

AB 32: Implementation Through 2020 and Beyond

A Joint Oversight Hearing of the Senate Environmental Quality Committee and the Select Committee on Climate Change and AB 32 Implementation

March 12, 2014

State Capitol, John L. Burton Hearing Room (4203)

9:00 AM

BACKGROUND PAPER

I. Climate Change

The 5th assessment report from the Intergovernmental Panel on Climate Change (IPCC) notes that atmospheric concentrations of global warming pollutants have risen to levels unseen in the past 800,000 years. Carbon dioxide concentrations have increased by 40 percent since pre-industrial times. There is broad scientific consensus that these global greenhouse gases emission increases are leading to higher air and water temperatures as well as rising sea levels, with serious consequences for California.

Sea level is expected to rise 17 to 66 inches by 2100, and the frequency of extreme events such as heat waves, wildfires, floods, and droughts is expected to increase.

Higher temperatures will result in more rain and less snow, diminishing the reserves of water in California's Sierra Nevada snowpack. Even if all GHG emissions ceased today, some of these developments would be unavoidable because the climate system changes slowly.

There are significant public health risks associated with climate change. According to the US EPA, warmer average temperatures will likely lead to hotter days and more frequent and longer heat waves and could increase the number of heat-related illnesses and deaths. Increases in the frequency or severity of extreme weather events could increase the risk of dangerous flooding, high winds, concentrations of unhealthy air, and water pollutants, and potentially enhance the spread of certain diseases.

Along with the potential costs associated with public health impacts, climate change also represents a very real threat to California's infrastructure, and could lead to billions of dollars in property damage. The Pacific Institute estimates that \$100 billion worth of property in California is at risk of flooding during a 100-year flood with a projected 1.4 meters of sea level rise.

As the evidence for anthropogenic climate change has mounted over the last few decades, the state has implemented a broad climate portfolio to mitigate global warming impacts by pursuing policies that reduce greenhouse gasses (GHGs).

II. Background: California Climate Policy Prior to AB 32

AB 4420 (Sher, Chapter 1506, Statutes of 1998) directed the California Energy Commission (CEC) to study global warming impacts to the state and develop an inventory of greenhouse gas emissions sources.

In 2000, SB 1771 (Sher, Chapter 1018, Statutes of 2000) established the California Climate Action Registry to allow companies, cities, and government agencies to voluntarily record their greenhouse gas emissions.

Two years later, AB 1493 (Pavley, Chapter 200, Statutes of 2002) was signed into law, and required ARB to develop regulations to reduce greenhouse gas emissions from passenger vehicles, light-duty trucks and non-commercial vehicles sold in California.

In 2003, the governors of California, Washington, and Oregon created the West Coast Global Warming Initiative with provisions for the states to coordinate climate change-related programs.

In 2005, Governor Schwarzenegger issued Executive Order S-3-05 and called for GHG emissions reductions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050. According to the 2008 Scoping Plan, the 2020 goal was designed to be an aggressive but attainable near-term target, and the 2050 goal represented broad scientific consensus at the time of emissions reduction levels necessary for climate stabilization. Executive Order S-3-05 also established the Climate Action Team (CAT) for state agencies in 2005, chaired by the Secretary of the California Environmental Protection Agency (CalEPA). The executive order tasks CAT with coordinating statewide efforts to implement global warming emission reduction programs and the state's climate adaptation strategy.

In 2006, SB 1368 (Perata, Chapter 598, Statutes of 2006) created greenhouse gas performance standards for new long-term financial investments in base-load electricity generation serving California. The Emission Performance Standard (EPS) law restricts the ability of utilities to build new carbon-intensive plants or enter into new contracts with high carbon sources of electricity.

California's Renewables Portfolio Standard (RPS) was originally established in 2002 under SB 1078 (Sher, Chapter 516, Statutes of 2002).

In 2006, the program was accelerated under SB 107 (Simitian, Chapter 464, Statutes of 2006) by requiring that 20 percent of electricity retail sales be served by renewable energy resources by 2010.

On November 17, 2008, Governor Schwarzenegger signed Executive Order S-14-08 ordering that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020.

In 2011, SB X1-2 (Simitian, Chapter 1, Statutes of 2011) codified the 33 percent by 2020 goal. The RPS applies to all electricity retailers in the state. Prior to the end target of 33 percent by 2020, the law includes midterm requirements of 20 percent of retail sales from renewables by the end of 2013, and 25 percent of retail sales from renewables by the end of 2016.

III. The Global Warming Solutions Act of 2006

In 2006, the Global Warming Solutions Act of 2006, AB 32 (Núñez and Pavley, Chapter 488, Statutes of 2006) established a statewide GHG emissions limit by 2020. AB 32 defines greenhouse gasses (GHGs) as carbon dioxide (CO₂), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride and requires the California Air Resources Board (ARB) to determine the 1990 statewide GHG emissions level and approve a statewide GHG emissions limit that is equivalent to that level, to be achieved by 2020.

AB 32 requires the ARB, among other things, to:

- Inventory greenhouse gas emissions in California.
- Implement regulations that achieve the maximum technologically feasible and cost-effective reduction of GHG emissions and impose fees for administrative implementation costs.
- Identify and adopt regulations for discrete early action measures.
- Prepare and approve a scoping plan to achieve the maximum technologically feasible and cost-effective reduction of GHG emissions by 2020, to be updated every five years.
- Convene an Environmental Justice Advisory Committee to advise the ARB in the development of the scoping plan.
- Appoint an economic advisory committee to obtain recommendations for GHG reduction measures.

The statute also specifies that the ARB may include market-based compliance mechanisms in the AB 32 regulations, after considering the potential for direct, indirect, and cumulative emission impacts from these mechanisms, including localized impacts in communities that are already adversely impacted by air pollution, and must design any market-based compliance mechanisms to prevent any increase in the emissions of toxic air contaminants or criteria air pollutants. The statute also specifies that market-based compliance mechanisms must also maximize additional environmental and economic benefits for California, as appropriate.

Pursuant to authority under AB 32, the ARB adopted cap-and-trade regulations, and those regulations were approved on December 13, 2011.

IV. Scoping Plan

The Scoping Plan was first approved by the ARB in 2008 and outlined a suite of measures aimed at achieving 1990-level emissions of 427 million metric tons of carbon dioxide equivalent (MMTCO_{2e}) in 2020. The plan originally established the reductions from California's 2020 "business as usual" GHG emissions projection to be 174 MMTCO_{2e}, but has since revised the estimate to 80 MMTCO_{2e}, in part to account for the economic downturn's impact on emission levels. Average emission data in the Scoping Plan broken down by sector reveal that transportation accounts for almost 40 percent of statewide GHG emissions, and electricity and commercial and residential energy sector account for over 30 percent of statewide GHG emissions. The industrial sector, including refineries, oil and gas production, cement plants, and food processors, was shown to contribute 20 percent of California's total GHG emissions.

The 2008 Scoping Plan recommended that reducing GHG emissions from the wide variety of sources that make up the state's emissions profile could best be accomplished through a cap-and-trade program along with a mix of other strategies including:

- the low carbon fuel standard (LCFS);
- light-duty vehicle GHG standards;
- expanding and strengthening existing energy efficiency programs, and building and appliance standards;
- achieving a 33 percent RPS;
- regional transportation-related GHG targets; and
- creating targeted fees on water use and high global warming potential pollutants.

The basic design of the program, as recommended by the original Scoping Plan, is that the combination of direct regulatory measures and cap-and-trade is intended to achieve the emission reduction target by 2020. An overall limit on greenhouse gas emissions from most of the California economy will be established by the "cap" portion of a cap-and-trade program, and direct regulations within both capped and uncapped sectors would achieve additional emissions reductions.

Although the Scoping Plan represents a comprehensive strategy toward achieving the 2020 goal, AB 32 does not require the ARB to implement any or all measures in the Scoping Plan. As a result, there are various recommended GHG reduction measures presented in the plan, but that were not subsequently implemented in regulations.

V. Emission Reduction Measures to Achieve AB 32 Goals

A breakdown by program of the 80 MMTCO₂e of GHG emissions reductions required to achieve the 2020 emission goal of 427 MMTCO₂e is shown in Table 1. These emission reduction values primarily come from the measure-specific staff reports, or Initial Statement of Reasons (ISORs), that served as the basis for subsequent rulemaking. The four programs that the ARB estimates will result in the largest emission reductions are cap and trade, with emissions reductions of 18 MMTCO₂e, 15 MMTCO₂e from LCFS, 12 MMTCO₂e from energy efficiency measures and 11 MMTCO₂e due to RPS that together account for 70 percent of the 80 MMTCO₂e of emissions reductions needed to achieve AB 32’s 2020 goal.

Measure	GHG Emissions Reductions (MMTCO₂e)
Cap and Trade	18
LCFS	15
Energy Efficiency	12
RPS	11
High Global Warming Potential Gases	6
Advanced Clean Cars	4
SB 375 Sustainable Communities	3
Other Measures	11

Table 1. Estimated GHG emissions reductions by program type to reach the 2020 emissions reductions goal of 80 MMTCO₂e.

The “other measures” category in Table 1 that accounts for 11 MMTCO₂e of emissions reductions represents a variety of other programs individually estimated to obtain more modest emissions reductions such as the tire pressure program, heavy-duty vehicle aerodynamics regulations, regulations to reduce emissions from diesel auxiliary engines at California ports (which represent three of the nine total discrete early action measures adopted by ARB as required by AB 32), preservation of forest carbon sequestration, and others.

i. Cap and Trade

Beginning on January 1, 2013, the cap-and-trade regulations set a firm, declining cap on total GHG emissions from sources that make up approximately 85 percent of all statewide

GHG emissions. Sources included under the cap are termed “covered” entities. The cap is enforced by requiring each covered entity to surrender one “compliance instrument” for every metric ton of carbon dioxide equivalent that it emits at the end of a compliance period. Over time, the cap declines, resulting in GHG emissions reductions.

Compliance instruments include allowances and offsets, where allowances are generated by the state in an amount equal to the cap, and offsets result from emissions reductions achieved in an uncapped sector and are quantified and verified using an ARB approved compliance offset protocol. In the first compliance period, the capped sector includes the electricity and industrial sectors. Uncapped sectors throughout the course of the program include small businesses (with annual emissions under 25,000 metric tons CO₂e), agriculture and forestry.

At full implementation of the current Scoping Plan, cap and trade is expected to contribute the equivalent of 18 MMTCO₂e in reductions in GHG emissions toward the 2020 GHG emissions limit.

Because the sectors covered under the cap-and-trade program are also subject to various direct regulatory measures, any underperformance of direct regulatory measures at reducing emissions will result in additional reductions needed under the cap-and-trade program. In other words, ARB intends the cap of the cap-and-trade program to serve as a backstop to achieve the 2020 GHG emissions reductions goal: the smaller the reductions achieved by other measures, the greater the reductions enforced by cap and trade. In this way, the program is designed to achieve emissions certainty (the 1990 level by 2020) regardless of the performance of the direct regulatory measures in achieving their estimated emissions reductions.

ARB is allocating most allowances for free in order to provide transition assistance and to minimize leakage for trade-exposed industries (where leakage refers to increased GHG emissions outside California either from entities leaving the state and producing emissions elsewhere, or by reduction of economic activity within the state that is offset by increased production outside the state). The remaining allowances (apart from a small amount set aside in a price containment reserve) are auctioned off.

ARB auctioned off about 5 percent of allowances in 2013, and approximates 50 percent will be auctioned in 2015. After the first compliance period, the number of allowances freely distributed to entities declines, and entities must either reduce emissions or purchase a greater number of allowances at auction. The program authorizes entities to buy or sell their allowances, creating a market that is intended by ARB to minimize the cost of compliance and encourage entities to invest in GHG emissions reductions. Electric utilities are provided free allocation of allowances for the benefit of ratepayers.

In 2015, distributors of transportation fuels, natural gas, and other fuels also come under the cap. Once under the cap, an entity covered by the regulation must periodically submit to ARB allowances sufficient to match its GHG emissions during the period.

Offsets: Under the cap-and-trade regulation, offsets may be used to satisfy up to 8 percent of a covered entity's compliance obligation. The inclusion of offsets in the cap-and-trade program is designed to help reduce entities' compliance costs. To date, ARB has adopted protocols for the following four project types:

- Livestock manure management
- Ozone depleting substances
- Urban forestry
- U.S. forestry

Current protocols under development include rice cultivation and coal mine methane projects. The cap-and-trade regulation establishes that offset projects must be located in the United States and its territories, Canada, or Mexico.

Linkage: The cap-and-trade regulations approved on December 13, 2011, include general requirements for linking to other trading programs, where linkage refers to the use of compliance instruments from a GHG emissions trading system outside California to meet compliance obligations under California's cap-and-trade regulation and the reciprocal approval of compliance instruments issued by California to meet compliance obligations in the external trading program. In April of 2013, the ARB approved the regulatory amendments to link with Quebec beginning on January 1, 2014.

Auction Proceeds: The ARB has conducted six auctions of GHG emission allowances so far. These auctions have resulted in approximately \$663 million in proceeds to the state. Several bills in 2012 provided legislative direction for the expenditure of auction proceeds including SB 535 (de León, Chapter 830, Statutes of 2012) and AB 1532 (J. Pérez, Chapter 807, Statutes of 2012).

SB 535 (de León) requires that 25 percent of auction revenue be used to benefit disadvantaged communities and requires that 10 percent of auction revenue be invested in disadvantaged communities.

AB 1532 (J. Pérez) of 2012 directs the Department of Finance to develop and periodically update a three-year investment plan that identifies feasible and cost-effective GHG emission reduction investments to be funded with cap-and-trade auction revenues.

In fiscal year 2013-14, \$500 million of auction proceeds was loaned to the General Fund. For the current fiscal year, the Governor's budget proposes to spend \$850 million from cap-and-trade auction revenue in 2014-15. Proposals range from water efficiency to rail modernization. The budget proposal directs about 30 percent of the money toward High-Speed Rail, specifically to support construction of the initial operating section.

ii. Low Carbon Fuel Standard

According to the 2008 Scoping Plan, the LCFS is projected to result in 15 MMTCO₂e of emissions reductions to reach the 2020 GHG emissions reductions goal.

The LCFS requires the reduction of carbon intensity of transportation fuels used in California by an average of 10 percent by 2020. Carbon intensity (CI) is a measure of the direct and indirect GHG emissions associated with each of the steps in the full lifecycle of a transportation fuel.

A party's overall CI for its transportation fuels needs to meet each year's specified CI level target. If the reduction in intensity exceeds the target, the provider earns a credit, which can be sold or carried forward.

Providers of clean fuels that meet the 2020 target are exempt from the regulation but can "opt" in to earn credits. Regulated fuel providers can meet their annual CI levels by making low-GHG fuels, carrying forward credits from previous years from their own production process, buying credits from other fuel producers, or reducing the amount of fuel they sell.

The LCFS achieves a 10 percent reduction in average CI by establishing an initial intensity level for specified providers of transportation fuels ("regulated parties") and incrementally lowering the allowable CI in each subsequent year. For example, modest targeted reductions of 0.5 and 1.0 percent are required for 2012 and 2013, respectively. The reductions become more substantial with each year, such that by 2020, the 10 percent average reduction is achieved. This reduction makes room for low CI alternative fuels to enter the market.

As of the 2nd quarter (Q2) of 2013, there were 25 percent more LCFS credits than deficits on the market. Of the credits available in Q2 of 2013, most were generated by low CI ethanol (78 percent), with the next highest fractions generated from natural gas (10 percent) and biodiesel (8 percent).

iii. RPS and Energy Efficiency

RPS: Although AB 32 gives ARB broad authority to regulate sources of greenhouse gas emissions, it requires that the ARB consult with the Public Utilities Commission (PUC) and the State Energy Resources Conservation and Development Commission (CEC) on all elements of its Scoping Plan that pertain to energy-related matters and in the development of the regulations as they affect electricity and natural gas providers in order to minimize duplicative or inconsistent regulatory requirements.

The 2008 Scoping Plan recommended a 33 percent RPS goal, and projected emissions reductions associated with achieving this goal to be 11 MMTCO₂e. As previously discussed, the RPS has been in existence since 2002, but has since been amended through

legislation in 2011 to require 33 percent of electricity retail sales be served by renewable energy resources by 2020.

According to the updated Scoping Plan, currently about 23 percent of the State's electricity comes from renewable power.

Energy efficiency: State policy prioritizes energy-efficiency measures in terms of securing resources for meeting the state's future energy needs. In 2009, the PUC adopted the *California Long-Term Energy Efficiency Strategic Plan* with strategies to achieve cost-effective energy efficiency in the electric and natural gas sectors in the timeframe of 2009 till 2020 and beyond.

ARB estimates of GHG reductions from full implementation of energy efficiency measures and programs are projected to result in 12 MMTCO₂e of emission reductions by 2020.

The updated ARB Scoping Plan notes that building efficiency standards were tightened in 2013 and represent an increase of efficiency of 25 percent for residential construction and 30 percent for non-residential construction. The standards ensure that better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption are installed in homes and businesses. The CEC also adopted aggressive energy efficiency standards for televisions in 2009, and first-in-the-nation energy efficiency standards for battery chargers in 2012.

The CEC is currently considering additional appliance categories under its appliance energy efficiency standards. Those under consideration include consumer electronics, lighting, water appliances, and several others.

iv. High Global Warming Potential Gases

Measures adopted by ARB to address GHG emissions with high global warming potentials include SF₆ emissions reduction regulations, perfluorocarbon emission reductions from semiconductor manufacturing, and reduction of hydrofluorocarbon (HFC) emissions from mobile air conditioner refrigeration units. These regulations were adopted as discrete early action items, and as such, AB 32 requires those measures to be adopted and enforceable no later than January 1, 2010.

v. Advanced Clean Cars

In 2002, AB 1493 (Pavley, Chapter 200, Statutes of 2002) required the ARB to develop and adopt, by January 1, 2005, regulations to achieve the maximum feasible and cost-effective reduction of GHG emissions from light-duty vehicles applicable no sooner than the 2009 model year. ARB developed these regulations but automaker lawsuits threatened their implementation, and the US EPA initially denied California's request for a waiver needed under federal law to implement them. The parties involved reached an agreement in May 2009 that resolved the issues.

Based on this agreement, ARB implemented its regulations to reduce GHG emissions in new passenger vehicles from 2009 through 2016, such that GHG emissions from cars will be about 30 percent lower in 2016 than in 2009. These regulations are commonly referred to as the “Pavley” regulations or “Pavley I.”

In January 2012, ARB built on the Pavley I standards with its Advanced Clean Car program. This program is a suite of regulations that combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements applicable to vehicles for model years 2017 through 2025.

In October 2012, the federal government adopted similar GHG emissions (and mileage) standards for vehicles, so it is possible for automakers to demonstrate compliance with California’s regulations based on compliance with federal standards. The Advanced Clean Cars program includes regulatory mechanisms including regulations on stricter GHG emission standards for cars and light trucks, building off the Pavley I standards, regulations for the production of zero emission vehicle (ZEV) by automakers, and regulations on providing fueling station for low-emission and zero-emission vehicles.

In 2013, AB 8 (Perea, Chapter 401, Statutes of 2013) extended various vehicle-related surcharges through 2023 to fund several incentive programs, including the Air Quality Improvement Program, administered by the ARB, that primarily provides rebates for ZEVs, and the Alternative and Renewable Fuel and Vehicle Technology program, administered by the CEC, to develop and deploy innovative vehicle and fuel technologies to combat climate change.

These incentive programs and state subsidies are intended to help shift market forces toward low- and zero-emission vehicles to result in a vehicle fleet transformation toward these vehicles by 2050.

The longer term timeframe (beyond 2020) and the 2017 implementation date for the full Advanced Clean Car regulations, is the primary reason for the relatively minor GHG reductions estimate contribution (4 MMTCO_{2e}) for meeting AB 32’s 2020 emissions reductions target.

vi. SB 375 Sustainable Communities

The Sustainable Communities and Climate Protection Act of 2008, SB 375 (Steinberg, Chapter 728, Statutes of 2008) requires the ARB to set regional targets for GHG emissions reductions from passenger vehicle use.

In 2010, ARB established these targets for 2020 and 2035 for each region covered by one of the state’s metropolitan planning organizations (MPO). ARB will periodically review and update the targets, as needed.

SB 375 requires each of California's MPOs to prepare a sustainable communities strategy (SCS) as part of its regional transportation plan (RTP).

The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets. Once adopted by the MPO, the RTP/SCS guides the transportation policies and investments for the region. ARB must review the adopted SCS to confirm and accept the MPO's determination that the SCS, if implemented, would meet the regional GHG targets. If the combination of measures in the SCS would not meet the regional targets, the MPO must prepare a separate "alternative planning strategy" (APS) to meet the targets.

VI. Updated Draft Scoping Plan

The ARB released a draft of the updated Scoping Plan October 2013, and updated this draft in February of this year. ARB staff expects to bring an updated Scoping Plan document to the Board for consideration sometime in late spring.

The update asserts that California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32.

The February 2014 updated Scoping Plan draft describes policies, actions, and strategies in the energy, transportation, fuels, agriculture, waste, and natural lands sectors as a means to continue emissions reductions in each of these sectors. The draft also emphasizes the need for California to establish a mid-term statewide emission reduction target "informed by climate science, to frame the additional suite of policy measures, regulations, planning efforts, and investments in clean technologies that are needed to continue driving down emissions."

The draft update includes a summary of the recent science on short-lived climate pollutants and notes that the ARB will develop a short-lived climate pollutant strategy by 2015 that will include an inventory of sources and emissions, the identification of additional research needs, and a plan for developing necessary control measures.

VII. Short-Lived Climate Pollutants

CO₂ remains in the atmosphere for centuries, which makes it the most critical greenhouse gas to reduce in order to limit long-term climate change.

However, climate pollutants including methane, tropospheric ozone, hydrofluorocarbons (HFCs), and soot (black carbon), are relatively short-lived (anywhere from a few weeks to 15 years), but have much higher global warming potentials than CO₂.

New research suggests that black carbon is the second largest man-made contributor to global warming and its influence on climate has been greatly underestimated.

Another recent study published in the journal *Nature Climate Change* found that reducing emissions of short-lived climate pollutants, including soot and methane, by 30 to 60 percent by 2050 would slow the annual rate of sea level rise by about 18 percent by 2050. In addition, the study found that, compared to just cutting CO₂ emissions, reducing the release of short-lived climate pollutants would do more to slow sea level rise before 2050, but that lowering CO₂ emissions would be required to limit warming and warming-related impacts beyond that point.

The three short-lived climate pollutants with the greatest implications for California are the following:

- *Black carbon*: Black carbon, a component of soot, also known as PM 2.5, comes from diesel engines and incomplete burning of carbon sources. Wildfires contribute almost 50 percent of the total black carbon emissions in the state. In addition to being a powerful global warming pollutant, black carbon is associated with numerous negative health impacts and is designated a potential human carcinogen. Black carbon is not listed under AB 32 as a greenhouse gas subject to AB 32 regulations. However, due to known health and air quality impacts, ARB adopted truck and bus regulations in 2008 to control diesel PM emission. The ARB also administers the Carl Moyer Program, which provides grants to fund “cleaner than required” engine upgrades or retrofits that reduce PM 2.5 and other pollutants.
- *Methane*: Methane (CH₄) is the principal component of natural gas and is also produced biologically under anaerobic conditions in ruminants, landfills, and waste handling. Atmospheric methane concentrations have been increasing as a result of human activities related to agriculture, fossil fuel extraction and distribution, and waste generation and processing. Many emissions sources of methane are unregulated (e.g. methane from dairy production and fugitive methane emissions from landfills and natural gas distribution) and recent scientific reports indicate that the US EPA has underestimated methane emissions by as much as 50 percent. The ARB staff plans to bring to the Board’s consideration in late 2014 proposed regulations to reduce fugitive methane emissions from storage tanks, well stimulation, pneumatic devices and leaking components.
- *Hydrofluorocarbons*: HFCs are synthetic gases used in refrigeration, air conditioning, insulation foams, solvents, aerosol products, and fire protection. They are primarily produced for use as substitutes for ozone-depleting substances which are currently being globally phased out. Currently, HFCs are a small fraction of the total climate forcing (<1 percent), but their emissions are growing relatively more rapidly than those of CO₂.

ARB has implemented several measures to reduce HFC emissions including low-global warming potential (GWP) requirements for aerosol propellants, a deposit-return recycling program for small cans of air conditioner refrigerant and a refrigerant management program.

VIII. 2011 State Emissions Data

The ARB reports that California's gross emissions of GHGs decreased by 6 percent from 478.4 MMTCO₂e in 2001 to 448.1 MMTCO₂e in 2011. During the same time period, California's population grew by 9 percent from 34.5 to 37.6 million people and as a result, the state's per capita emissions have decreased over the past 11 years from 13.9 to 11.9 MMTCO₂e.

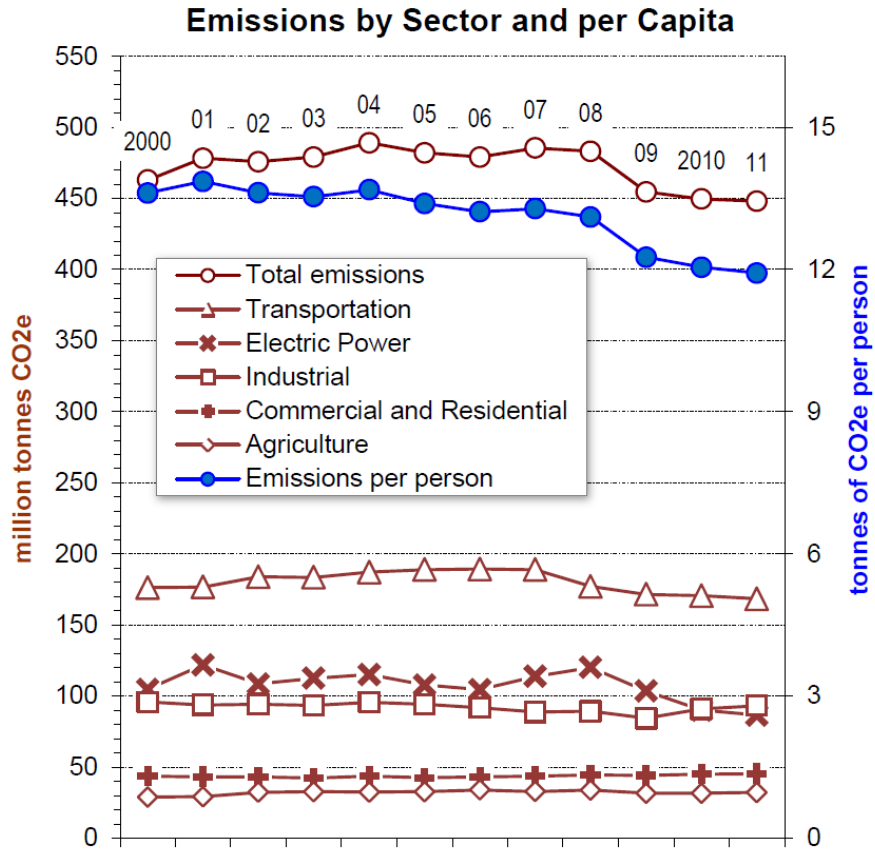


Figure 1. California GHG emissions for 2000-2011.

In 2011, emissions continued to decrease for the transportation and electric power sectors. Emissions from all other sectors stayed flat or increased.

In particular, emissions from agriculture have increased from 29.2 MMTCO₂e in 2001 to over 32.2 MMTCO₂e in 2011. In addition, emissions from high global warming potential gases, primarily HFCs and PFCs that are used as substitutes for ozone-depleting substances, have grown steadily from 7.1 MMTCO₂e in 2001 to 15.2 MMTCO₂e in 2011.

The ARB notes that fugitive emissions of SF₆ and high-GWP gases from semiconductor manufacturing (both which were regulated as discrete early actions by ARB) have decreased by 25 percent and 6 percent respectively from 2001 to 2011.

According to the ARB, although various measures have been adopted to reduce GHG emissions to reach AB 32's 2020 goal, the bulk of the reductions won't be seen until mid-decade and most reductions since 2008 have been driven by economic factors, such as the recession, previous energy efficiency actions, renewable power requirements, and climate hydrology.

IX. Post 2020

Scientific research indicates that an increase in the global average temperature of 2°C (3.6°F) above pre-industrial levels, which is only 1.1°C (2.0°F) above present levels, poses severe risks to natural systems and human health and well-being.

However, even with 2°C stabilization, sea level rise of several meters beyond 2100 is likely. To have a good chance of avoiding temperatures above those levels, studies have focused on a goal of stabilizing the concentration of heat-trapping gases in the atmosphere at or below the 450 parts per million (ppm) CO₂-equivalent.

In early May 2013, the Mauna Loa monitoring station located at the top of the Hawaii's Mauna Loa volcano, recorded CO₂ of 400 ppm (measured at 316 ppm when the station made its first measurements in 1958).

The latest climate science and the current status of global warming pollution impacts further underscores the urgent need to accelerate GHG emissions reductions to avoid the most severe impacts of climate change.

As previously noted, Executive Order S-3-05 calls for GHG emissions reductions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050.

AB 32 specifies that the 2020 statewide GHG emissions limit remains in effect unless amended or repealed. The statute expresses the Legislature's intent that the 2020 GHG limit continue in existence and be used to maintain and continue reductions in emissions of GHGs beyond 2020. AB 32 also requires ARB to make recommendations to the Governor and the Legislature on how to continue reductions of GHG emissions beyond 2020.

SB 1125 (Pavley and Lara), introduced in February of this year would require ARB, on or before January 1, 2016, and in consultation with specified entities, to develop and submit to the Governor and the Legislature a report containing recommendations on a timetable of reduction targets of GHG emissions and short-lived climate pollutants with high global warming potentials beyond 2020.