

Potential Strategies to Reduce Climate Change Emissions in California

Table 2 below lists potential climate change emission reduction strategies that are considered attractive and are being evaluated by the California Climate Action Team (CAT).

The strategies listed in Table 2 are not yet fully underway although many have been implemented on a small scale, e.g. Landfill Methane Capture. The CAT will evaluate emission reduction potential for each of the strategies listed.

TABLE 2 - Strategies Partially Initiated or Being Considered
Agency Responsible
Air Resources Board
Other New Light Duty Vehicle Technology Improvements
HFC Reduction Strategies
Transport refrigeration units, Off-road electrification, Port electrification (ship to shore)
Manure Management
Semi Conductor Industry Targets (PFC Emissions)
Flared Natural Gas Measure
Biodiesel Blends
Ethanol in Gasoline
Heavy Duty Vehicle Emission Reduction Measures
Reduced Venting and Leaks in Oil and Gas Systems
Public Utilities Commission
Additional Energy Efficiency Programs
Combined Heat and Power Initiative
Electricity Sector Carbon Policy
Integrated Waste Management Board
Landfill Methane Capture
Zero Waste – High Recycling
Resources Agency
Forest Management Projects
Reforestation Projects
Conservation Projects
Water Management
Fire Management
Energy Commission
Building Energy Efficiency Standards *
Appliance Energy Efficiency Standards **
Cement Manufacturing
Business, Transportation & Housing
Additional Travel Reduction Measures
Smart Land Use
Department of Food & Agriculture
Conservation tillage/cover crops
Enteric Fermentation
Green Box Programs and Technology Measures

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Summary Descriptions for Each Strategy

Other New Light Duty Vehicle Technology Improvements: Adoption of new climate change emission reduction standards phased in beginning in 2017 model year. These standards would follow up on the existing mid-term climate change emission reduction standards that reach maximum stringency in 2016.

Hydrofluorocarbon (HFC) Reduction Strategy: Measures would reduce HFC emissions by: prohibiting the sale of HFCs in small cans; requiring use of low global-warming-potential (GWP) refrigerants in air conditioners and new commercial refrigerators; requiring refrigerant leak tightness on mobile air conditioners and some types of commercial refrigerators and air conditioners; improving enforcement of EPA-required HFC recovery during service and repair.

Transport Refrigeration Units, Off-road Electrification, Port Electrification (ship to shore): Significant emission reductions are possible in both the 2010 and 2020 timeframes by: requiring all new transport refrigeration units to be equipped with electric standby; requiring cold storage facilities to install electric infrastructure to support electric standby transport refrigeration units; requiring phase-in of vessels and infrastructure to support shore-side power use; and a combination of regulatory and incentive programs to encourage replacement of diesel engines with zero- or near-zero-emission engines.

Manure Management: Rule 4570 currently proposed for the San Joaquin Valley is intended to reduce volatile organic compounds but would also reduce climate change emissions. Concepts that may appear in the rule include: different requirements based on facility size; specific control requirements included on a list of technologies; a mix of control options selected from a list; and a facility-wide control efficiency for a certain percentage reduction. Possible control options include management practices, manure handling practices, and lagoon/liquid waste control options.

Semiconductor Industry Targets (PFC Emissions): Suggested control measures targeted to climate change emission reductions would be developed by ARB for consideration by the local Air Pollution Control Districts.

Flared Natural Gas Measure: Natural gas associated with the extraction of crude oil is sometimes released to the atmosphere. These greenhouse gas emissions can be reduced and eliminated through flaring and venting reduction projects.

Biodiesel Blends: Achieves a two to four percent biodiesel displacement of California diesel fuel.

Ethanol in Gasoline: Measures being considered would maximize the used of biomass ethanol used in E-85 vehicles. There are currently over 200,000 flexible fuel vehicles in California capable of using E-85.

Heavy-Duty Vehicle Emission Reduction Measures: Emission reductions from heavy-duty vehicles through engine improvements, aerodynamic design and education programs for drivers would be evaluated.

Reduced Venting and Leaks in Oil and Gas Systems: Strategies to reduce methane lost to the atmosphere in oil and gas production, processing, transmission, and distribution are being evaluated.

Additional Energy Efficiency Programs: These include energy efficiency measures beyond the 2013 goals currently in place that could be expected as technology evolves and becomes more reliable and cost effective. Additional technical analysis is needed to determine technology readiness and costs.

Combined Heat and Power Initiative: As part of the 2005 Integrated Energy Policy Report CEC conducted an initial assessment of the combined heat and power in California. Implementation possibilities include: utility tariffs to enable combined heat and power owners to sell excess onsite electricity generation to the utility at prevailing wholesale prices; credits to reflect carbon dioxide emission reductions; transmission and distribution benefit payments that reflect the local and temporal benefits of combined heat and power; and/or incentives to encourage utilities to promote installation of combined heat and power projects.

Electricity Sector Carbon Policy: The PUC is investigating various strategies and incentives to encourage the IOUs to make cost-effective procurement decisions that are based in part on reducing greenhouse gas emissions.

Landfill Methane Capture: Capture of methane emitted from landfills via a gas recovery system. Although some landfill methane capture already occurs, opportunities to expand the capture of methane from landfills will be explored. Capture of methane can occur through installed direct gas use projects or electricity projects with backup flare systems to capture and use the methane.

Zero Waste – High Recycling: Measures that result in additional recovery of recyclable materials from landfills and transforming organic/biomass and plastic waste into marketable products are being considered.

Forest Management Projects: Forest projects based on the commercial or non-commercial harvest and regeneration of native trees and that employ natural forest management practices. Such projects include: mandates for older harvest ages and/or increased riparian buffers; financial incentives by reducing the harvest yield tax paid by landowners if managed for older forests; and credits for climate change emission reductions through offsets under a cap and trade program.

Reforestation Projects: Forest projects that are based on the restoration of native tree cover on lands that were previously forested. Such projects include: and increased investments in existing reforestation incentive programs, including the California Forest Improvement Program and the federal Forest Stewardship Program; and credits for climate change emission reductions through offsets under a cap and trade program.

Conservation Projects: Forest projects that are based on specific actions to prevent the conversion of native forests to a non-forest use, such as agriculture or other commercial development. Such projects include: increased investments in conservation easements (Forests Legacy Program); and credits for climate change emission reductions through offsets under a cap and trade program.

Water Management: Work with urban and agricultural water suppliers to implement measures that reduce energy demand while meeting water supply and water use efficiency goals.

Fire Management: Fire management practices that reduce GHG emission from catastrophic wildfires.

Building Energy Efficiency Standards: Energy efficiency standards for buildings are adopted by the California Energy Commission (CEC) every three years. GHG emission reductions will result from the CEC's future adoption of standards effective in the years 2008, 2011, 2014, 2017.

Appliance Energy Efficiency Standards: Energy efficiency standards for appliances are adopted at discretionary points in time by the California Energy Commission (CEC). GHG emissions will result from the CEC's future adoption of standards effective 2009.

Cement Manufacturing: Emissions of GHG are associated with all three phases of cement manufacturing: processing, combustion and blending. While the cement industry has achieved significant GHG emission reductions since 1990, opportunities for further reductions still exist, particularly with expanded research into processing and blending technologies.

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Additional Travel Reduction Measures: Additional travel reduction measures such as transit investments, telecommuting, pedestrian and bicycle infrastructure improvements and congestion pricing are all being considered in the Governor's "GoCalifornia" transportation and mobility initiative. These measures would be complimentary to the Not Dumb Growth Measures.

Smart Land Use: Measures to be considered are intended to produce more efficient land use patterns that additionally foster bike- and pedestrian-friendly neighborhood designs.

Conservation Tillage/Cover Crops: Consideration of agricultural management practices, selectively applied, which will increase carbon storage in soil while improving soil quality and fertility and reducing erosion.

Enteric Fermentation: Measures to reduce methane emissions from livestock include grazing management, animal health, and improved production efficiency.

Green Box Programs and Technology Measures: There are a number of draft options, including implementation options, that are still being considered by the Climate Action Team. These options, along with options provided by stakeholders, will be continually evaluated.

* Energy savings from future building energy efficiency standards beyond those attributed to the 2005 building energy efficiency standards on Table 1 will be computed two years in advance of each effective date. As these calculations occur over time, GHG emission reduction values will be computed and counted as progress toward the 2010 and 2020 goals. The next energy savings calculation will be for the 2008 standards. This calculated result will be available 2006.

** Energy savings from future appliance energy efficiency standards beyond those attributed to the 2004 energy appliance efficiency standards on Table 1 (effective 2006) will be computed one year in advance of each standards adoption date. As these calculations occur over time, GHG emission reduction values will be computed and counted as progress toward the 2010 and 2020 goals. The next energy calculation will be for the 2009 standards. This calculated result will be available 2008.