

Caltrans Efforts to Address Climate Change

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California's Transportation System

- ▶ California's population (2010) – 38.1 million (U.S. Census estimate)
 - ▶ Number of registered vehicles – 31.9 million
 - ▶ Annual Vehicle Miles of Travel (VMT) on California's entire transportation road system – 325 billion. (262.8 billion VMT on the state highway and Interstate system)
 - ▶ California's annual fuel consumption – gasoline 15.7 billion gallons; diesel 3.1 billion gallons (2007 Calif. Energy Commission)
 - ▶ 37 percent – California's GHG emissions are from transportation (largest sector percentage)
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Caltrans Overview

- ▶ \$12.6 billion dollar budget (fiscal year 2012/13)
- ▶ Owns and operates State Highway System.
- ▶ Approximately 19,500 employees statewide (headquarters and 12 district offices)
- ▶ Operates 12,137 pieces of equipment; (7,211 cars and light trucks; 1,819 medium and heavy duty trucks)
- ▶ Estimated 191.3 tons of CO₂ emissions resulting from Caltrans operations



Caltrans Districts



Caltrans Efforts to Mitigate GHG Emissions



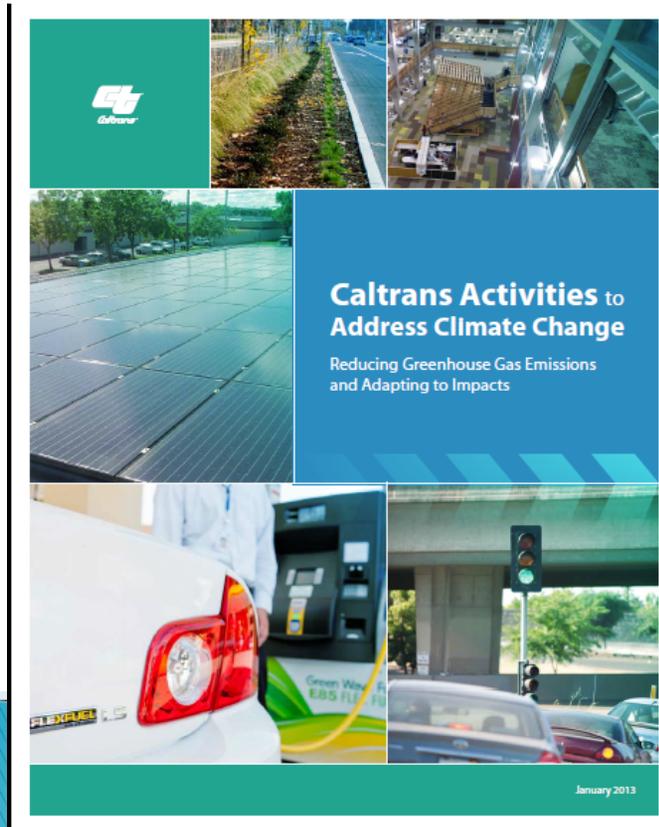
Why is Caltrans Working to Reduce Greenhouse Gas (GHG) Emissions?

- ▶ California's Assembly Bill (AB) 32 (2006) – Requires that California's GHG emissions be reduced to 1990 levels by 2020.
- ▶ Governor's Executive Order S-3-05 (2005) – Requires state government to reduce GHG emissions.
- ▶ Governor's Executive Order B-18-12 (2012) – Requires state government to reduce operational GHG emissions. New state buildings must achieve LEED Silver certification or higher, include renewable energy generation, and reduce water consumption.



Caltrans Activities to Address Climate Change

Reducing Greenhouse Gas Emissions and Adapting to Impacts



The Report examines activities within these areas of Caltrans that reduce GHG emissions and prepare for the impacts of climate change

- ▶ Planning and Environmental
- ▶ Materials, Concrete, and Pavement
- ▶ Maintenance and Operations
- ▶ Facilities and Administration
- ▶ GHG Reduction Activities in Caltrans Districts
- ▶ Adapting to Climate Variability and Change



Planning and Environmental

Caltrans Plans, Processes, and Guidance Documents related to GHG reductions

California Transportation Plan (CTP)

California Interregional Blueprint (CIB)

Regional Transportation Plan (RTP) Guidelines

Statewide Transit Strategic Plan (STSP)

California State Rail Plan (CSRP)

Goods Movement Action Plan (GMAP)

Smart Mobility Framework

Context Sensitive Solutions

Complete Streets Program

Highway Main Streets Guide

Standard Environmental Reference



Materials, Concrete, and Pavement

Caltrans' Use of Alternatives to Portland Cement and the Resulting GHG Reductions (2011)

Portland Cement Alternative	Total Annual Cement Use (tons)	Average Proportion of Alternative in Cement Mix	GHG Reductions per Ton (tons CO ₂ e/ tons used)	Annual GHG Reductions (tons CO ₂ e)
Limestone	374,066	2%	0.012	4,501
Fly ash/furnace blast slag		25%	0.111	41,345
District-specific mixes		varies	varies	1,389
Total				47,235

Caltrans' Use of Asphalt Alternatives and the Resulting GHG Reductions (2011)

Strategy	Annual Usage	Unit	GHG Reductions per Unit Used (lbs. CO ₂ e/unit)	Annual GHG Reductions (CO ₂ e)
Cold-in-place recycling	1,630,442	Cubic yards	0.007	12,043
Rubberized hot-mix asphalt	2,610,071	Tons	0.019	49,056
Rubberized warm-mix asphalt	67,696	Tons	0.006	376
Total				61,475

Maintenance and Operations

Caltrans' Alternative Fuel Usage and Resulting GHG Reductions

Fuel	Annual Usage in Gallons	Used as a Substitute for:	Annual Usage in GGE or DGE*	GHG Reduction per GGE or DGE (lbs. CO ₂ e)	Annual GHG Reductions (tons CO ₂ e)
E85 Ethanol (from corn)	164,083	Gasoline	119,429	0.05	3
B5 biodiesel (70% waste oil, 30% soy)	2,959,146	Diesel	2,949,001	0.87	1,290
Liquefied petroleum gas (propane)	28,568	Gasoline	21,002	5.65	57
Compressed natural gas (CNG)	N/A	Diesel	136,482	8.53	582
Total			3,225,914		1,932

Caltrans' Use of Energy-Efficient Lighting and the Resulting GHG Reductions (2011)



Strategy	Type of Fixture Replaced	Number of Fixtures Replaced To Date	Wattage of New Fixture	Wattage of Old Fixture	Annual GHG Reductions per Fixture Replaced (tons CO ₂ e)	Annual GHG Reductions (tons CO ₂ e)
LED traffic and ramp metering lights	Incandescent	77,946	22	120	0.29	22,804
LED ped signals	Incandescent	37,736	15	85	0.22	8,377
LED flashers	Incandescent	2,207	25	155	0.21	455
Xenon message signs	Incandescent	183	4,200	15,000	4.28	783
LED message signs	Incandescent	545	1,200	15,000	5.47	2,981
LED roadway lighting	High-pressure sodium	243	90-125	100-450	0.56	136
Induction sign lighting	Mercury-vapor	15,000	85	205	0.19	2,854
Total		133,860				38,390

Facilities and Administration

Strategies to Generate Clean Energy and Increase Efficiency in Facilities

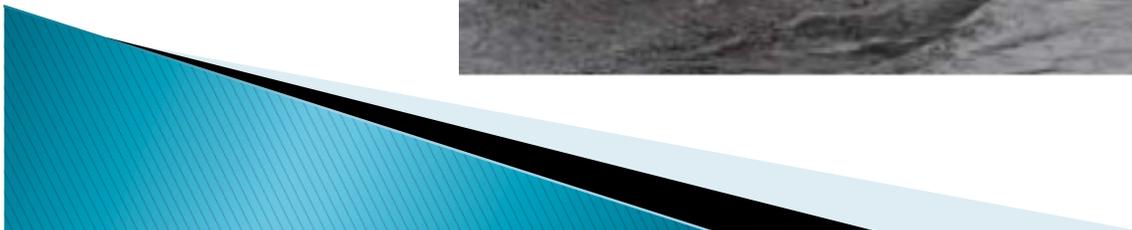
Strategy	Annual GHG Reductions (tons CO ₂ e)
Renewable energy projects	1,252
LEED-certified buildings	769
Data center upgrades	85
Energy-efficient lighting	630
Low-flow toilets and water fixtures	4
Computer energy reduction	505
Other energy efficiency upgrades and retrofits	1,517
Total	4,762

Statewide Participation in Caltrans Employee Commute Programs

Mode	Number of Participants	Annual GHG Reductions (tons CO ₂ e)
Bicycle	666	493
Vanpool	312	721
Carpool	695	1,449
Transit	1,645	3,802
Total	3,318	6,465



Adapting to Climate Change



Climate Change Impact	How it Impacts Transportation
Sea Level Rise	Flooding, roadway washouts, road closures, damage to roadway substructure
Intense Weather Events (precipitation)	Flooding and landslides – temporary road closures, bridge scour, roadway washouts
Higher Temperatures	Pavement buckling and rutting, increased thermal expansion of bridges, changes in vegetation, increased wildfires and landslides



Caltrans' Participation in Climate Change Efforts

CA State Government

- ▶ Climate Action Team (CAT)
- ▶ Participates on several CAT sub-group efforts: Research, Coastal Oceans, Communications, SB 375, State Operations
- ▶ Climate Registry
- ▶ Heat Adaptation Workgroup
- ▶ Update of the 2009 Calif. Adaptation Strategies

National Organizations

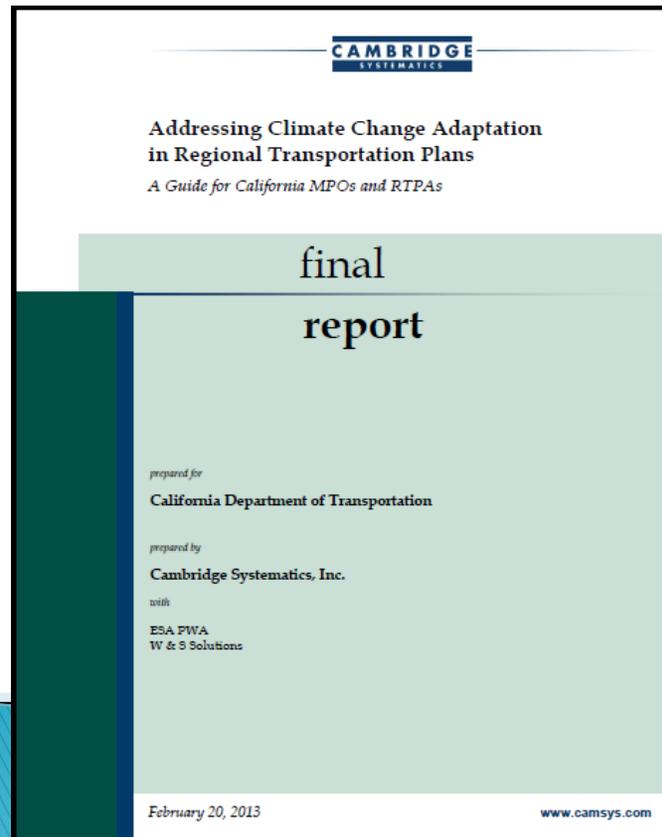
- ▶ American Association of State Highway and Transportation Officials (AASHTO)

Local/Regional Efforts

- ▶ Caltrans works with local and regional agencies statewide



Addressing Climate Change Adaptation in Regional Transportation Plans a Guide for California MPOs and RTPAs



Purpose of the Guide: Resource to help MPOs and RTPAs

- ▶ Provide California MPOs and RTPAs with an overview of climate change adaptation
- ▶ Provide suggested data and information that can help incorporate climate change adaptation into the regional planning process
- ▶ Provide a step by-step process for those MPOs/RTPAs which would like to incorporate climate change risks into their regional plans



Future Efforts and Directions for Caltrans and Other State Agencies

California State Government

- ▶ Continue climate change dialogue
- ▶ Develop a set of commonly accepted climate change assumptions to be used by state government – sea level rise, precipitation amounts, etc.
- ▶ Assumptions would be available for governmental agencies to use in their various planning activities

Caltrans Specific

- ▶ Continue to develop climate change communications materials for Caltrans staff and regional transportation agencies
- ▶ Develop policies and procedures on climate change
- ▶ Continue to develop guidance for Caltrans staff on how to address climate change impacts in transportation plans, designs, on-going maintenance, etc.



Caltrans Activities to Address Climate Change – Reducing Greenhouse Emissions and Adapting to Impacts

http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/documents/Caltrans_ClimateChangeRprt-Final_April_2013.pdf#zoom=75

Addressing Climate Change Adaptation in Regional Transportation Plans – A Guide for California MPOs and RTPAs

http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/documents/FR3_CA_Climate_Change_Adaptation_Guide_2013-02-26_.pdf#zoom=65

