For example, (1) reducing emissions from electricity suppliers through the state Renewable Portfolio Standard can free-up cap-and-trade allowances for other covered entities and (2) increasing the supply of biofuels sold in California to meet LCFS requirements might reduce the amount of biofuels businesses in other jurisdictions need to supply in order to comply with the federal Renewable Fuel Standard.



LAO Assessment: Cap-and-Trade

In December 2017, we issued a report—*Cap-and-Trade Extension: Issues for Legislative Oversight*—identifying important cap-and-trade implementation details that merit legislative oversight.

Economywide Carbon Pricing the Most Cost-Effective Policy to Reduce Emissions

- Wide variety of possible actions households and businesses could take to reduce emissions, but costs of each action are hard for the government to estimate. This makes it difficult for government to adopt policies that target only the lowest cost actions.
- In contrast, carbon pricing—such as cap-and-trade—provides financial incentive for households and businesses to undertake emission reduction activities. Households and business then have flexibility to determine which actions to reduce emissions are less costly than paying the carbon price.

Cap-and-Trade Likely Has Not Played a Primary Role in Emission Reductions So Far

- Relatively low allowance price because emissions below program caps.
- Other factors—such as economic conditions, technological advancements, and other climate policies—causing emissions to remain below caps.

Details of Post-2020 Cap-and-Trade Implementation Will Determine Overall Effects



LAO Assessment: Cap-and-Trade

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Issues for Legislative Consideration and Oversight

Key implementation decisions often have trade-off between costs and emissions reductions.

- **Setting Emissions Caps.** Are program caps set at levels that are consistent with the statutory annual GHG targets? A large number of “banked” allowances increases the risk of exceeding the state’s 2030 GHG target.
- **Managing Allowance Price Uncertainty.** Future prices are subject to significant uncertainty, but might have to increase substantially in order to meet emission goals. Are tools for managing allowance prices—such as the price floor, ceiling, and “speed bumps”—set at levels that are consistent with how Legislature balances trade-offs between costs and emission reductions?
- **Allowance Allocation and State Revenue.** Allocation of allowances—and the revenue generated from selling allowances—is currently used to achieve a variety of policy goals. These goals include mitigating GHG emissions leakage to other jurisdictions, offsetting household and business costs related to climate policies, and achieving various other state policy goals through state-funded programs. Is current structure accomplishing each of these goals effectively and is the appropriate balance being struck between these different goals? How might this balance change if allowance prices increase in future years?
- **Linkage With Other Jurisdictions.** How does linkage with other jurisdictions effect overall effectiveness of the program? What are future plans to expand linkage and what is Legislature’s oversight role?

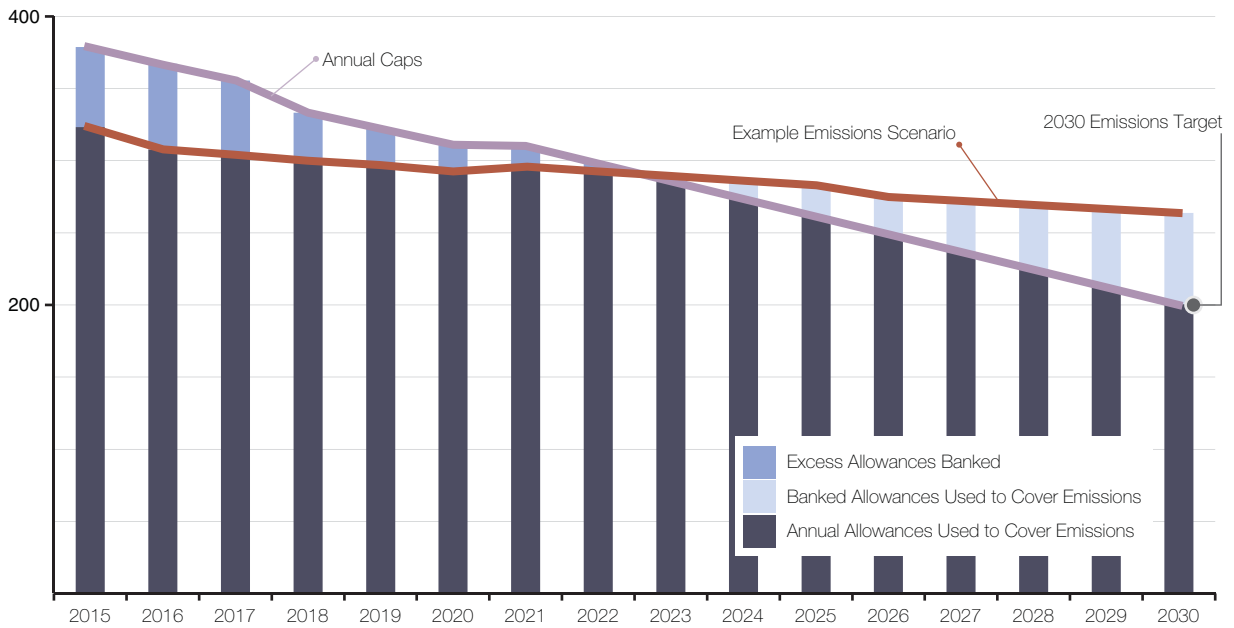


LAO Assessment: Cap-and-Trade

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Large Number of Banked Allowances Increases Risk of Exceeding GHG Target

Million Metric Tons



GHG = greenhouse gas.

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LAO Assessment: Transportation Policies

In our other December 2018 report issued pursuant to AB 398, *Assessing California's Climate Policies—Transportation*, we assess the effects of state GHG reduction policies in the transportation sector.

State Oversees Various Programs Designed to Reduce Greenhouse Gas (GHG) Emissions in Transportation Sector

Light-Duty Vehicle Programs

- **Clean Vehicle Rebate Project.** Rebate for purchase or lease of a new zero-emission vehicle (ZEV).
- **Clean Cars 4 All.** Rebate to retire an older, high emission vehicle and replace it with a newer zero or lower-emission vehicle.
- **Single-Occupant Vehicle Decals.** Program that allows ZEV drivers to use the high-occupancy lane even when containing only a single individual.
- **Clean Car Standards.** Joint state and federal regulation requiring auto manufacturers to incrementally improve fuel efficiency and reduce GHG emissions from their vehicle fleets over time.
- **ZEV Mandate.** State regulation requiring auto manufacturers to increase the number of ZEVs sold in the state.
- **Public ZEV Infrastructure Funding.** Funding to support the installation of public electric vehicle recharging and hydrogen refueling stations.

Heavy-Duty Vehicle Incentives

- **Demonstrations and Pilots.** Grants for technologies and equipment that are not yet commercially available.
- **Programs for Early Commercial Deployment.** Incentives for technologies that have passed the pilot stage and commercial models are starting to become available.
- **Programs Focused on Local Pollution Reductions.** Programs primarily focused on reducing near-term reductions in local emissions, such as incentives for vehicle replacements.
- **ZEV Fueling Infrastructure.** Programs that fund infrastructure for heavy-duty vehicle charging and refueling stations.

Low Carbon Fuels

- **Low Carbon Fuel Standard.** Regulation requiring reductions in the carbon intensity of transportation fuels.

Vehicle Miles Traveled

- **SB 375.** 2008 legislation requiring regional transportation planning agencies to create plans to reducing light-duty vehicle miles traveled.



LAO Assessment: Transportation Policies

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Overall Magnitude of Impacts of Policies Are Unclear

- Policies have both benefits and costs. The magnitude of the effects is generally unclear.
- There are some estimates of program benefits and costs before they are implemented (prospective analyses), but not many estimates of actual program effects after they are implemented (retrospective analyses).
- Retrospective analyses are often difficult for a variety of reasons. For example, it is difficult to isolate the effect of each policy—or group of policies—from other factors, such as changes in economic conditions, consumer preferences, and gasoline prices.

Large Number of Policies Targeting Transportation Emissions Creates Challenges

- Interactions with other state and federal policies potentially offset emission reductions. For example, interactions with other policies—such as federal renewable fuel standards and federal fuel efficiency standards—could “reshuffle” emissions to other jurisdictions, rather than reduce net emissions.
- More difficult to evaluate effects of each policy. For example, unclear which electric vehicle policy is the most effective approach for increasing electric vehicle adoption.
- Potential lack of coordination across agencies. For example, three state agencies administer different heavy duty vehicle and infrastructure incentive programs.
- Increased administrative costs. State administrative costs likely at least in the low tens of millions of dollars annually.



LAO Assessment: Transportation Policies

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Policies Are Relatively Costly Ways to Reduce GHGs, but Could Be Valuable in Limited Other Circumstances

- Based on available information, transportation-specific policies generally more costly than cap-and-trade.
- However, in some instances, there might be strong rationale for additional policies that complement a carbon price.
- Examples could include (1) addressing other GHG-related “market failures” —such as underinvestment in research and development activities—and (2) reducing co-pollutants.
- Often not clear whether complementary policies target these other goals effectively.



Recommendations and Issues for Legislative Consideration

Use Economywide Pricing to Achieve Low-Cost GHG Reductions

- Cost-effectiveness increasingly important as GHG goals become more ambitious.
- Ensure cap-and-trade program implementation is consistent with Legislature's GHG goals, while also appropriately balancing trade-offs between emission reductions and costs.

Implement Complementary Policies Only in Certain Circumstances

- Ensure complementary policies effectively target other market failures or policy goals not addressed by carbon pricing.

Focus on Policies That Are Most Likely to Encourage GHG Reductions in Other Jurisdictions to Maximize Overall GHG Reduction Benefits

- California is about one percent of global GHG emissions.
- Legislature might want to consider the degree to which each program encourages emission reductions in other jurisdictions. These could include (1) policies that serve as demonstration for other jurisdictions and/or (2) policies that promote advancements in technologies that could be used in other jurisdictions.

Establish Robust System to Evaluate Effects of State Climate Policies

- For example, Legislature might want to require departments to conduct retrospective evaluations of major programs after they are implemented. This could include requiring departments to plan for how it will conduct such evaluations prior to implementing new or expanded programs.
- Evaluation is especially important given California's role in demonstrating GHG-reduction policies to other jurisdictions.

