2017
State Agency Greenhouse Gas Reduction Report Card

This Report Card documents the effectiveness of measures to reduce greenhouse gas (GHG) emissions in California. Figure 1 shows the trend in reductions as reported in this year's and previous years' Report Card. This year's Report Card documents reductions of 46 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) that occurred in 2015. Each Report Card shows reductions that happened two years prior to publication.[1]

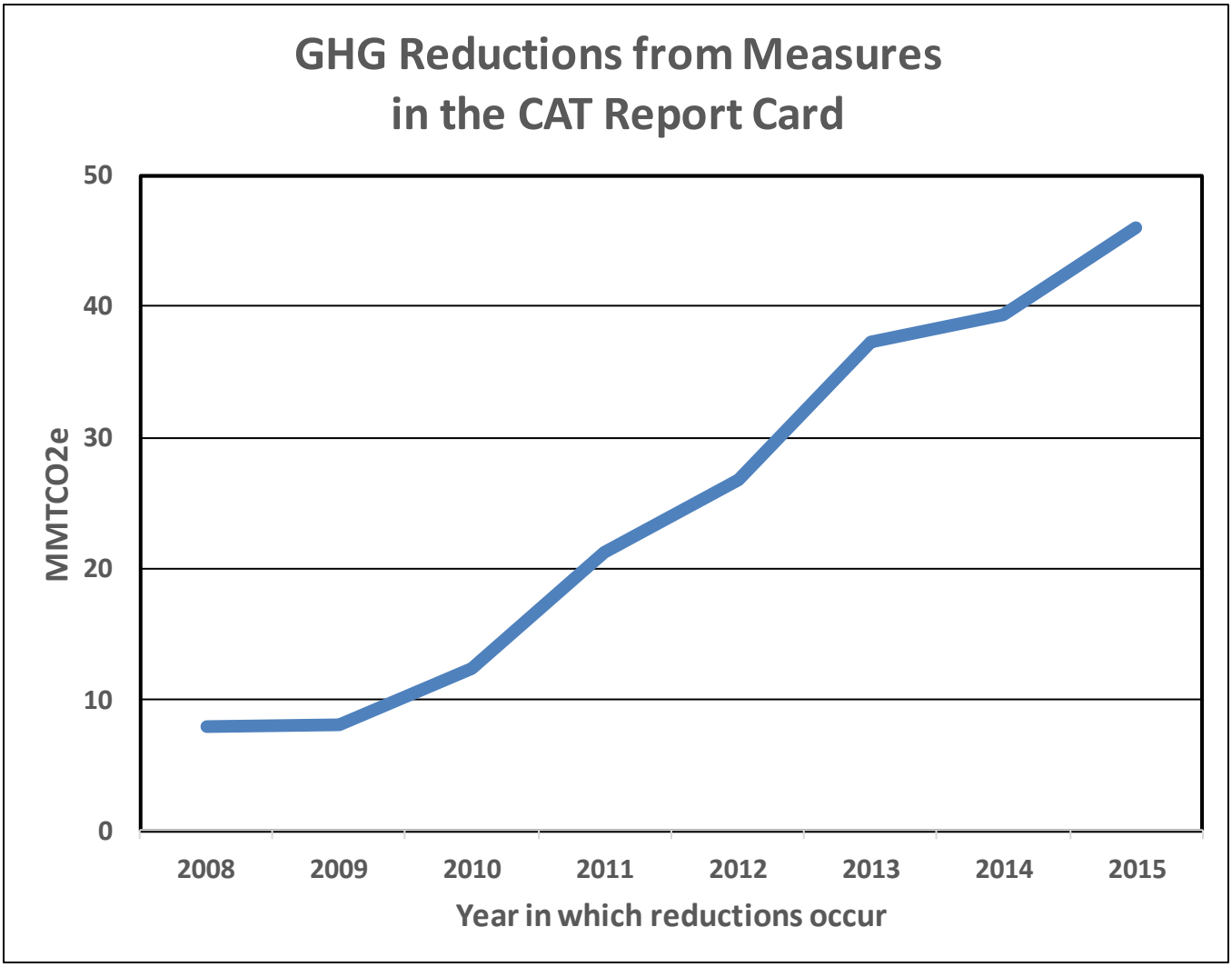

Figure 1

During 2015, we began to see large investments of the Cap-and-Trade auction proceeds in projects that reduce GHG emissions. For details on these programs and outcomes, see the 2016 California Climate Investments Annual Reports.[2]

[1] All of the Report Cards are available at http://climatechange.ca.gov/climate_action_team/reports/

[2] https://arb.ca.gov/cc/capandtrade/auctionproceeds/annualreport.htm

Background

Annually, the California Environmental Protection Agency (CalEPA) must prepare a report describing state agency actions to reduce GHG emissions. Per Section 12892 of Part 2.5 of Division 3 of Title 2 of the Government Code SB 85 (Stats. 2007, ch. 178), this law further directs CalEPA to compile and organize this information in the form of a "Report Card" and post it on the CalEPA website. The report reflects information gathered in 2016 for actual GHG reductions occurring in 2015. Projections of future GHG emissions were current as of October 2016, when state agencies were required to submit their information to CalEPA.

The statute requires that the Report Card include the following:

- A list of measures adopted and implemented by the state agency with the actual GHG emissions reduced as a result of these measures.
- A list and timetable for adoption of any additional measures needed to meet GHG emission reduction targets.
- A comparison of the reductions from actions taken or proposed to be taken by a state agency to that agency's GHG emission reduction targets.
- An estimate of the greenhouse gas emissions from each agency's own operations and activities.

Climate Change Report Card Tables

The required information is organized into four tables as described below:

TABLE 1: GHG Reduction Target Comparison:

Table 1 summarizes the reductions shown in Tables 2 and 3, and compares the 2020 goals from Table 3 with the annual reductions from current programs shown in Table 2. Reductions shown are those achieved within California during the given year. The annual figures reflect cumulative efforts but not cumulative reductions[3]. Also, they do not include reductions that might occur out-of-state.

TABLE 2: On-going Measures and Reductions in 2015:

Table 2 looks back to 2015, showing GHG emission reductions achieved by Scoping Plan measures in that calendar year, as reported to CalEPA by the responsible agencies. Nearly all of the GHG emission reduction measures in the 2008 AB 32 Scoping Plan are already in place and operational.

TABLE 3: GHG Reduction Measures and Reductions Expected in 2020:

Table 3 looks ahead to 2020, listing: measures; the expected GHG reduction in 2020; and progress in implementation since the previous Report Card. Several measures require cross-agency implementation. The total reduction for these measures may be listed twice to reflect that each agency is responsible for some portion of the reductions. In addition, several individual measures feature interacting impacts so that the reduction numbers from each are not strictly additive (as recognized and explained in the 2008 Scoping Plan, which can be

[3] For example, consider the GHG reductions due to building efficiency standards. The GHG reductions that occur in 2015 are a consequence of cumulative installations that occurred over several years, not just in 2015.

found at http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm).

Nearly all the Scoping Plan measures are in place by now. For the few exceptions, the final column of Table 2 indicates the implementation timeline.

TABLE 4: Climate Action Team (CAT) – GHG Inventory Status:

Each CAT agency is required to report an estimate of the greenhouse gas emissions from their own operations and activities. Table 4 lists the CAT agencies, boards, departments and commissions, and the current status of the greenhouse gas inventory activities for each. The information in this Table was provided to CalEPA by the named agency or department.

The GHG inventories employ protocols established by The Climate Registry (TCR)*. Inventories identified as 'verified' have been verified by an approved third party and submitted to the registry. The verified inventory reports can be found on the registry's website: https://www.theclimateregistry.org/our-members/cris-public-reports/.

*Originally chartered by the state of California as the California Climate Action Reserve

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Abbreviations:

ARB – Air Resources Board

CAL FIRE – California Department of Forestry & Fire Protection

CAT -- Climate Action Team

CDFA – California Department of Food & Agriculture

CEC – California Energy Commission

CalRecycle – California Department of Resources Recycling and Recovery

CPUC – California Public Utilities Commission

DGS – Department of General Services

DWR – Department of Water Resources

GHG – Greenhouse Gas

GW – Gigawatt

GWh – Gigawatt hour

GWP –Global Warming Potential

LEED – Leadership in Energy and Environmental Design (certification program)

MMBtu – Million British Thermal Units

$MMTCO_2e$ - Million Metric Tons of CO_2 Equivalent

$MTCO_2e$ - Metric Tons of CO_2 Equivalent

MW – Megawatt

MWh – Megawatt hour

OPR – Office of Planning and Research

SF_6 – Sulfur Hexafluoride

SWRCB – State Water Resources Control Board

TABLE 1 - GREENHOUSE GAS (GHG) EMISSION REDUCTIONS

The following summarizes the totals from Tables 2 and 3. Reductions shown are Million Metric Tons of CO_2 equivalent ($MMTCO_2e$) and are those achieved within California during the given year. The annual figures do not reflect reductions that might occur out-of-state. For many measures, the annual reductions are due to cumulative action over several years since 2008.

TABLE 1a:
GHG EMISSION REDUCTIONS ACHIEVED

Agency	GHG Emission Reductions Achieved in 2013[1]	GHG Emission Reductions Achieved in 2014[1]	GHG Emission Reductions Achieved in 2015[1]
ARB	10.8	13.6	14.3
CAL FIRE	2.2	3.7	2.2
CalRecycle	0.0	0.0	3.5
Caltrans	<0.1	<0.1	<0.1
CDFA	0.0	0.0	0.5
CEC	5.0	6.6	9.0
CPUC	12.8	15.4	15.1
DGS [3]	<0.1	<0.1	<0.1
DWR	0.0	0.0	1.4
HCD [4]	0.0	0.0	0.0
OPR [4]	0.0	0.0	0.0
SWRCB	0.0	0.0	0.0
Additional GHG emissions reductions from previous year		8.5	6.7

TABLE 1b:
Agency GHG Targets for 2020

Agency	Expected GHG Emission Reductions in 2020 from Agency Measures [2]
ARB	82.6
CAL FIRE	0.0
CalRecycle [3]	1.0
Caltrans	0.2
CDFA	2.3
CEC	2.3
CPUC	40.3
DGS [4]	5.3
DWR	1.2
HCD [5]	0.0
HSR	0.0
OPR [5]	0.0
SWRCB	0.5
Total [6]	**135.7**

Notes

1. The values in this column are taken from the totals in Table 2. The figures may reflect emission reductions from programs implemented before AB 32 was enacted in order to provide a broad picture of all on-going GHG related efforts. Figures for years prior to the most recent year come from previous year Report Cards.
2. The values in this column are taken from the agency totals in Table 3. These figures only reflect reductions from programs implemented since AB 32 was enacted. The total aggregate GHG reduction cannot be directly calculated from these values due to issues of double counting. Example: the Green Building measures achieve reductions, primarily, by reducing energy consumption. Such reductions would be captured in the energy sector but the measure would be implemented by non-energy sector agencies such as DGS.
3. Only 1.0 $MMTCO_2e$ of the CalRecycle total shown on Table 3 is included in the target because the balance of the reductions may occur largely out-of-state.
4. Most of the GHG reductions from DGS measures are captured within the energy sector. The target is for measures that are not counted elsewhere.
5. These agencies have important programmatic responsibilities but do not have emission reduction regulatory authority.

TABLE 2: ONGOING MEASURES AND RELATED GHG EMISSION REDUCTIONS

$MMTCO_2e$ - Million Metric Tons of CO_2 Equivalent

Numbered footnotes appear at the end of each agency's section.

California Air Resources Board **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
	High Global Warming Potential (GWP) Gases[1,2,3,4]	**2.9**	**2.9**
Reduction of Refrigerant Emissions from Non-Professional Services (H-1)	This regulation requires a self-sealing valve on small cans of refrigerant, and a deposit and recycling program for the cans.		
SF_6 Limits in Non-Utility and Non-Semiconductor Applications (H-2)	This regulation achieves GHG emission reductions from sulfur hexafluoride (SF_6) use in non-semiconductor and non-utility applications through a phase-out of use over several years. The use and sales requirements exclude a limited number of uses such as use in eye surgeries.		
GHG Emission Reductions from Semiconductor Operations (H-3)	This regulation requires semiconductor operations to use process optimization, alternative chemistries, and abatement technologies in combination or separately to reduce GHGs. The emission standards apply to semiconductor operations that emit more than 0.0008 $MMTCO_2e$ per year. Reduction of GHG emissions from this measure began in 2012.		
Global Warming Potential Use in Consumer Products (H-4)	This regulation sets Global Warming Potential (GWP) limits for compounds used in specific consumer products.		

California Air Resources Board **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
	High GWP Gases, continued		
Refrigerant Management Program (H-6)	This regulation requires facilities with large refrigeration systems with more than 50 pounds of high-GWP refrigerant to conduct periodic leak inspections, promptly repair leaks, and keep service records on site. These facilities are also required to register and submit annual refrigerant usage reports to ARB. This regulation also affects any person who installs, services, or disposes of any appliance using a high-GWP refrigerant; as well as refrigerant wholesalers, distributors, and reclaimers. The regulation became effective January 1, 2011. The emissions are based on facilities with large and medium (200 to 2,000 lbs.) refrigeration systems that have reported. The annual leak rate for these facilities was reported to have been reduced from 25 to 14 percent annually.		
SF_6 Emission Reductions from Gas Insulated Switchgear (H-6)	This regulation sets an annual emission rate limit for SF_6 as a proportion of an entity's capacity of sulfur hexafluoride in gas insulated switchgear. The maximum allowable annual emission rate was ten percent for 2011 and will decrease one percent per year until 2020, at which point the maximum allowable annual emission rate remains at one percent.		
With California Energy Commission, California Building Standards Commission Specifications for New Supermarket Refrigeration (H-6)	This measure sets minimum prescriptive standards for energy efficient refrigeration systems and for design and installation of leak-tight refrigeration systems, which will apply to new supermarket construction and new supermarket refrigeration installation beginning January 1, 2014. The measures have been added to the California Title 24 Building Standards Code, Part 6 (Energy Efficiency), and Part 11 (Green Building Standards Code). GHG emission reductions are expected from increased energy efficiency, and from reduced refrigerant leakage. Estimated reductions are expected to be 0.5 $MMTCO_2e$ annually by 2020, and as more supermarkets replace their older systems with newer systems, the reductions are expected to achieve a maximum of 1.2 $MMTCO_2e$ annually by 2030.		

California Air Resources Board **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
	Recycling and Waste Management[1,2]	**1.0 ± 0.7**	**1.0 ± 0.7**
Landfill Methane (RW-1)	This regulation requires enhanced control of methane emissions from municipal solid waste (MSW) landfills and requires owners and operators to install gas collection and control systems at smaller and other uncontrolled landfills. Affected landfills are required to implement advanced methane monitoring requirements. Design Plans were required by June 17, 2011 and emission controls are required within 18 months after approval of the Design Plan for active MSW landfills or within 30 months after approval of the Design Plan for closed or inactive MSW landfills.		
	Transportation Sector[1,2,3,4,5]	**10.5[6,7]**	**14.3**
Pavley (AB 1493) (National GHG Standard for 2012-2025 Model Year Light-Duty Vehicles ≤ 8,500 lbs. GVWR) (T-1)	This regulation, required by AB 1493 (Pavley, Chapter 200, Statutes of 2002), sets fleet-average GHG standards for new passenger vehicles, phasing in over 2009-2016. The emission reductions increase to 26 $MMTCO_2e$ annually in 2020 as the GHG standards are fully implemented.		
Low Carbon Fuel Standard (T-2)	This regulation requires fuel providers in California to ensure that the mix of fuel they sell into the California market meets, on average, a declining standard for GHG emissions measured in CO_2 equivalent grams per energy unit of fuel sold. Estimated reductions include those achieved by over-compliance with the regulation.		
Tire Pressure Program (T-4)	This regulation requires specified automobile servicing businesses to ensure proper tire inflation at the time of service, as well as public education about proper tire inflation.		
Ship Electrification (T-5)	This regulation requires most container, passenger, and refrigerated cargo ships to shut off their auxiliary engines while at dock and receive power from the electrical grid, or reduce their emissions by a similar amount via the implementation of other technologies.		

California Air Resources Board **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Transportation Sector, continued			
Diesel Anti-Idling (T-6)	This Air Toxic Control Measure limits general idling of all commercial and publicly owned diesel-fueled vehicles with a gross vehicle weight of greater than 10,000 pounds. This regulation reduces diesel particulate matter (PM), oxides of nitrogen (NOx), and the amount of diesel fuel used in California. For overnight cab comfort, vehicle owners may choose from several idle emission reduction technologies including diesel-fueled auxiliary power systems and certified clean idle engines. While it provides significant NOx reductions, the certified clean idle engine, which is widely used in 2008 and newer models, offers limited fuel saving.		
Goods Movement (Drayage Trucks) (T-6)	This regulation requires the reduction of PM, and NOx emissions from drayage trucks operating at California's ports and rail yards through retrofits and turnover of pre-2007 trucks. GHG reductions are attained by the reduction of black-carbon emissions and GHG co-benefits through increased fuel-efficiency.		
Heavy-Duty Vehicle GHG Emission Reduction Measure TTGHG + Phase I (above 8,500 lbs. GVWR) (T-7)	The Tractor-Trailer Greenhouse Gas regulation reduces GHG emissions from 53-foot or longer box-type trailers and the tractors that pull them by increasing their fuel efficiency through improvements in aerodynamic drag and tire rolling resistance. It requires (i) 2010 and older tractors to be retrofitted with U.S. EPA SmartWay verified tires, (ii) 2010 and older model year trailers with U.S. EPA verified aerodynamic technologies and low rolling resistance tires, and (iii) 2011+ model year trailers and 2011 through 2013 model year tractors to be U.S. EPA SmartWay designated. Phase 1 standards align with the federal Phase 1 Regulation, adopted by U.S.EPA in 2011. The adoption provides nationwide consistency for engine and vehicle manufacturers, and allows ARB to enforce the requirements.		
Medium- and Heavy-Duty Vehicle Hybridization (T-8)	This incentive program reduces the GHG emissions of urban, stop-and-go vehicles, such as parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks, through the use of hybrid and zero-emission technology. Incentives for hybrid and zero-emission trucks became available starting the first quarter of 2010 and the program will continue into 2017 with up to $18 million in additional funding augmenting the $84 million previously allocated.		

California Air Resources Board **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
ARB NOTES:	[1] For regulatory programs, emission reductions reported are taken from the most recent emissions inventory and reflect the latest updates available to economic forecasts, technology performance, vehicle and equipment population estimates, etc. These data are provided at the sector level in order to accurately report the actual reductions achieved, given the real-world interactions among multiple regulatory programs that address the same sector. [3] Previous reports have included cumulative emission reductions rather than annual emission reductions. In addition, this report card includes quantification methodology that has been updated to reflect the latest vehicle usage and fuel economy values, in addition to other factors. [2] Ongoing measures administered by other agencies contribute emission reductions to the Electrical and Natural Gas, High GWP, and Transportation Sectors. [4] ARB programs that are undergoing evaluation or development will contribute emission reductions to the Agricultural, High GWP, Industry, and Transportation Sectors. [5] The Cap-and-Trade Program contributes emission reductions to the Electrical and Natural Gas, Industry, and Transportation Sectors. [6] **Diesel Anti-Idling:** The primary contributor to reduced GHG emissions savings since 2013 is an increase in clean idle-certified trucks (30g NOx/hr) in 2014. The Anti-idling regulation limits the minutes a truck can idle. However, if the truck is certified clean idle, it may idle for hours. The increase in idling can be attributed to most late model trucks, which are certified clean idle. In addition, the Truck and Bus regulation has led many truck owners to prefer compliance through the purchase of 2007 standard trucks (many of which are clean idle) over the retrofit of older trucks. [7] **Medium- and Heavy-Duty Vehicle Hybridization:** Previous reports included cumulative emission reductions rather than annual emission reductions. In addition, this report card includes quantification methodology that has been updated to reflect the latest vehicle usage and fuel economy values, in addition to other factors.		

California Department of Forestry and Fire Protection (CAL FIRE) **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Sustainable Forests (various programs)	Existing state and federal regulations and assistance programs. Recent research shows California forests increasing in growing stock[1] and likely sequestering more than 5.0 $MMTCO_2e$ per year.[2] CAL FIRE, federal and other known state forest sector activities contributing to current sequestration rates include:		
Forest Practices	Annual benefit from California Forest Practice Act rule changes instituted in December 2004 equals 2.2 $MMTCO_2e$.[3]	2.2	2.2
Urban Forestry	CAL FIRE funded planting of 37,857 trees in 2015 for a cumulative total of 113,845 trees since 2005 resulting in annual reductions of 0.0016 $MMTCO_2e$.[4] Annual sequestration is based on cumulative numbers of trees since sequestration increases over time as trees mature. Educational programs enhance effectiveness of voluntary tree planting by homeowners, utilities and others, but we cannot reliably track voluntary outputs at this time.	<0.1	<0.1
Forest Legacy	CAL FIRE conserved no acres in 2015 for a one-time avoided conversion emission of zero $MMTCO_2e$.[5] Ongoing annual uptake benefits from conservation purchases by other agencies in 2005-2007 total 0.02 $MMTCO_2e$.[6] CAL FIRE has not tracked subsequent conservation purchases.	1.5	0.0
State Responsibility Area Fire Prevention Fund Grant Projects	CAL FIRE conducted fuel reduction on 1,102 acres using mechanical or manual treatments and 541 acres using prescribed burning in 2015 as part of this program. CAL FIRE does not track fuel treatments and biomass utilization by federal agencies. The Vegetation Treatment Program EIR is being revised, and the new document will contain a more detailed analysis of fuel treatment emissions.[7]	N/A	N/A

California Department of Forestry and Fire Protection (CAL FIRE) **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Vegetation Management Program (VMP)	CAL FIRE conducted fuel reduction on 232 acres using mechanical or manual treatments and 4,409 acres using prescribed burning in 2015 as part of this program. CAL FIRE does not track fuel treatments and biomass utilization by federal agencies. The Vegetation Treatment Program EIR is being revised, and the new document will contain a more detailed analysis of fuel treatment emissions.[7]	N/A	N/A
California Forest Improvement Program (CFIP)	CFIP planted zero acres in 2015 for a cumulative total of 2,232 acres since 2005. Annual sequestration from cumulative acres planted since 2005 are still negligible, since the method assumes near-term emissions from site preparation treatment. The method likely underestimates benefits for reforestation projects conducted immediately after wildfires, however, and should be revisited.[8]	0	0

CAL FIRE NOTES:

[1] CAL FIRE anticipates revisions to the estimate of carbon sequestration in California forests with recently revised estimates

[2] Smith, James E., and Linda S. Heath. 2008. Carbon stocks and stock changes in U.S. forests, and Appendix C. P. 65-80, C-1-C-7 in: U.S. Department of Agriculture. U.S. Agriculture and Forestry Greenhouse Gas Inventory: 1990-2005. Technical Bulletin No. 1921. Washington, DC: Office of the Chief Economist.

[3] CAL FIRE, Forest Conservation Management Strategy, AB 32 Scoping Plan, Appendix C, p. 166.

[4] Benefits estimated using method developed for Urban Forestry Strategy in CAT Report and AB 32 Scoping Plan.

[5] Benefits estimated using method developed for Forest Conservation Strategy in CAT Report and AB 32 Scoping Plan.

[6] Benefits estimated using method developed for Forest Conservation Strategy in CAT Report and AB 32 Scoping Plan.

[7] Personal communication, CAL FIRE Vegetation Management Program.

[8] Benefits estimated using method developed for Reforestation Strategy for AB 32 Scoping Plan.

California Department of Resources, Recycling and Recovery (CalRecycle) **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Statewide Recycling	CalRecycle provides assistance to local jurisdictions, businesses and the public with their recycling efforts. In 2015, a per-resident disposal rate of 4.7 pounds/resident/day was calculated using SB 1016's measurement system; the per-resident "diversion rate equivalent" was 63 percent.[1]	3.5 ± 0.5	3.5 ± 0.5
CALRECYCLE NOTES:	[1] Achieved 65 percent in 2010; 65 percent in 2011; 66 percent in 2012; 65 percent in 2013; 65 percent in 2014.		

California Department of Transportation (Caltrans) **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Alternative Cement and Concrete Strategies	In 2009, Caltrans amended their Standard Specifications for concrete to allow contractors to use less energy-intensive concrete mixes. These alternatives include fly ash, blast furnace slag, and silica fume. Caltrans is also looking into ways to reduce GHG emissions associated with concrete. These include prototyping use of roller-compacted concrete which requires less cement as a binding agent and thereby reduces life-cycle emissions. Completed work on new construction specifications for 2015 implementation that provide for increased use of recycled Portland cement concrete. These specifications establish the means by which up to 15 percent returned plastic concrete (excess Portland cement concrete that has not yet hardened) can be used for specified infrastructure improvements. In addition to conservation of water and other resources, this provides for a 16.2 percent reduction in embodied energy and a 15.3 percent reduction in carbon footprint for items using returned plastic concrete.	<0.1	<0.1
Alternative Asphalt Strategies	Caltrans has multiple initiatives to reduce the carbon content of asphalt and the energy required to lay it: cold-in-place recycling, rubberized hot-mix asphalt, and rubberized warm-mix asphalt. Use by Caltrans of alternatives to hot mix asphalt reduces its operational GHG emissions by over 61,000 tons per year.	<0.1	<0.1
Alternative Fuel and Fleet Strategies	Caltrans has been working to conserve fleet fuel use since the mid-1980s by developing more efficient ways to manage the fleet. Recent efforts focus on using alternative fuels and more efficient vehicles in its fleet and equipment, including: renewable diesel, biodiesel, ethanol, liquefied petroleum gas (propane), compressed natural gas (CNG), hydrogen fuel cell vehicles, and hybrid electric vehicles.	<0.1	<0.1

California Department of Transportation (Caltrans) **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Alternative Employee Commuting Strategies	Caltrans has many employee commute programs in place that reduce the need to drive to work. These include monthly bus passes, emergency ride home vouchers, subsidies for vanpools, carpool matching services, and secure-access bicycle parking.	<0.1	<0.1
LED Roadway Lighting	In 2010, Caltrans began retrofitting street lights with Light Emitting Diode (LED) light fixtures. Full deployment is continual.	<0.1	<0.1
Facility Efficiency and Energy Conservation	Caltrans continues to work towards reaching the goals articulated in Executive Order B-16-2, and Executive Order B-18-12 to support the state's renewable power statutes. These include energy and water conservation, and updated Leadership in Energy and Environmental Design (LEED) standards.	<0.1	<0.1

California Department of Food and Agriculture **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
State Water Efficiency and Enhancement Program (SWEEP)	CDFA developed SWEEP in response to emergency drought legislation SB 103 (Committee on Budget and Fiscal Review, Chapter 2, Statutes of 2013), which provided an initial $10 million in 2014 for CDFA to disperse funding from the Cap and Trade Program directly to agricultural operations to incentivize the installation of irrigation systems that save water and reduce greenhouse gas emissions. Farmers apply for grant funding for irrigation management technologies, microirrigation systems, pump efficiency, or management practices that demonstrate water savings and reduced GHG emissions.	<0.1	0.5

California Energy Commission **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Appliance Energy Efficiency Standards	The Appliance Efficiency Regulations increase efficiency of appliances sold to California consumers and businesses. Emission reductions result from energy-efficient appliances consuming less electricity and natural gas, avoiding emissions associated with electricity generation and natural gas combustion. Using the California Energy Demand (CED) 2015 final revised mid-case forecast, annual incremental statewide appliance electricity savings for 2015 were 2,759 GWh.[1] Cumulative electricity savings in 2015 from a 2008 base year were 14.08 TWh. Annual statewide incremental appliance natural gas savings in 2015 were estimated to be 29 million therms.[2] Cumulative appliance natural gas savings in 2015 from a 2008 base year were 188 million therms. Cumulative energy savings figures for 2014 were 11.32 TWh and 159 million therms.	3.9	4.7
Building Energy Efficiency Standards	The Building Energy Efficiency Standards are designed to increase the efficiency of all newly constructed residential and nonresidential buildings and additions and alterations to existing buildings in California. The strategy is to develop, implement, and enforce standards that require and result in reductions in energy and water use in buildings. Using the CED 2015 final revised mid-case forecast, annual incremental statewide building electricity savings for 2015 were 1,367 GWh.[1] Cumulative building electricity savings in 2015 were 6.20 TWh from a 2008 base year. Annual statewide incremental building natural gas savings were 55 million therms in 2015. Cumualtive natural gas savings from building efficiency standards in 2015 were 226 million therms from a 2008 base year.[2] Cumulative energy savings figures for 2014 were 4.84 TWh and 171 million therms.	2.2	2.9

California Energy Commission **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$** **2014**	**2015**
Comprehensive Publicly Owned Utility Customer Energy Efficiency Programs	Publicly owned utilities (POU) in California have electricity efficiency (EE) programs that benefit their ratepayers. The publicly owned utilities began reporting electricity program savings in 2007. Their programs achieved annual electricity savings of 682 GWh in 2015.[3] Cumulative POU EE savings from a 2008 base year were 3.6 TWh in 2014 and 4.3 TWh in 2015.[2]	1.0	1.1

CEC NOTES:

[1] The estimates are based on the California Energy Demand 2014-2026 (CED 2015) final mid-case scenario, which can be found at: http://www.energy.ca.gov/2015_energypolicy/documents/2016-01-27_electricity_efficiency_savings.php

[2] Energy Commission staff use a GHG emission factor of 588 lbs CO_2/MWh or 0.267 $MTCO_2$/MWh to estimate the GHG emission attribute of electricity savings for 2014 and 2015. Natural gas savings estimates were obtained from CED 2015 and estimates use a GHG emissions factor for each therm of natural gas combustion avoided of 0.00529 $MTCO_2e$. One therm equals 0.1 MMBtu.

[3] Statewide electricity savings from publicly owned utility energy efficiency programs for 2014 and 2015 are reported in *Energy Efficiency in California's Public Power Sector – A 2016 Status Report* , page 2. The annual public utilities energy efficiency status report for 2016 can be found at: http://eecoordinator.info/energy-efficiency-in-californias-public-power-sector-a-2016-status-report/. The POUs use a technical manual to standardize estimation of energy efficiency program savings. This manual can be found at: http://cmua.org/wpcmua/wp-content/uploads/2016/06/2016-CMUA-POU-TRM_Final_v692016.pdf

California Energy Commission **Program Title**	**Description of Measures (non-Scoping Plan Strategies)**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Alternative and Renewable Fuels and Vehicle Technology Program (ARFVTP)	The ARFVTP was established by AB 118 (Nunez, Statutes of 2007) to transform California's fuel and vehicle types to help attain climate change and air quality goals of the state. The ARFVTP provides up to $100 million annually for projects and the program was extended through 2024 by AB 8 (Perea, Statutes of 2013). As of September 1, 2016, the program has awarded $622 million to projects including alternative fuel production and infrastructure, alternative fuel and advanced vehicle technologies, manufacturing and workforce training, fuel standards and equipment certifications, sustainability studies and centers for alternative fuels. The National Renewable Energy Laboratory (NREL) has estimated direct GHG emissions benefits of 71,000 metric tons in 2013 and 226,000 metric tons in 2015 from ARFVTP funded projects. NREL also estimates 1.7 million metric tons annually will be directly reduced by the year 2020 from projects within this program. The additional potential market transformation benefits are less certain with estimates by 2020 ranging from a low of 0.4 $MMTCO_2e$ to a high of 2 $MMTCO_2e$.	0.1	0.2
California Clean Energy Jobs Act: Proposition 39 (K-12) Program	The Energy Commission implements the California Clean Energy Jobs Act (Proposition 39 K-12 Program) as guided by SB 73 (Statutes of 2013) and California budget acts. Program implementation guidance was published in December 2014. As of October 2016, the Energy Commission has received 1,224 applications from Local Educational Agencies and approved 1,086 of the applications. Approximately $763 million in award funds have been approved for over 14,000 energy efficiency and clean energy measures. Once completed these measures are estimated to save 288,526 MWh of electricity, 1.8 million therms of natural gas, and 90,021 gallons of fuel oil. Once all measures are completed, staff estimate approximately 100,000 metric tons of GHG emissions will be avoided. Funding allocations between 2013 and 2016 totals $973 million. Under the Prop 39 initiative up to $550 million annually can be appropriated by the Legislature for eligible projects.	0.1	0.1

California Public Utilities Commission **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
California Solar Initiative	SB 1 (Murray, Chapter 132, Statutes of 2006) established a $3 billion rebate program to support the deployment of 3,000 MW of distributed solar generation capacity statewide through 2016. The CPUC's portion of this goal and associated budget is 1,940 MW and $2.4 billion. In January 2015, the CPUC reauthorized the CSI low income programs (SASH and MASH) with $108 million in new funding to run until the additional incentives are claimed or until 2021.	0.7	1.0
California Solar Initiative – Thermal Program (Solar Water Heating)	The CPUC's California Solar Initiative (CSI)-Thermal program offers incentives based on the amount of natural gas or electricity displaced by solar water heaters. Incentives are available for residential, multifamily, and commercial applications. The program was created in January 2010.	<0.1	<0.1
Self-Generation Incentive Program	The Self Generation Incentive Program (SGIP) provides incentives for qualifying distributed energy generation resources. http://www.cpuc.ca.gov/sgip/	TBD	<0.1

California Public Utilities Commission **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Investor-Owned Utilities Energy Efficiency Programs	The CPUC funds energy efficiency (EE) programs through the resource procurement budgets of the utilities, as required by Public Utilities Code Section 454.5 (b)(9)(C). The programs developed for energy efficiency reach residential single family, residential multi-family, commercial, industrial, and agricultural customers of investor-owned electric and natural gas distribution utilities.	8.2	7.2
Renewables Portfolio Standard	The California Renewables Portfolio Standard (RPS) Program was established by SB 1078 (Sher, Chapter 516, Statutes of 2002), and has been subsequently modified by SB 107 (Simitian, Chapter 464, Statutes of 2006), SB 1036 (Perata, Chapter 685, Statutes of 2007) and SB 2 (1x) (Simitian, Chapter 1, Statures of 2011-12 First Extraordinary Session). The RPS program is codified in Public Utilities Code Sections 399.11-399.20. Under SB 2 (1x), the RPS program administered by the CPUC requires each retail seller to increase its total procurement of eligible renewable energy resources so that 33 percent of retail sales are served by eligible renewable energy resources no later than December 31, 2020. Emissions reductions in 2009 through 2015 represent the increased renewable energy procurement compared to 2007 levels.	6.2	6.9

Department of General Services (DGS) **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
Green Buildings - LEED	This measure reduces GHG emissions associated with the design and construction of state-owned or state-leased buildings. During 2015, four new, renovated, or existing buildings totaling 303,761 sq. ft. were completed and LEED certified.	<0.1	<0.1
Green Buildings – Distributed Generation	This measure reduces GHG emissions associated with the installation of clean on-site renewable generation. By the end of 2015, a total of 39.34 MW had been installed at state facilities, with more being installed over the next five years. Efforts continue to expand distributed generation programs further, including a Request for Proposals for wind generation.	<0.1	<0.1
Green Buildings – Existing State Buildings Retro-Commissioning	This measure reduces GHG emissions associated with the optimization of energy systems and improvement of environmental performance in existing buildings. Currently 18 energy savings retrofit projects using Energy Service Companies (ESCOs) are in progress statewide. No new energy savings projects have begun due to the expired contract for the pool of ESCOs, pending streamlining legislation, and the development of new processes. A new RFQ to establish a pool of ESCOs will be issued in November 2016 under the authority of the recently enacted legislation (the addition of Public Utilities Code 388.2). In addition, new streamlined methods are being developed so that energy savings projects can also be completed using other types of agreements including those with utility companies. DGS has awarded an RFP to install a Monitoring-Based Commissioning system residing at the Central Plant and has begun the investigation phase.	0	0

California Department of Water Resources (DWR) **Program Title**	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	
		2014	**2015**
End Use Water Conservation & Efficiency	SBX7-7, the Water Conservation Act of 2009 (Steinberg, Chapter 4, Statutes of the 2009-2010 Seventh Extraordinary Session), mandates a 20 percent reduction in statewide per capita urban water use by the year 2020 ("20x2020").	**	1.4
DWR NOTES: ** Emission reduction not quantified.			

TABLE 3: GHG EMISSION REDUCTION MEASURES, AND REDUCTIONS EXPECTED IN 2020

Numbered footnotes appear at the end of the document. **Notes** identified with asterisks are at the end of each agency's section.

$MMTCO_2e$ - Million Metric Tons of CO2 Equivalent

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities Since Last Report Card or Implementation Timeline
	AIR RESOURCES BOARD (ARB) MEASURES				
	AGRICULTURAL SECTOR				
A-1	ARB, CDFA	Methane Capture at Large Dairies	This measure encourages voluntary installation of anaerobic digesters at large dairies through economic incentives such as marketable carbon offset credits (offsets), favorable utility contracts, or renewable energy incentives. Emissions reductions from offset projects approved and issued by ARB are attributed to reductions under the Cap-and-Trade Program. In addition, ARB is collaborating with CDFA, the State Water Board, and other stakeholders to identify and reduce barriers to greater digester use. This collaboration is also shown under those being implemented by CDFA.	1[3]	ARB issued offset credits to four compliance projects and 50 early action projects. Additional projects are currently under review. As this protocol is applicable across the US, not all of these projects are in California.
	ELECTRICAL AND NATURAL GAS SECTOR				
E-3	CPUC, CEC, ARB	Renewables Portfolio Standard	SB 350 (De Leon, Chapter 547, Statutes of 2015) increases the use of renewable electricity via the Renewables Portfolio Standard (RPS). California electric utilities must obtain 50 percent of their electricity from eligible renewable energy resources by 2030.	Reduction included in CPUC totals.	ARB is working with CPUC and CEC on implementation.
	HIGH GLOBAL WARMING POTENTIAL (GWP) GASES				
H-1	ARB	HFC Reduction Strategies, Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Servicing	This regulation requires a self-sealing valve on small cans of refrigerant, and a deposit and recycling program for the cans.	0.3	Amendment was proposed and approved at the April 22, 2016, Board hearing and 15-day changes are being made. Implementation and enforcement are ongoing including product certification, return rate determination, and their association unclaimed deposits.
H-2	ARB	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	This regulation places restrictions on nonessential end uses of SF_6, where feasible alternatives are available.	< 0.1	Ongoing implementation includes compiling annual reports, processing and reviewing exemption requests, and investigating discrepancy between sales and emissions data reported.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities Since Last Report Card or Implementation Timeline
H-3	ARB	High GWP GHGs Emission Reductions from Semiconductor Operations (Discrete Early Action)	This regulation requires semiconductor operations to use process optimization, alternative chemistries, and abatement technologies in combination or separately to reduce GHGs. The emission standards apply to operations that emit more than 0.0008 MMT CO_2e per year.	0.2	ARB is collaborating with local air districts on implementation.
H-4	ARB	Limit High GWP Use in Consumer Products-- Pressurized Gas Duster GWP Limit of 150 and Other Consumer Product Categories (Discrete Early Action)	This regulation requires setting GWP limits on specific consumer products.	0.2	Implementation ongoing.
H-5	ARB	<u>High GWP Reductions from Mobile Sources:</u> 1) Low GWP Refrigerants for New Vehicle Air Conditioning Systems	Measure provides credit incentives for using low GWP refrigerants with the air conditioning systems on new vehicles. This measure has been integrated into the Advanced Clean Cars Measure and therefore reductions from this activity are not counted toward the 0.6 $MMTCO_2e$ in reductions for H-5.	0.6	Part of Advanced Clean Cars program. Implementation Timeline: Model year 2017.
H-6	ARB	<u>High GWP Reductions from Stationary Sources:</u> 1) High-GWP Refrigerant Management Program for Stationary Sources Refrigerant Registration /Reporting/Repair Program	Measure to reduce emissions of high GWP refrigerants from stationary, non-residential refrigeration equipment through leak detection and repair, system retrofit or retirement, and reporting and recordkeeping requirements.	5.9	Implementation ongoing.
		2) Specifications for Commercial and Industrial Refrigeration Systems	Measure to reduce both direct emissions of high GWP refrigerants resulting from the design, installation, and indirect emissions resulting from energy consumption of large supermarket refrigeration systems.		Adopted by CEC and CBSC. Implementation ongoing.
		4) SF_6 Emission Reductions from Gas Insulated Switchgear	Measure to set maximum SF_6 emission rate for gas insulated switchgear.		Implementation ongoing.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities Since Last Report Card or Implementation Timeline
	INDUSTRY SECTOR				
I-1	ARB	Energy Efficiency and Co-Benefits Assessments for Large Industrial Sources	This regulation requires major industrial facilities to conduct an assessment of the potential to reduce GHG emissions, and reductions of criteria air pollutants and toxic air pollutants as possible co-benefits.	N/A	All five industrial sector public reports have been released. ARB findings in process.
I-2	ARB	Oil and Gas Extraction GHG Emission Reduction	This measure would require controls to minimize the venting and fugitive emissions of methane from crude oil and natural gas production, processing, and storage operations.	0.5	First Board hearing occurred July 2016. Board hearing to consider final rule will occur early 2017.
I-3	ARB	GHG Leak Reduction from Natural Gas Transmission and Distribution	Replaces pipelines, as well as improves operations at meter and regulating stations, to minimize fugitive and venting emissions of methane and carbon dioxide from natural gas transmission and distribution.	0.5	Continuing to evaluate. Currently working with CPUC on implementing SB 1371 (Leno, Chapter 525, Statutes of 2014).
I-5	ARB	Incorporation of Methane into Air District Rules for Major Industrial Sources to Reduce Fugitive Emissions/Leaks	This regulation proposes to remove existing fugitive methane exemptions from the regulations applicable to equipment and sources employed in California's refineries and other major industrial sources.	N/A	Under evaluation in collaboration with local air districts.
	RECYCLING AND WASTE MANAGEMENT				
RW-1	ARB	Landfill Methane Control Measure (Discrete Early Action)	This regulation requires enhanced control of methane emissions from municipal solid waste (MSW) landfills and requires owners and operators to install gas collection and control systems at smaller and other uncontrolled landfills. Affected landfills are required to implement advanced methane monitoring requirements. ARB is working with local air districts on implementation and enforcement.	1.8***	Implementation ongoing.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities Since Last Report Card or Implementation Timeline
	TRANSPORTATION SECTOR				
T-1	ARB	Pavley I and Advanced Clean Cars	On May 19, 2009, the Obama administration announced an agreement to enact national GHG standards for cars and light trucks. This agreement among the U.S. Environmental Protection Agency (EPA), National Highway Transportation Safety Administration (NHTSA), California, and the major auto manufacturers has several key parts. EPA and NHTSA agreed to conduct a joint rulemaking establishing a national GHG and fuel economy standard for 2012-2016. California amended its new passenger motor vehicle GHG emission standards for model years 2012-2016 to permit compliance based on federal GHG emission standards. The automakers agreed to drop their lawsuits. EPA granted California the requested waiver. California's program went into effect with the 2009 model year, and all parties agreed to maintain all existing authorities. The Advanced Clean Cars Program will achieve additional GHG reductions from passenger vehicles for model years 2017-2025. This Program represents a new approach to passenger vehicles – cars and light trucks – by combining the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards known as Low Emission Vehicles (LEV) III. The new approach also includes efforts under the Zero-Emission Vehicle Program to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California.	23.6	Pavley I: Implementation ongoing. Advanced Clean Cars: Implementation 2017-2025.
T-2	ARB	Low Carbon Fuel Standard (LCFS) (Discrete Early Action)	This regulation requires fuel providers in California to ensure that the mix of fuel they sell into the CA market meets, on average, a declining standard for GHG emissions measured in CO2 equivalent grams per energy unit of fuel sold.	15	LCFS Implementation ongoing. Board approved readoption of the LCFS regulation on September 25, 2015. The implementation of the improved program began on January 1, 2016.
T-3	Local Governments / ARB / CalTrans / HCD / OPR / Regional Planning Agencies	Regional Transportation-Related Greenhouse Gas Targets	ARB set regional passenger vehicle GHG reduction targets to implement SB 375 (Steinberg, Chapter 728, Statutes of 2008) in September 2010, developed a methodology to review Metropolitan Planning Organizations (MPO) sustainable communities strategies (SCS) in July 2011, and is reviewing MPO SCSs as regions develop them. SB 375 enhances California's ability to reach its AB 32 (Nunez, Chapter 488, Statutes of 2006) goals by promoting effective planning with the goal of more sustainable communities. SB 375 also establishes incentives to encourage implementation of a SCS or alternative planning strategy (APS) to meet the targets. Developers can get relief from certain environmental review requirements under the California Environmental Quality Act (CEQA) if their new residential and mixed-use projects are consistent with a region's SCS (or APS) that meets the target.	3.0	All MPOs have adopted their first Sustainable Communities Strategies. Working with MPOs on developing updated target recommendations.
T-4	ARB	Tire Pressure Program (Discrete Early Action)	This strategy requires specified automobile servicing businesses to ensure proper tire inflation at the time of service, as well as public education about proper tire inflation.	0.7	Implementation ongoing.
T-5	ARB	Ship Electrification at Ports (Discrete Early Action)	This regulation requires most container, passenger, and refrigerated cargo ships to shut off their auxiliary engines while at dock and receive power from the electrical grid, or reduce their emissions by a similar amount via the implementation of other technologies.	0.2	Implementation ongoing. Implementation Timeline: 2010-2020.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities Since Last Report Card or Implementation Timeline
T-6	ARB	Goods Movement Efficiency Measures:		3.5	On July 17, 2015 Governor Brown issued Executive Order B-32-15 which requires the development of an integrated action plan that establishes targets to improve freight efficiency and a transition to zero emission technologies. The action plan further requires the identification of policies, programs, and investments to achieve those targets.
		1) Port Drayage Trucks	This regulation requires the reduction of diesel particulate matter (PM), and oxides of nitrogen (NOx) emissions from drayage trucks operating at California's ports and rail yards through retrofits and turnover of pre-2007 trucks. GHG reductions are attained by the reduction of black-carbon emissions and GHG co-benefits through increased fuel-efficiency.		Continuing to evaluate and expand the focus to zero and near-zero emission technology options.
		2) Transport Refrigeration Units Cold Storage Prohibition	Transport Refrigeration Units (TRUs) are powered by external combustion engines. This measure would limit the amount of time TRU engines could run for extended cold storage at facilities including distribution centers and grocery stores.		Continuing to evaluate and expand the focus to zero and near-zero emission technology options.
		3) Cargo Handling Equipment, Anti-Idling, Hybrid, Electrification	ARB will investigate and potentially develop a new measure to restrict unnecessary idling of cargo handling equipment, which would reduce fuel consumption and associated emissions of GHGs, criteria pollutants, and toxic air contaminants.		Continuing to evaluate and expand the focus to zero and near-zero emission technology options.
		4) Goods Movement System-Wide Efficiency Improvements	The System-Wide Efficiency Improvement actions may provide emission reductions from California's freight transport system through development and implementation of efficiency strategies that reduce fuel usage and provide continued progress toward a lower carbon, more sustainable freight transport system.		A multi-agency, academic, industry, and environmental working group is currently evaluating efficiency improvement opportunities to be included in the California Sustainable Freight Action Plan.
		5) Commercial Harbor Craft Maintenance and Design Efficiency	This measure proposes to facilitate reduction of fuel consumption and associated CO_2 emissions through a variety of technologies and strategies that improve vessel efficiency.		Continuing to evaluate and expand the focus to zero and near-zero emission technology options.
		6) Clean Ships	This regulation proposes to require a reduction of fuel consumption and associated CO_2 emissions through a variety of technologies and strategies, such as hull and propeller design in new ships, that improve the efficiency of ocean-going vessels.		Continuing to evaluate and expand the focus to zero and near-zero emission technology options.
		7) Vessel Speed Reduction	This measure proposes to primarily require reduction of NOx emissions as well as diesel PM, SOx, and CO_2 emissions resulting from reduced fuel consumption from speed reduction.		Continuing to evaluate and expand the focus to zero and near-zero emission technology options.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities Since Last Report Card or Implementation Timeline
T-7	ARB	Phase I and Tractor-Trailer Heavy-Duty Vehicle GHG Emission Reduction Measures; TTGHG + Phase I (above 8,500 lbs. GVWR)	Tractor-Trailer Greenhouse Gas regulation reduces GHG emissions from 53-foot or longer box-type trailers and the tractors that pull them by increasing their fuel efficiency through improvements in aerodynamic drag and tire rolling resistance. It requires (i) model year 2010 and older tractors to be retrofitted with U.S. EPA SmartWay verified tires, (ii) 2010 and older model year trailers with U.S. EPA-verified aerodynamic technologies and tires with low rolling resistance, and (iii) 2011+ model year trailers and 2011 through 2013 model year tractors to be U.S. EPA SmartWay designated. Phase 1 standards align with the federal Phase 1 Regulation, adopted by U.S.EPA in 2011. The adoption provides nationwide consistency for engine and vehicle manufacturers, and allows ARB to enforce the requirements.	2.6	Impact of Phase 1 was added. Tractor-Trailer Greenhouse Gas Regulation was adopted Dec-2008; Amended Dec-2010; Amended Dec-2013; Implementation 2010-2019. Implementation Timeline of Tractor-Trailer Greenhouse Gas Regulation: 2010-2019. Implementation Timeline of Phase 1: Phase I implementation began in 2014.
T-8	ARB	<u>Medium- and Heavy- Duty Vehicle Hybridization</u>: 1) Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)	HVIP reduces the GHG emissions of urban, stop-and-go vehicles, such as parcel delivery trucks and vans, utility trucks, garbage trucks, transit and school buses, and other vocational work trucks, through the use of hybrid and zero-emission technology. HVIP provides increased incentives for vehicles that provide benefits to disadvantaged communities. Incentives, in the form of vouchers for hybrid and zero-emission trucks and buses, are available.	< 0.1	1) Board approved $18 million in FY 2016-2017 for hybrid and zero-emission trucks and buses from AQIP and Low Carbon Transportation Investments.
		2) Zero-Emission Truck and Bus Pilot Projects	These projects would place a significant number of zero-emission trucks and buses in a handful of strategic "hubs," encouraging advanced technology clusters with infrastructure, marketing, workforce training, and other synergies. The technology hub or ecosystem concept, when fully implemented, can help address many of the deployment challenges we see today by supporting economies of scale in manufacturing, workforce training, vehicle maintenance and repair, and infrastructure issues.	N/A	2) Board approved $25 million in FY 2014-15 and $60 million in FY 2016-17 for zero-emission truck and bus pilots (no GHG quantification yet). Implementation Timeline: Phase II implementation began in 2016.
	OTHER SECTORS / STRATEGIES				
Appendix C, Sections 3 and 4	ARB	Cool Communities	This guidance encourages efforts such as light colored pavement, cool roofs and shade trees to decrease the effective temperature of urban areas. These strategies can result in energy savings due to decreased need for air conditioning, leading to decreased GHG emissions associated with energy generation. These efforts also increase albedo, thus reflecting sunlight radiation back to space and resulting in local cooling.	N/A *	Implementation ongoing.
Scoping Plan Chapter IV, Section B	ARB	Small Business Toolkit	This toolkit provides guidance and informational resources to local businesses on best practices, emission calculation methods, case studies, cost-effectiveness information, and other tools to assist in reducing GHG emissions.	N/A *	Implementation ongoing.
Appendix C, Section 3	ARB	Local Government Toolkit	Local governments can use this toolkit to help California meet its AB 32 (Nunez, Chapter 488, Statutes of 2006) targets through climate action planning. The toolkit was designed to provide guidance and resources to help cities and counties reduce GHG emissions and save money.	N/A *	Implementation ongoing.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities Since Last Report Card or Implementation Timeline
Scoping Plan Chapter II, Section B	ARB	Local Government Operations Protocol	This protocol provides a standardized set of guidelines to assist local governments in quantifying and reporting GHG emissions associated with their government operations. It allows cities to track their own emissions over time, but it is not intended to be used to compare one city's emissions to another city's emissions.	N/A *	Implementation ongoing.
Scoping Plan Chapter II, Section C.1.	ARB	Cap-and-Trade Program	The California Cap-and-Trade Program is a market-based approach that provides a firm limit, or "cap," on GHG emissions from the electricity, industrial, commercial, and residential fuels and transportation fuels sectors. The California program may link with other Western Climate Initiative Partner programs to create a regional market system that will achieve greater environmental and economic benefits for the State. Part of entities' compliance with the program is expected to come from the use of offsets (qualified projects outside of sectors under the cap). Offset protocols that are in effect under the Cap-and-Trade Program include: 1) U.S. forest projects, 2) urban forests, 3) livestock manure (digesters), 4) ozone depleting substances (ODS), 5) mine methane capture, and 6) rice cultivation. These protocols can be used in any of the lower 48 states to generate offsets in the California Cap-and-Trade Program, and the U.S. forest projects protocol has been expanded to also include Alaska. ARB is continuing to hold quarterly auctions for allowances and held the first joint auction with linked jurisdiction Québec on November 25, 2014. Amendments to the regulation were approved by the Board Apr-2014 (went into effect Jul-2014), Sep-2014 (went into effect Jan-2015), and Dec-2014 (went into effect Nov-2015). The program linked with the Cap-and-Trade system in Québec starting January 1, 2014, and is proposed to link with the emerging program in Ontario starting January 1, 2018.	23**	Implementation ongoing. Amendments to extend the major provisions of the Cap-and-Trade Regulation beyond 2020, to broaden the Program through linkage with Ontario, to prevent emissions leakage in the most cost-effective manner through appropriate allocation to entities, to clarify compliance obligations for certain sectors, to enhance ARB's ability to implement and oversee the Program, and to use the Program to demonstrate California's compliance with the Federal Clean Power Plan were released in July 2016 and first considered by the Board at the September 2016 hearing. The second Board hearing to consider the final regulation is scheduled for Spring 2017, following at least one round of 15-day change amendments. If approved, these amendments would go into effect October 2017.
Total Reductions Expected from ARB Led Strategies				**82.6**	

ARB NOTES: * These measures facilitate reductions through voluntary actions.
** Set at a level needed to help achieve the GHG emission reduction target for 2020.
*** Adjusted using a 100-year GWP of 25 for methane.

Note: The term "approved" indicates the Board's action at the hearing. This is an interim step in the administrative process; final action by ARB to adopt a regulation occurs after the hearing, and a regulation does not become legally effective under California law until it has been approved by the Office of Administrative Law.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	CAL FIRE / BOARD OF FORESTRY MEASURES				
	FOREST SECTOR				
F-1 (Substrategies Below)	CAL FIRE / BOARD OF FORESTRY	Sustainable Forests *	Maintain the current level of carbon sequestration through sustainable management practices including reducing the risk of wildfires, avoiding or mitigating land-use changes that reduce carbon storage, and supporting voluntary actions to conserve biodiversity. Actions to support this strategy are detailed below.	TBD**	On-going
F-1: Substrategy 1	CAL FIRE / BOARD OF FORESTRY	Conservation Forest Management	Maintain and enhance forest stocks on timberlands through forest management practices subject to the Forest Practice Act.	TBD**	Implementation Timeline: 2005-2020.
F-1: Substrategy 2	CAL FIRE / BOARD OF FORESTRY	Forest Conservation	Prevent conversion of forestlands through publicly and privately funded acquisitions and easements.	TBD**	None Implementation Timeline: 2005-2020.
F-1: Substrategy 3	CAL FIRE / BOARD OF FORESTRY	Fuels Management/Biomass	Reduce wildfire emissions through fuels reduction on private and federal lands and provide GHG benefits by using woody biomass for biofuels and biopower as fossil fuel alternative.	TBD**	California Forest Improvement Program and Vegetation Management Program funded manual or mechanical fuels reduction on 1,332 acres and prescribed burned 4,950 acres. Implementation Timeline: 2005-2020.
F-1: Substrategy 4	CAL FIRE / BOARD OF FORESTRY	Urban Forestry	Plant trees in urban areas to sequester carbon and provide shade to reduce energy use. Urban forest wood waste will also be used for biopower (renewable energy/fossil fuel alternative).	TBD**	Implementation Timeline: 2005-2020.
F-1: Substrategy 5	CAL FIRE / BOARD OF FORESTRY	Afforestation/Reforestation	Reforest state, private and federal lands to produce sequestration benefits.	TBD**	None Implementation Timeline: 2005-2020.
Total Reductions Expected from CAL FIRE Led Strategies				**TBD****	

CAL FIRE NOTES:

* CAL FIRE led activities may increase the baseline sequestration potential in future years as funding becomes available for more expansive implementation of the 5 substrategies listed above.

**TBD – CAL FIRE anticipates revisions to the estimate of carbon sequestration in California forests with recently revised estimates from Forest Inventory and Analysis data (FIA) that are currently under review by CAL FIRE and the Forest Climate Action Team (FCAT). New estimates should be made available in 2017.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020 ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	CALRECYCLE MEASURES				
	RECYCLING AND WASTE MANAGEMENT				
RW-1	ARB, CalRecycle	Landfill Methane Control Measure (Discrete Early Action)	This regulation requires enhanced control of methane emissions from municipal solid waste landfills and requires owners and operators to install gas collection and control systems at smaller and other uncontrolled landfills. Affected landfills are required to implement advanced methane monitoring requirements. CalRecycle continues to work with ARB, other agencies, and external stakeholders as new data and scientific methodologies become available, to ensure that California has the most up-to-date and scientifically accurate estimates of fugitive methane emissions.	1.5 [1]	Ongoing
RW-2	CalRecycle	Increasing the Efficiency of Landfill Methane Capture	CalRecycle continues to pursue strategies to reduce landfill methane emissions above and beyond what is required under RW-1. CalRecycle continues investigations regarding the adequacy of compliance wells installed around the perimeter of landfills to monitor for potential landfill gas migration. The investigation is performed with assistance from the Local Enforcement Agencies as well as landfill operators.	<0.1	CalRecycle has teamed up with ARB to secure a $700K contract (with CalPoly as our potential researchers) to further refine existing emission estimates. The research aims to measure emissions from a few select landfills to better understand emission rates from daily, intermediate and final covers and relate such emissions to oxidation rates as well as capture efficiency.
RW-3 (Sub strategies listed below)	CalRecycle	Zero Waste - High Recycling	Detailed description of related measures below.	Reductions detailed below	
RW-3: Sub strategy 1	CalRecycle	Anaerobic Digestion	Anaerobic digestion (AD) uses engineered in-vessel systems to accelerate the decomposition of organic materials to produce biogas, soil amendments and reduce waste. Diverting organic waste from landfills to AD provides significant reduction of GHG emissions through landfill methane avoidance. This strategy will also result in substantial renewable energy production that will aid in meeting the Renewable Portfolio Standards goal and compliance with the Low Carbon Fuel Standard. Additionally, AD provides employment opportunities and other co-benefits to the communities where the facilities are located.	2.0 [2]	In 2015, there were six stand-alone AD facilities and four wastewater treatment plants in California that digested approximately 150,000 tons of organic waste statewide and avoided approximately 100,000 MTCO2e GHG emissions. • Through the Greenhouse Gas Reduction Fund (GGRF), awarded three grants and one loan to AD projects, totaling more than $10 million. • Worked with ARB to develop additional Low Carbon Fuel Standard pathways as well as AD-specific Emission Reduction Factors. • Finalized in-vessel digestion regulations.
RW-3: Sub strategy 2	CalRecycle	Mandatory Commercial Recycling Regulation	The commercial recycling measure focuses on increased commercial waste diversion. In accordance with AB 341 (Chesbro, Chapter 476, Statutes of 2011), CalRecycle annually reviews each jurisdiction's progress in implementing Mandatory Commercial Recycling (MCR). The MCR program was expanded by AB 1826 (Chesbro, Chapter 727, Statutes of 2014), requiring businesses, including State agencies, to recycle their organic waste on and after April 1, 2016.	5.0 [2]	Staff are presently conducting the 2012-2015 review for all jurisdictions. CalRecycle conducted a statewide waste characterization study to assess statewide goals. The final report was published in October 2015. In 2016, staff have met with each jurisdiction to discuss implementation plans.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020 ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
RW-3: Sub strategy 3	CalRecycle***	Extended Producer Responsibility (EPR)	Extended producer responsibility (EPR) laws place shared responsibility on producers and all entities in a product life cycle for reducing health and environmental impacts that result from supply chain, production, use, and end-of-life management. These laws follow producer responsibility principles to ensure programs that are sustainably funded and properly manage leftover or discarded products generated in California: Carpet (AB 2398 - J. Perez, Chapter 681, Statutes of 2010); Mattresses (SB 254 – Hancock, Chapter 388, Statutes of 2013); Paint (AB 1343 - Huffman, Chapter 420, Statutes of 2010).	<0.1	**Carpet**: In 2015, 17,500 tons of materials were recycled through various applications. Carpet America Recovery Effort estimates GHG emission reductions as 27,000 MTCO2E in the 2015 calendar year. Mattresses: The collection and recycling program began December 30, 2015. CalRecycle has worked with ARB to develop a GHG reductions quantification methodology, and estimates for GHG reductions are included for the first time in the 2017 Report Card. **Paint**: In the 2014-2015 fiscal year, 2.7 million gallons of postconsumer paint were processed through the paint stewardship program , resulting in GHG emission reductions.
RW-3: Sub strategy 4	CalRecycle	Increase Production & Markets for Compost	Efforts to increase production and markets for compost are continuous. Agricultural markets represent the bulk of sales and grow slowly. Organic Input Materials are an increasingly important sector of that market. New growth areas include Low-Impact Development and Climate Appropriate landscaping.	2.0 [2]	• CalRecycle infrastructure grants funded by CCI will result in a new 60,000 ton per year composting facility going on line by late 2016, and another 30,000 per year facility coming on line in 2017. Both of these will take food materials as a feedstock. A new, large green materials composting facility was recently permitted in Southern California. • Governor Brown included building soil carbon as one of his five pillars of climate adaptation, and instituted the Healthy Soils Initiative. • CalRecycle worked closely with CDFA to build a framework for the inclusion of compost use incentives within the Healthy Soils Program. • Hundreds of compost products are now listed as approved Organic Input Materials by CDFA.
Appendix C, Section 4.E.	CalRecycle, DWR	Watershed Friendly Landscape Guidelines	CalRecycle works with DWR, California Urban Water Conservation Council (CUWCC), California Landscape Contractors Association (CLCA), landscape coalitions such as the River Friendly Landscape (RFL) Coalition, and other stakeholders, to develop watershed-friendly landscape guidelines that include compost and mulch use. CalRecycle collaborates with stakeholders on research to quantify benefits of using compost and mulch in watershed-friendly landscapes; assists with education and outreach.	<0.1	• CalRecycle worked with stakeholders to promote drought- and climate friendly landscape strategies. • CalRecycle worked with DWR on updates to the Model Water Efficient Landscape (MWEL) Ordinance. • 2015 MWELO update includes new requirement that compost be used on specified landscape projects. • CalRecycle collaborated with CUWCC on landscape guidelines, education and outreach.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020 ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
Appendix C, Section 9. C.	CalRecycle	Liquefied Natural Gas from Landfill Gas Measure	Executive order S-06-06 directs State agencies participating in the Bio-energy Interagency Working Group to enhance the sustainable management and development of biomass resources for electricity generation and production of alternative fuels (bio-fuels). This activity implements grant-funded projects at two landfills to demonstrate commercial scale technologies for converting landfill gas to LNG vehicle fuel.	1.0	In 2015 the Altamonte Landfill produced over 2 million gallons of LNG biofuel. Full implementation by 2020.
Not in Scoping Plan	CalRecycle	Achieved 50 Percent Statewide Recycling Goal	Prior to Scoping Plan development, California had already achieved its Statewide Recycling Goal of 50 percent. The 3 MMTCO2e figure for this strategy reflects the GHG reduction at the 54 percent level for recycled materials which was accomplished in 2006. SB 1016 (Wiggins, Chapter 343, Statutes of 2008) shifted from the historical emphasis on using calculated generation and estimated diversion to using annual disposal as a factor when evaluating jurisdictions' program implementation	3.0	CalRecycle provides assistance to local jurisdictions, businesses and the public with their recycling efforts. In 2015, a per-resident disposal rate of 4.7 pounds/resident/day was calculated using SB 1016's measurement system; the per-resident "diversion rate equivalent" was 63 percent.[4]
Not in Scoping Plan	CalRecycle	AB 341 – California's 75 Percent Recycling Initiative	AB 341 (Chesbro, Chapter 476, Statutes of 2011) set an ambitious 75 percent statewide recycling goal of California's solid waste by 2020, which means that roughly 20 million tons per year of materials currently disposed in landfills will be recycled resulting in significant GHG reductions.	20 [2]	Full implementation by 2020.
Not in Scoping Plan	CalRecycle	Greenhouse Gas Reduction Grants & Loans Program	The Greenhouse Gas Reduction Fund (GGRF) receives Cap-and-Trade auction proceeds which are appropriated by the Legislature and Governor for projects that support the goals of AB 32 (Nunez, Chapter 488, Statutes of 2006). CalRecycle established the GHG Reduction Grant and Loan Program to provide financial incentives for capital investments in composting/digestion infrastructure and recycling manufacturing facilities that will result in reduced greenhouse gas emissions.	0.2	AB 1613 (Chapter 370, Statutes of 2016), which was signed by the Governor in September 2016, allocates $40 million in Fiscal Year 2016-17 for CalRecycle to administer.
Total Reductions Expected from CalRecycle Led Strategies				20 [5]	

CalRecycle NOTES:

[1] Reduction included under ARB's totals

[2] GHG emission reduction estimate in Scoping Plan

[3] Split responsibility for Substrategy 3: CalRecycle is lead for EPR, and DGS is lead for EPP.

[4] Achieved 65 percent in 2010; 65 percent in 2011; 66 percent in 2012; 65 percent in 2013; 65 percent in 2014; 63 percent in 2015.

[5] The total does not include RW 1 (Landfill Methane Control Measure) because its reduction is included under ARB's reductions. Also total does not include "Achieve 50 Percent Statewide Recycling Goal" because it pre-dates the Scoping Plan.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	CALTRANS MEASURES				
	TRANSPORTATION SECTOR				
Not in Scoping Plan	CalTrans	Alternative Employee Commuting Strategies	Caltrans has many employee commute programs in place that reduce the need to drive to work. These include monthly bus passes, emergency ride home vouchers, subsidies for vanpools, carpool matching services, and secure-access bicycle parking. Projected GHG emission reductions in 2020 are 7,000 $MTCO_2$.	<0.1	Annual GHG emission reductions are approximately 6,000 MTCO2.
Not in Scoping Plan	CalTrans	Fleet Greening and Fuel Diversification	The Caltrans Fleet Greening Program was formally initiated in August 2000 to reduce emissions from the fleet. Current turnover of the fleet to alternative fuel and hybrid vehicles is exceeding requirements of Executive Order B-16-12. Projected GHG emission reductions in 2020 are 10,000 MTCO2.	<0.1	In 15/16, 20 hydrogen vehicles and 14 CNG HDV were purchased. Additionally, GPS has been installed in the majority of fleet vehicles and has already improved drivers' behavior and associated driving efficiencies. Implementation Timeline:2020.
Not in Scoping Plan	CalTrans	LED Retrofits	Caltrans is replacing traditional streetlights with energy saving LEDs. Projected GHG emission reductions in 2020 are 46,000 MTCO2.	<0.1	Since 2010, Caltrans has reduced the emissions from streetlights by over 65 percent by retrofitting traditional bulbs to LEDs. Last year, Caltrans reduced kWh consumption by 3%. Implementation Timeline: 2020.
	INDUSTRY SECTOR				
Not in Scoping Plan	CalTrans	Alternative Asphalt Strategies	Caltrans' use of alternatives to hot mix asphalt reduces operational GHG emissions. Projected GHG emission reductions in 2020 are 60,000 MTCO2.	0.1	N/A
Not in Scoping Plan	CalTrans	Alternative Cement and Concrete Strategies **	This strategy reflects Caltrans cement consumption only. The measure includes both the 2.5 percent limestone cement mix and up to 25 percent supplementary cementitious material. It is also expected that given the new Caltrans' cement standards, the GHG emission savings could be reflected in the statewide cement consumption as well. However, that saving is not shown here. Since 2009, Caltrans cement standards allow 5 percent limestone and up to 50 percent supplementary cementitious material which is expected to improve the CO2 emission savings correspondingly. The Scoping Plan has identified the Cement Sector as falling under Cap & Trade. Projected GHG emission reductions in 2020 are 50,000 MTCO2.	0.1	N/A
	OTHER				
Not in Scoping Plan	CalTrans	Facility Efficiency and Energy Conservation	Caltrans has improved the energy efficiency of existing Caltrans buildings and has constructed new facilities that meet LEED standards. Several of the most widely-deployed strategies to reduce GHG emissions at Caltrans facilities include LEED certified buildings, data center upgrades, energy efficient lighting, and low flow toilets and water fixtures. Projected GHG emission reductions in 2020 are 8,000 MTCO2.	<0.1	Caltrans continues to work towards reaching the goals articulated in Executive Order B-16-2, and Executive Order B-18-12 to support the state's renewable power statutes. These include energy and water conservation, and updated Leadership in Energy and Environmental Design (LEED) standards.
Total Reductions Expected from CalTrans Led Strategies				**0.2**	

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE (CDFA) MEASURES *				
	AGRICULTURAL SECTOR				
A-1	CDFA, ARB	Methane Capture at Large Dairies (Enteric Fermentation, Dairy Digesters)	State and Federal Agencies continue to work on addressing regulatory, (including permitting), technical and financial barriers to a widespread voluntary adoption of anaerobic digesters on dairies. CDFA organized the Dairy Digester Working Group to address some of the pending issues. More information about implementation of this measure and the protocol for measuring compliance can be found in the 'Agricultural Sector' listing on the ARB section of this document.	0.4	CDFA received $12 million to establish the Dairy Digester Research and Development Program. CDFA is ensuring the timely completion of the construction of the dairy digester projects and has awarded the research funds. GHG reporting will begin in 2016 for all funded products.
Not in Scoping Plan	CDFA. ARB. SWRCB, DWR	Incentives for farmers to utilize efficient management practices	The State Water Efficiency and Enhancement Program provides incentives in the form of grants to agricultural operations for improvements to irrigation systems that both save water and reduce greenhouse gas emissions.	1.8	CDFA awarded $60 million in SWEEP projects for 360 projects. CDFA received another $7.5 million in 2016 for projects to begin in 2017.
Early Action Item	CDFA, ARB, CEC	Agricultural Research - Nitrous Oxide Reduction	CDFA has engaged in efforts with ARB and CEC during the past several year to coordinate research activities on reducing nitrous oxide emissions from nitrogen fertilizer applications. See https://www.cdfa.ca.gov/is/frep/view.aspx for more information.	N/A [4]	CDFA has completed work on nitrous oxide emission factors with ARB but management practice studies continue.
Not in Scoping Plan	CDFA	Hydrogen Fuel Quality and Quantity	CDFA – Division of Measurement Standards (DMS) continues to work with the CEC, ARB, and hydrogen station developers in the testing and certification of dispensers. Retail hydrogen fuel quality will be monitored and tested by the DMS on an ongoing basis to ensure the safe and effective operation of FCEV's. ARB's 2014 report forecasts 18,500 FCEV on California's roadways by 2020.	0.1	CDFA – Division of Measurement Standards has established fuel quality standards and test methods essential to the commercialization of zero-emission fuel cell electric vehicles (FCEV).The Division has also developed the metrological standards and test methods for evaluating hydrogen dispenser accuracy leading to successful California Type Approval of various hydrogen dispensers being installed in the state - thereby enabling the introduction of manufacturers vehicles to the marketplace.
Not in Scoping Plan	CDFA	Biodiesel Blends Renewable Diesel	CDFA-DMS is an active partner in ongoing development of national standards under ASTM (American Society for Testing of Materials) International for biodiesel, renewable diesel fuels, and diesel substitutes such as dimethyl ether. Under a grant from the California Energy Commission, DMS is researching test methods needed for the development of a greater than 20 percent biodiesel blend standard.	N/A [4]	Active partner in ongoing development of national standards
Not in Scoping Plan	CDFA	Ethanol Flex Fuel, Gasoline-Ethanol Blends, and other alcohols	CDFA-DMS promotes the use of Ethanol based fuels by the establishment of specifications and regulations which allow the sale of Ethanol Flex Fuel and higher Gasoline Ethanol blends.	N/A [4]	DMS is participating with ASTM International in the development of national standards for butanol based fuel. Regulations are in place to permit the sale of Bio-butanol and other Bio-alcohol fuels as these products are brought into the market. The California Type Approval Program has established clear guidelines for approval of any new alternative fuel metering devices.

Not in Scoping Plan	CDFA	Developmental Fuels	CDFA's developmental engine fuel variance program allows alternative fuels that currently have no National Standard to be used in limited applications for the purpose of developing a National Standard.	N/A [4]	DMS is actively working with the California Air Resource Board to identify new fuels that meet California's goals of lower fossil carbon emissions, reduced air pollution, energy independence, and increased use in renewable fuels. Theses fuel will provide California agriculture new opportunities to develop crops for alternative fuels and even greater opportunity for transforming agriculture waste into green fuel.
Not in Scoping Plan	CDFA, CEC	Energy Crops	Coordinate with the CEC on research on energy crops.	N/A [4]	This work is now complete and the report has been posted online.
Not in Scoping Plan	CDFA	Specialty Crop Block Grants	Several research projects related to GHG reductions were funded under the 2012 Specialty Crop Block Grant Program (SCBGP). The results of the funded research projects are expected to have a direct impact on the current understanding of GHG from agriculture and potential offset strategies. This research is critical in addressing knowledge gaps in GHG emissions for California specialty crops. More information on this and other funded projects can be found at www.cdfa.ca.gov/grants.	N/A [4]	The SCBGP made additional awards in the past year.
Total Reductions Expected from CDFA Led Strategies				**2.3**	

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	ELECTRIC AND NATURAL GAS SECTORS				
E-1	CEC	Comprehensive Publicly Owned Utilities Efficiency Program	Over the next few years, the POUs will potentially implement energy efficiency components of SB 350 (De Leon, Chapter 547, Statutes of 2015), AB 802 (Williams, Chapter 590, Statutes of 2015), and SB 758 (Skinner, Chapter 470, Statutes of 2009) to reduce energy consumption and the associated GHG emissions. Cumulative electricity savings in 2020 from a 2008 base year are estimated to be 8,561 GWh. Average annual savings increase between 2007-2015 (56,960 MWh/yr) was used to estimate 2016-2020 POU EE program savings.	2.3*	The Energy Commission is preparing guidance for development of Integrated Resource Plans that include electrification of the transportation sector. The Energy Commission supports POUs in estimating achievable energy efficiency through participation in the Demand Analysis Working Group. POUs currently use a technical resource manual that provides methods for estimating energy savings and peak demand impacts from energy efficiency measures and projects. The POUs expect use of this tool will provide for more consistent and transparent estimates of savings from energy efficiency measures.
E-1	CEC	Building Energy Efficiency Standards	Every three years the Energy Commission updates California's minimum energy efficiency standards for building design and construction that are technically feasible and cost-effective. The Building Energy Efficiency Standards were first adopted in 1978 and are developed through a public process to solicit stakeholder input. California's national leading Building Energy Efficiency Standards (Standards) are moving the state closer to achieving its zero-net energy (ZNE) goals, whereby all newly constructed low-rise residential buildings are to be ZNE by 2020 and all new commercial buildings by 2030. The Energy Commission published the proposed 2016 Building Energy Efficiency Standards in February 2015 and adopted those standards in June 2015. The California Building Standards Commission approved the Energy Commission's conduct of the rulemaking proceeding for these standards in December 2015. The 2016 Standards will become effective on January 1, 2017. In 2016, the Energy Commission began a new three-year cycle to update the Building Energy Efficiency Standards. The Energy Commission is now implementing the Existing Buildings Energy Efficiency Action Plan, which was adopted by the Commission in 2015. A major initiative of the Action Plan is putting in place AB 802 (Williams, Chapter 590, Statutes of 2015), which required energy consumption benchmarking of commercial and multi-family buildings with time-certain requirements for disclosure. For additional information about California's building energy efficiency programs see: http://www.energy.ca.gov/title24/ Cumulative energy savings from building standards in 2020 from a 2008 base year are estimated to be 13.8 TWh and 478 million therms of natual gas.	6.2 **	The Energy Commission worked closely with the CPUC and others on strategies to achieve zero net energy (ZNE) buildings in newly constructed buildings. The Commission also completed the 2016 Building Energy Efficiency Standards rulemaking proceeding through Commission adoption of proposed standards in June 2015. In 2016, the Commission also began the pre-rulemaking phase of the 2019 Building Energy Efficiency Standards. This phase will continue into 2017 followed by the rulemaking phase and the anticipated adoption of the 2019 Standards in the spring of 2018. The effective date of the 2019 Standards will be January 1, 2020.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
E-1	CEC	Appliance Energy Efficiency Standards	The Energy Commission is mandated to create energy efficiency standards for all new appliances not covered by federal energy efficiency standards. To develop these standards, the Energy Commission seeks information from manufacturers, industry associations, energy efficiency advocates, energy utilities and other stakeholders. Once standards are approved, they are included within the state's *Appliances Energy Efficiency Database* that contains listings for all appliances certified by the Energy Commission as meeting current standards. The Commission continually seeks public input on further opportunities to improve appliance energy efficiency and make additional progress towards California's economic and environmental goals. For additional information about California's appliance energy efficiency programs see: http://www.energy.ca.gov/appliances/ Cumulative energy savings from appliance standards in 2020 from a 2008 base year are estimated to be 24.1 TWh and 354 million therms of natual gas.	8.3 **	The Energy Commission issued proposed regulations for energy efficiency standards of computers and display monitors. The Commission adopted standards for LED lamps and small diameter directional lamps. The Energy Commission will conduct workshops to obtain input on additional efficiency savings from water efficiency and landscape emitters. The Commission has a pre-rulemaking proceeding that seeks input on proposed standards for pool pump motors and portable electric spas. Staff is updating voluntary LED specifications to incentivize manufacturer production and sales of higher efficiency LED lamps. Staff is reviewing federal appliance efficiency standards for potential improvements to energy efficiency of federally regulated appliance products.
	TRANSPORTATION SECTOR				
T-4	CEC	Fuel-Efficient Tires	Review federal actions with fuel efficiency of replacement tires. Reducing the rolling resistance of replacement tires through consumer information and minimum standards promises fuel savings and reductions in GHG emissions. A fact sheet on tire efficiency measures can be found at: http://www.whitehouse.gov/the-press-office/2014/12/09/fact-sheet-increasing-safety-and-efficiency-while-saving-money-pump	TBD ***	The Energy Commission monitors activities related to strategies for achieving improvements to tire rolling resistence and fuel efficiency. The National Highway Traffic Safety Administration launched the TireWise Consumer Education Campaign that includes strategies to improve tire fuel efficiency. For more information on NHTSA's program see: http://www.nhtsa.gov/About-NHTSA/Press-Releases/NHTSA-Launches-TireWise-Consumer-Education-Campaign
Total Reductions Expected from CEC Led Strategies				**2.3******	

CEC NOTES:

* Estimate of POU EE Program energy savings is based upon a 2016 status report to Legislature; average change in MWh savings (2006-2015) used to project savings from 2015 to 2020. POUs use a standardized approach to estimating efficiency program savings. A methods manual can be found at: http://cmua.org/energy-efficiency-technical-resource-manual-2016/ Note: prior CEC reporting of POU EE in 2020 was cumulative total; the 0.3 MMTCO2 figure above is reported as annual GHG savings in 2020.

** Building and appliance standards pre-date the Scoping Plan and are not included in AB32 reduction totals, but shown here to document on-going efforts. Electricity savings based on CA Energy Demand (CED 2015) final mid-case forecast and 588 lbsCO2/MWh for avoided electricity consumption. Natural gas savings also based on CED 2015 and 0.00529 MTCO2E per MMBtu.

*** NHTSA (US DOT) has a goal to finalize a rule by 2017 that provides a consumer information program on tire fuel efficiency. NHTSA created a webpage on tire fuel efficiency: http://www.safercar.gov/tires/pages/tires_fuelefficiency.html

**** The only strategy that contributes to this total is the Comprehensive Publicly Owned Utilities Efficiency Program.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	CALIFORNIA PUBLIC UTILITIES COMMISSION (CPUC) MEASURES *				
	ELECTRICAL AND NATURAL GAS SECTOR				
E-1	CPUC	IOU Energy Efficiency Programs	The CPUC regulates ratepayer-funded energy efficiency programs. The CPUC works with the investor-owned utilities, other program administrators, and vendors to develop programs and measures to transform technology markets within California using ratepayer funds. For more visit http://cpuc.ca.gov/energyefficiency/	11.7	For ongoing and recent updates visit http://cpuc.ca.gov/energyefficiency/ Additional information such as program tracking data can be found at http://eestats.cpuc.ca.gov
E-2	CPUC, CEC	Customer-Installed Combined Heat and Power systems (non SGIP)	The CPUC has programs to support the deployment of CHP, recognizing the potentially substantial contributions CHP can make to the state's energy needs and greenhouse gas mitigation objectives. For more visithttp://www.cpuc.ca.gov/General.aspx?id=5432	2.7	For ongoing and recent updates visithttp://www.cpuc.ca.gov/General.aspx?id=5432
E-3.1	CPUC, CEC	Renewables Portfolio Standard	The RPS program establishes a minimum amount of renewable energy the IOUs and POUs must procure from renewable sources to serve their retail customers. The main targets are 33 percent by 2020 and 50 percent by 2030. For more information visit http://cpuc.ca.gov/RPS_Overview/	19.3	The CPUC in 2016 continued various policy and oversight efforts to continue implementation and administration of the California RPS. Visit http://cpuc.ca.gov/RPS_Overview/ for more.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
E-4	CPUC, CEC	California Solar Initiative (CSI) Senate Bill 1 - GoSolarCalifornia (previously titled - 'Million Solar Roofs')	The goal of GoSolarCalifornia is to facilitate the deployment of 3,000 MW of rooftop solar via provision of rebates to help buy-down the up front cost of rooftop solar PV on residential and commercial buildings. The CPUC portion of GoSolarCalifornia is known as the California Solar Initiative (CSI). The CPUC is responsible for 1,940 MW of retro-fit projects.	2.2	The CPUC continues oversight of the CSI program. In 2016, the CPUC is conducting an evaluation of the CSI RD&D program. For more visit http://gosolarcalifornia.org/about/index.php
CR-2	CPUC	CSI Thermal	The California Solar Initiative (CSI) Thermal Program provides up-front incentives toward the purchase of solar water heaters and other solar thermal technologies. For more visit http://www.cpuc.ca.gov/General.aspx?id=3753	0.1	In January 2015, the program was modified to increase incentive levels for the single-family and multifamily sub-programs, reallocate funding across sub-programs, and institute project caps for multifamily / commercial and solar pool heating projects. Implementation Timeline: 2016.
Not In Scoping Plan	CPUC	Self Generation Incentive Program	Within the IOU service territories, this program provides customer rebates to support the deployment of clean customer side generation including wind, fuel cells, and storage. Pursuant to SB 412 (Kehoe, Chapter 182, Statutes of 2009), in 2011, the CPUC issued a decision modifying the program to focus more specifically on technologies that provide for net GHG emission reductions.	TBD	For recent updates visit http://www.cpuc.ca.gov/sgip/
Scoping Plan Chapter II, Section C.1.	ARB, CPUC	Cap-and-Trade Program	The Commission's role in the Cap-and-Trade program is to determine appropriate uses of the proceeds utilities receive from participation in the program, including the Climate Credit (www.cpuc.ca.gov/climatecredit) and the CA Industry Assistance Credit (www.cpuc.ca.gov/industryassistance). Additionally, the Commission reviews and approves the utilities' procurement authorities, strategies, and associated costs to comply with the Cap-and-Trade Program.	Reduction included in ARB totals.	The CPUC oversaw the first distribution of the CA Industry Assistance Credit. The CPUC is also working on a rulemaking (R.14-03-003) to address how natural gas utilities will distribute GHG allowance proceeds to customers and introduce costs into rates. Additionally, the CPUC continued oversight of utility procurement of GHG compliance instruments.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
Not In Scoping Plan	CPUC	Green Tariff Shared Renewables (GTSR) Program	SB 43 (Wolk, Chapter 413, Statures of 2013) enacted the Green Tariff Shared Renewables (GTSR) Program. The GTSR Program is intended to (1) expand access to all eligible renewable energy resources to all ratepayers who are currently unable to access the benefits of onsite generation and (2) create a mechanism whereby institutional customers, commercial customers and groups of individuals can meet their needs with electrical generation from eligible renewable energy resources.	Incremental to 33 percent RPS goals. TBD	In May 2016, the CPUC adopted D.16-05-006 that addressed participation of ECR projects in the Renewable Auction Mechanism. For recent updates see http://www.cpuc.ca.gov/General.aspx?id=12181
Not In Scoping Plan	CPUC	Alternative Fuel Vehicles (Natural Gas and Electric Vehicles)	The CPUC facilitates the deployment of Zero-Emission Vehicles (ZEV) and their supporting infrastructure to develop and commercialize the transportation technologies that are essential to achieve California's renewable energy, air quality, and climate change goals. For more information visit http://www.cpuc.ca.gov/General.aspx?id=5597	TBD	In January 2016, the CPUC authorized SCE and SDG&E to begin pilot programs to install electric vehicle charging infrastructure. The CPUC is currently considering a PG&E proposal for an infrastructure pilot. The CPUC is also working to accelerate widespread transportation electrification pursuant to SB 350 (De Leon, Chapter 547, Statutes of 2015). The CPUC issued guidance to the electric IOUs to file applications with the CPUC in 2017 to propose portfolios of programs and investments that will accelerate widespread transportation electrification.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	WATER SECTOR				
W-3	CPUC	Water Energy Communications Nexus	This proceeding will develop a partnership framework between investor owned energy utilities and the water sector to co-fund programs that reduce energy consumption by the water sector in supplying, conveying, treating, and distributing water, and examine the role of telecommunications in water management, use and public safety.	TBD	In 2016 multiple workshops were held on the topic of water and energy agency pilots to utilize the use of Advance Metering Infrastructure to maximize water and energy savings. For more visit http://www.cpuc.ca.gov/nexus_calculator/
Total Reductions Expected from CPUC Led Strategies				**40.3**	
CPUC NOTES:	* GHG Reduction goals for PUC measures are taken from ARB's AB 32 Scoping Plan. Unless otherwise noted, values represent statewide reductions for the measures and are not prorated to the CPUC jurisdictional utilities' share.				

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	DEPARTMENT OFGENERAL SERVICES (DGS) MEASURES				
	GREEN BUILDINGS				
GB-1	DGS	Green Buildings Initiative	This project focuses on implementing green building measures in new and existing buildings, including LEED certification, Retro-commissioning, Retrofit projects, and on-site clean generation projects (details included in substrategies described below).	Reductions specified by substrategy (below)	
GB-1: substrategy 1	DGS, State Agencies	New state buildings	Ensuring all new and renovated state buildings are built to LEED-NC (New Construction) Silver or higher standards. This estimate is based on achieving LEED-NC certifications at a rate consistent with what was achieved in 2007-2008.	0.1	In 2015, 3 LEED-NC (New Construction) and LEED-CI (Commercial Interiors) certifications were received for new and existing buildings and tenant spaces (149,536 sq. ft.).
GB-1: substrategy 2	DGS, State Agencies	Existing state buildings	Attain LEED-EB (Existing Buildings) certification for all existing buildings over 50,000 square feet in size. This estimate is based on the LEED certification of 60 DGS buildings by 2020. DGS also leases buildings for other state agencies that meet this criteria.	0.9	DGS enrolled in U.S. Green Building Council LEED Volume Certification to streamline LEED-EB (Existing Buildings) certification, internalize, and greatly reduce costs. One existing building was LEED-EBOM certified in 2015 (154,225 sq. ft.)
GB-1: substrategy 3	State Architect, Office of Public School Construction, Department of Education	Schools	Various activities to encourage California schools to be built and operated to high levels of energy and environmental performance. (This original estimate is based on 40 percent of California schools constructed/renovated to LEED and Collaborative for High Performance Schools standards by 2020.) The Division of the State Architect's 7x7x7 Program will select 7 architects statewide to study 7 different school buildings statewide in different climate zones, to determine measures that can be implemented to improve the energy and water conservation performance of existing schools throughout California. This program was concluded in February 2016 with presentations and documentation of results available to all school districts in the state.	0.2	DSA partnered with the American Institute of Architects to host four regional events in San Diego, Los Angeles, San Luis Obispo, and Berkeley. The final case studies were presented at a "call-to-action" event in Sacramento in February 2016.
GB-1: substrategy 4	DGS, State Agencies	Leased Buildings	There are now mandatory energy and environmental improvements for leased buildings. This estimate is based on all new build-to-suit leases constructed to LEED standards and continuing to educate owners/occupants on the benefits of green buildings.	0.3	All new build-to-suit leases continue to be built to LEED Silver or higher certification standards, as well as large leases in existing buildings.
GB-1: substrategy 5	DGS, State Agencies, CSU/UC	Distributed Generation	Implement clean renewable energy generation projects at state facilities. It is anticipated that at least 100 MW of clean renewable generation will be installed in state facilities by 2020. Installations will consist of Solar Photovoltaic, Wind and Solar Thermal generation projects.	0.2	Total contracted MW of 3rd party financed solar PV systems totaled 39.34 MW as of 2015.
GB-1: substrategy 6	DGS, State Agencies, CIWMB, DTSC	Environmentally Preferable Purchasing (EPP)	Develop environmentally preferable purchasing specifications, contracts and guidelines to promote the use of commodities that lower energy use, increase recycling and reuse and reduce the emission of greenhouse gasses. Develop metrics to help assess significance of impact reduction.	*	Identification of appropriate metric and baseline by commodity is in progress.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
GB-1: substrategy 7	California Building Standards Commission, CEC, DGS, State Architect, HCD, OSHPD	Green Building Code Development	In 2008, California adopted the first-in-the-nation Green Building Standards Code (CALGreen) which became effective August 1, 2009. It contained voluntary standards which local authorities could adopt as mandatory regulations within their jurisdictions. On January 1, 2011, the 2010 edition of the CALGreen Code went into effect. It is composed of both voluntary and mandatory measures to further promote green building standards. Since then the Building Standards Commission has continued to enhance the CALGreen Code, implementing reductions in construction waste, water use, environmental impact during and after construction and increase the efficient use of building materials.	2.9	CALGreen's intervening code supplement (effective July 1, 2015) moved voluntary electric vehicle infrastructure requirements to mandatory. Mandatory prescriptive fixture flow rates were added along with clarifications to the voluntary tier fixture flow rate tables and percentages. The reference standards for carpet systems and resilient flooring systems were updated. Additionally, voluntary Solar Reflective Index values were updated.
	TRANSPORTATION SECTOR				
Appendix C, Section 2.B.	DGS, State Agencies	Right-size the State Fleet	As a result of Executive Order (EO) B-2-11, the state identified 6,931 state fleet assets as cost-inefficient and/or non-mission critical.	0.2	This activity is completed except for a few assets requiring resolution. Three assets are involved in a litigation hold which will be ongoing. DGS is seeking to resolve the remaining 8 assets to complete the fleet reduction activities.
Appendix C, Section 2.B.	DGS, State Agencies	Removing Higher-Polluting Vehicles from the State Fleet	After the state fleet is right-sized we will continue to identify the most polluting vehicles in the state fleet and replace those vehicles with greener more fuel efficient vehicles. We will continue working with other state agencies on cost effective vehicle replacement strategies which will include the institution of default compact vehicle class size for future vehicle procurements. DGS is currently working with a consultant to develop a vehicle lifecycle methodology to replace older, higher-polluting vehicles with newer, more fuel-efficient vehicles.	0.4	While the original project is 99.4 percent completed we will continue working with other state agencies on cost-effective vehicle replacement strategies which will include the institution of default compact vehicle class size for future vehicle procurements. DGS is currently working with a consultant to develop a vehicle lifecycle methodology to replace older, higher-polluting vehicles with newer, more fuel-efficient ones.
Appendix C, Section 2.B.	DGS, State Agencies	Actively manage vehicle miles traveled and reduce petroleum consumption	1. Reduce the number of vehicle miles traveled, 2. Reduce GHG emissions, criteria pollutants, and maintenance costs, and 3. Actively manage fuel consumption (meeting objectives by decreasing petroleum use through the increased use of renewable and alternative fuels for necessary business travel). By combining all three strategies listed above the State fleet is expected to reduce petroleum consumption by 20 percent or 9 million gallons of gasoline and diesel.	0.2	As of 2015, the statewide fleet has reduced its petroleum consumption from 2003 baseline levels by 16.07 percent (6,197,514 gallons).
Total Reductions Expected from DGS Led Strategies				**5.3**	

DGS NOTES: * Unable to determine projected GHG reductions arising from EPP Program due to the relative immaturity of computational algorithms and lack of data collection processes in this area.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	DEPARTMENT OF WATER RESOURCES (DWR) MEASURES				
	WATER SECTOR				
W-1	DWR, SWRCB	End use water conservation & efficiency	Promote greater implementation of water conservation measures, including best management practices, to improve efficiency. Implement the Governor's 20x2020 Plan (20 percent reduction in water use by 2020), and implement provisions of SBx7 7, the Water Conservation Act of 2009 (Steinberg, Chapter 4, Statutes of 2009-2010 Seventh Extraordinary Session).	1.4 [3]	By the end of 2015 DWR had executed grant agreements with 21 entities for $27.8 million resulting from the 2014 water-energy grant program solicitation, authorized by the 2014 drought legislation and funded by Cap & Trade auction revenues, for residential, commercial, and institutional water efficiency projects, that reduce water, energy, and GHG emissions. In 2016 grantees began work on these projects that together, are expected to achieve lifetime savings of 270,000 acre-feet of water, with GHG emission reductions of 0.2 MMTCO2e. Information on the 2016 solicitation can be found at http://www.water.ca.gov/waterenergygrant/
W-3, W-5; Appendix, Volume 1	DWR	DWR Climate Action Plan	DWR's Climate Action Plan (CAP) includes procurement and development of cleaner and renewable energy supplies and energy efficiency improvements for the State Water Project, as well as the continued generation of clean hydroelectricity.	1.2	In 2016, DWR was honored with the national Climate Leadership Award for Organizational Leadership, the only public agency in the country so recognized this year. The Department continued to implement energy efficiency and renewable energy projects for the State Water Project (SWP). As of 2014, DWR's carbon emissions are approximately 30% below their 1990 levels (based upon a five-year running average), and continue to be on track to be 50% below 1990 levels by 2020, the target the Department established in its Climate Action Plan. More information on the CAP is available at: http://www.water.ca.gov/climatechange/CAP.cfm
Total Reductions Expected from DWR Led Strategies				**1.2**	

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT (HCD) MEASURES				
	TRANSPORTATION SECTOR *				
T-3: C-56	HCD	Regional, Transportation-Related Greenhouse Gas (GHG) Targets.	HCD Regional Housing Needs Allocation determinations specify number of new housing units for regional and local planning entities to plan for and coordinate and integrate with the Sustainable Communities Strategy and Regional Transportation Plan for housing and transportation planning to be consistent. Regional planning entities must allocate a share of RHNA to each local gov't to plan for in updating its housing element. HCD is required to approve region RHNA Plans and local gov't housing elements that describe local land-use decisions regarding housing siting and densities, etc. and consideration of factors relevant to achieving reductions in vehicle trips and GHG emissions.	Not Applicable. Regional transportation entities provide GHG reduction information to Air Resources Board.	HCD provided comments on the update to the Regional Transportation Plan Guidelines to encourage continuing and strengthening integration and outreach with local government housing elements during the creation of the Sustainable Communities Strategies. In addition, HCD provided technical assistance to cities with planned high speed rail stations in order to encourage station integration in their housing plans. HCD, in conjunction with OPR also convened a workshop with planning directors in Stanislaus county which provided technical assistance for SB 743 (Steinberg, Chapter 386, Statutes of 2013) implementation.
	LAND USE *				
C-82	HCD	Housing Element Technical Assistance	Housing Element Technical Assistance: HCD updated technical assistance and completed outreach efforts to include climate change and greenhouse gas emission reductions objectives in technical assistance materials and resources for local governments to use and include in updating their housing elements. This included identification of new land use strategies that both address housing supply and affordability requirements (density of housing, infill potential, energy conservation in residential development both in construction and retrofitting and design) and reduction in greenhouse gas emissions.	N/A [4]	Over 2015-16, HCD provided technical assistance to jurisdictions in Fresno County, including the city of Fresno, in developing effective strategies to address existing and projected housing needs. The Department encouraged those jurisdictions to utilize infill areas and transit corridors in their housing elements. In addition, the Department will conduct outreach related to recent changes to density bonus law, permitting for accessory dwelling units, and follow-up with jurisdictions in implementation of their housing elements.
C-83	HCD	Affordable Housing Finance Incentives	Funding applications to the Transit Oriented Development (TOD) housing program include criteria for GHG reduction and energy efficiency objectives.	N/A [4]	In 2015-2016, HCD provided staff support in the Development of the Affordable Housing Sustainable Communities Program. The second round of funding was completed in October. $289 million in competitive grants and loans were awarded to 25 housing and transit-friendly infrastructure projects that reduce greenhouse gas emissions contributing to climate change. In addition, the Department awarded $27 million for park development to communities for production of affordable units, with an bonus given for infill units consistent with an adopted SCS

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
C-49	HCD	Local Assistance on GHG Reduction Strategies	HCD staff made presentations at statewide, region, and local conferences and workshops to educate housing developers, housing advocacy groups, business and industry groups, environmental advocates, and local government housing and planning departments about the relationship between planning well for housing and achieving climate change objectives and effective housing and land use strategies to reduce greenhouse gas emissions.	N/A [4]	Additional technical assistance and outreach efforts were completed pursuant to above description for C-82.
C-76	HCD	Regulatory Relief to GHG Emission Reduction Land Use Strategies	Dependent upon resources and workload, HCD intends to review information regarding regulatory barriers to housing and efficient land use strategies and prepare recommendations on how such barriers can be addressed.	N/A [4]	Since the last update, HCD reviewed 265 housing elements finding 92 local governments adequately updated land use and regulatory relief strategies to comply with State housing law as amended by SB 375 (Steinberg, Chapter 728, Statutes of 2008).
Total Reductions Expected from HCD Led Strategies				**0.0**	

HCD NOTES: * Transportation / Land Use Sectors: Responsibility for many of the reductions previously associated with land use, smart growth and related strategies has shifted to the ARB to ensure consistency with the Scoping Plan and the mandates of SB 375 (Steinberg, Chapter 728, Statutes of 2008). HCD will play an active role in the implementation of these and related land use measures through a variety of planning efforts and programs.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	CALIFORNIA HIGH SPEED RAIL AUTHORITY (HSR) MEASURES				
	TRANSPORTATION				
Not in Scoping Plan	HSR	Construction Recycling	The Authority has required all contractors to recycle all concrete and steel and at least 75% of all other construction waste.	<0.1	Construction underway for first construction packages and recycling has been reported
Not in Scoping Plan	HSR	Caltrain Electrification	The Authority has provided funding to Caltrain to carry out electrification of the Caltrain system between San Jose and San Francisco. Expected GHG reductions from electrification of train operations are 0.035 MMT in 2020. increased ridership is expected to reduce GHG emissions by an additional 0.044 MMT in 2020, due to replacement of passenger vehicle trips by train trips.	<0.1	Environmental planning work underway for electrification. Implementation Timeline: 2018.
Total Reductions Expected from HSR Strategies				**0.0**	

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	OFFICE OF PLANNING AND RESEARCH (OPR) MEASURES *				
	OTHER SECTORS/STRATEGIES				
Chapter II Section A	OPR	CEQA Guidelines re: GHG emissions	OPR develops California Environmental Quality Act (CEQA) guidelines to help lead agencies address greenhouse gas impacts.	N/A [4]	A comprehensive update to the CEQA guidelines will be occurring through 2016.
Not in Scoping Plan	OPR	Comprehensive General Plan Guidelines Update	The General Plan Guidelines contains recommendations for how a community should plan for future growth. The update of the General Plan Guidelines has a robust discussion on climate change evaluation and response.	N/A [4]	A comprehensive update to the General Plan Guidelines is in public review draft form. The update will be complete at the end of 2016. OPR is working with ARB to determine potential local contributions to statewide emissions goals through locally led programs.
Chapter II Section B	OPR	Technical Assistance	OPR provides advice to state and local agencies on preparing climate action plans that integrate with CEQA, planning and zoning law and climate change legislation. Other technical assistance efforts support distributed generation, zero emissions vehicles and other Governor/State priorities. On an on-going basis, OPR provides technical advice, including training on climate action planning and related implementation measures, to local and state agencies. A new Best Practices Pilot Program (BP3) at OPR will continue to support local and regional initiatives on climate change.	N/A [4]	Ongoing
Not in Scoping Plan	OPR	CEQA Guidelines re: Infill and transportation emissions	SB 226 (Simitian, Chapter 469, Statutes of 2011) requires OPR to develop performance standards for certain infill projects that promote, among other policy objectives, the reduction in greenhouse gas emissions. SB 743 (Steinberg, Chapter 386, Statutes of 2013) requires OPR to propose alternatives to Level of Service (LOS) as a metric for transportation which will result in metrics being changes to support activities that have a lower greenhouse gas emissions component relative to historic metrics.	N/A [4]	Ongoing
Not in Scoping Plan	OPR	Interagency Coordination	OPR engages other agencies, departments and external organizations to streamline the development of statewide measures to address climate change. Via newly signed SB 246 (Wieckowski, Chapter 606, Statutes of 2015), OPR will be developing an Integrated Climate Adaptation and Resiliency Program (ICARP) that will address co-benefits and overlapping priorities of GHG emissions and adaptation.	N/A [4]	ICARP will launch in January 2017. Other related interagency coordination efforts are ongoing.
Not in Scoping Plan	OPR	Convenings and Conferences	OPR leads and partners on convenings that support statewide emissions reduction goals, including the: California Climate Change Symposium, California Climate Action Planning Conference, California Adaptation Forum, and numerous workshops each year. These efforts are ongoing.	N/A [4]	Ongoing

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	OFFICE OF PLANNING AND RESEARCH (OPR) MEASURES *				
Not in Scoping Plan	OPR	Environmental Goals and Policy Report (EGPR)	The Environmental Goals and Policy Report (EGPR) is required by statute to be completed every four years and provides the framework for State action across a wide variety of topic areas, including climate change and greenhouse gases. Although goals and policies in the EGPR help guide the development of plans such as the AB 32 (Nunez, Chapter 488, Statutes of 2006) Scoping Plan, the EGPR itself does not have direct emissions reductions.	N/A [4]	Ongoing
Total Reductions Expected from OPR Strategies				**0.0 ***	
OPR NOTES: * OPR has important programmatic responsibilities but does not have emission reduction regulatory authority.					

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emission Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	STATE WATER RESOURCES CONTROL BOARD (SWRCB) MEASURES				
	WATER SECTOR				
W-2	SWRCB, DWR, CEC, CPUC	Water Recycling	This measure proposes the production and use of additional recycled water where the recycling of treated effluent is not maximized at wastewater treatment plants located in areas where imported water is used. Implementation of water recycling projects would be prioritized for those areas that discharge to water bodies from which the wastewater cannot otherwise be easily recovered, such as the ocean and brackish water bodies. GHG benefits would be realized where recycled water would consume less energy than water obtained from existing sources.	0.3 [3]	In 2016, the State Water Board executed contracts for planning grants ($876,618), construction grants (approximately $123.2 million), and construction loans (approximately $144.8 million). In addition, the State Water Board adopted a General Order for recycled water use, replacing the existing statewide Waste Discharge Requirements for Recycled Water Use, to streamline permitting of non-potable recycled water projects statewide.
W-4	SWRCB	Storm Water Reuse	This measure proposes that Low Impact Development (LID) be required to maximize the infiltration and/or capture of storm water to increase local water supplies. Where favorable soil and geologic conditions exist, storm water would be infiltrated to increase groundwater supplies. In locations where potential infiltration is either limited or not recommended, capture and storage for on-site non-potable use would be encouraged. GHG benefits would be realized where local water would consume less energy than water obtained from existing sources.	0.2 [3]	In January 2016, the State Water Board approved the statewide Strategy to Optimize Resource Management of Storm Water (Storm Water Strategy) which provides a vision, mission, goals, objectives, and specific projects to establish the value of storm water as a resource in California. In December 2015, the State Water Board adopted the Proposition 1 Storm Water Grant Program Guidelines and the Storm Water Resource Plan Guidelines for development of watershed-based plans that identify projects that use storm water as a resource while maximizing environmental and water supply project benefits.
Total Reductions Expected from SWRCB Led Strategies				**0.5**	

TABLE 3 FOOTNOTES:

1. Where multiple agencies are noted, the first is the lead agency and the others work in collaboration to achieve measure goals.

2. Measures shown with GHG emission reduction shown as "TBD" represent on-going or future efforts for which quantification has not been completed.

3. GHG emission reduction estimate not included in calculating the total reductions needed to meet the 2020 target as established in the Scoping Plan. (See Scoping Plan for details).

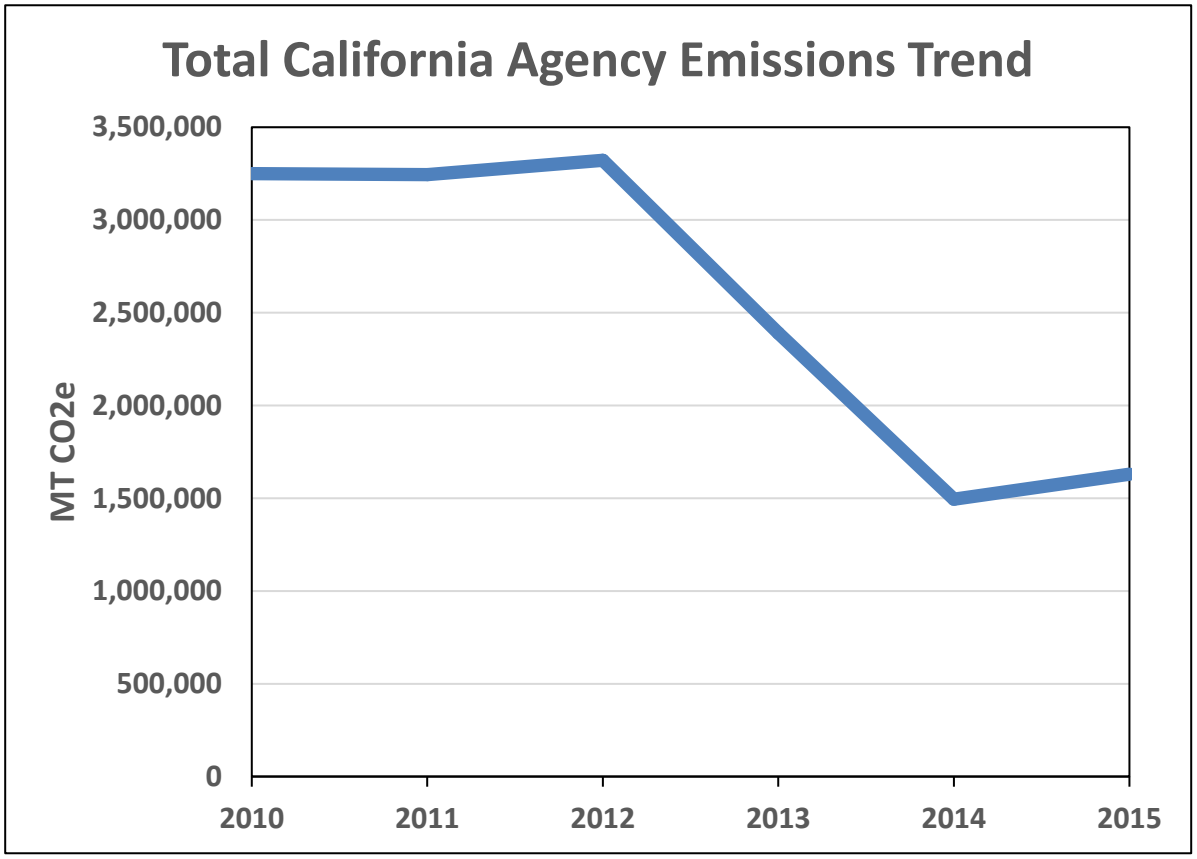
4. These measures will not result in direct reductions of GHG emissions but will facilitate reductions through associated voluntary actions and potential future regulatory efforts.

5. These programs pre-date the Scoping Plan but are included here to document on-going efforts. GHG reductions are not included in the total for the agency as they do not provide additional reductions over and above what would have occurred absent AB 32.

GHG Inventories of State Agencies

Starting with the January 2010 report card, CalEPA began compiling GHG inventories prepared by the CAT member agencies. These inventories were each prepared independently using the Climate Action Reserve's *General Reporting Protocol*.

In April of 2012, Governor Brown issued Executive Order B-18-12, which, among other things, requires all state agencies under the direct authority of the Governor to take actions to reduce entity-wide greenhouse gas emissions by 10 percent by 2015 and 20 percent by 2020, as measured against a 2010 baseline. In order to track progress, all state agencies were instructed to develop annual GHG inventories and enter them into The Climate Registry's *Climate Registry Information System*, or CRIS. Figure 2 shows the total GHG emissions from all State agency operation from 2010 to 2015.



2010 emissions	2011 emissions	2012 emissions	2013 emissions	2014 emissions	2015 emissions	2010-2015 Change
3,243,009	3,244,466	3,321,693	2,390,039	1,494,897	1,622,689	-49.96%

Figure 2

Currently, over 40 state agencies report their annual GHG emissions to The Climate Registry Information System. From 2010-2015, state agencies have reduced emissions nearly 50% primarily due to the California Department of Water Resources' divestiture of the Reid Gardner coal-fired power plant. Additional GHG reduction measures that agencies continue to implement include: identifying vehicles for zero emission vehicle/plug-in hybrid replacement, instituting energy conservation principles, pursuing LEED and zero-net-energy at existing and new facilities, and participating in green energy purchase programs that supply 50% or 100% renewable energy to state facilities.

In order to avoid double counting in this state-government-wide reporting effort, departments and agencies changed reporting methods for their emissions, starting with 2010 emissions. For example, in the case of departments and agencies occupying DGS-owned buildings, they no longer include emissions from those buildings in their inventories. Instead, DGS reports those emissions in its own inventory. Because of these changes in reporting, it is important to compare emissions only from calendar year 2010 forward.

Additionally, while changes in year-to-year GHG emissions can result from changes in the way state agencies do business, they also result from elements beyond individual agency control. In particular, California utilities rely extensively on hydropower for base-load energy generation. In dry years, more electricity will be generated using natural gas with a resultant substantial increase in GHG emissions. Similarly, weather conditions (cold or hot) can have a significant impact on building energy use. Because the state experiences weather anomalies, longer-term, multi-year trends will prove useful for policy makers developing mid-term and long-term climate goals.

The data below is organized by Agency though many departments are reporting invidually.

Table 4: Climate Action Team - GHG Inventory Status

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Emissions in Metric Tons CO_2E for each year calculated				NOTES
			Year	Direct	Indirect	Total	Green indicates verified inventory
Calfornia State Transportation Agency							
The following Boards and Departments calculate emissions separately:		2007	2007	136,587	93,996	230,583	
		2008	2008	75,546	111,331	186,877	
		2009	2009	98,423	131,227	229,650	
		2010	2010	125,627	89,356	214,983	
		2011	2011	125,342	85,725	211,067	
		2012	2012	118,242	78,373	196,615	
		2013	2013	115,989	80,841	196,830	
		2014	2014	110,074	45,538	155,612	
- *CalTrans*	Yes	2015	2015	116,001	48,172	164,173	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Emissions in Metric Tons CO_2E for each year calculated				NOTES
			Year	Direct	Indirect	Total	Green indicates verified inventory
California Environmental Protection Agency							
-Totals include inventory data for the ARB, CalRecycle, OEHHA, DPR, DTSC and SWRCB		2005	2005	2,632	4,914	7,546	
		2006	2006	3,119	4,780	7,899	
		2007	2007	3,050	5,545	8,595	
		2008	2008	3,177	5,478	8,655	
		2010	2010	2,364	4,884	7,248	
		2011	2011	2,120	4,952	7,072	
		2012	2012	1,964	4,704	6,668	
		2013	2013	2,069	4,544	6,613	
		2014	2014	1,882	3,961	5,783	
	Yes	2015	2015	1,921	4,474	6,395	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Emissions in Metric Tons CO_2E for each year calculated				NOTES
			Year	Direct	Indirect	Total	Green indicates verified inventory
California Department of Food and Agriculture	Yes	2010	2010	8,133	1,974	10,107	
		2011	2011	7,952	1,966	9,918	
		2012	2012	6,740	1,948	8,688	
		2013	2013	6,157	1,603	7,760	
		2014	2014	5,737	2,386	8,124	
		2015	2015	5,895	1,901	7,796	
California Governor's Office of Emergency Services	Yes	2010	2010	107	1,125	1,232	
		2011	2011	320	990	1,310	
		2012	2012	303	904	1,207	
		2013	2013	1,354	1,261	2,615	
		2014	2014	2,109	1,570	3,679	
		2015	2015	2,118	1,564	3,682	
CA Public Utilities Commission	Yes	2004	2004	92	849	941	
		2005	2005	432	1,084	1,516	
		2006	2006	515	1,228	1,743	
		2010	2010	167	892	1,059	
		2011	2011	156	850	1,006	
		2012	2012	149	805	954	
		2013	2013	173	836	1,009	
		2014	2014	152	729	881	
		2015	2015	126	861	987	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Emissions in Metric Tons CO_2E for each year calculated				NOTES
			Year	Direct	Indirect	Total	Green indicates verified inventory
Health and Human Services Agency		2010	2010	5,320	5,909	11,229	
		2011	2011	6,244	5,026	11,270	
		2012	2012	5,855	4,768	10,623	
		2013	2013	5,390	2,140	7,530	
		2014	2014	4,514	210	4,723	
- *Department of Public Health*	Yes	2015	2015	4,785	294	5,079	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Emissions in Metric Tons CO_2E for each year calculated				NOTES
			Year	Direct	Indirect	Total	Green indicates verified inventory
Natural Resources Agency							
- The following Boards and Departments		2007	2007	41,882	7,460	49,342	
		2008	2008	37,222	6,044	43,266	
		2009	2009	34,273	5,620	39,893	
		2010	2010	33,832	4,916	38,748	
		2011	2011	32,916	4,587	37,503	
		2012	2012	38,355	4,664	43,019	
		2013	2013	35,536	5,540	41,076	
		2014	2014	37,406	4,298	41,704	
- CalFire	Yes	2015	2015	44,389	5,413	49,802	
		2003	2003	22	576	598	
		2008	2008	14	948	962	
		2009	2009	11	863	874	
		2010	2010	4	903	907	
		2011	2011	3	894	897	
		2012	2012	3	1347	1350	
		2013	2013	1	489	490	
		2014	2014	1	400	401	
- CA Energy Commission	Yes	2015	2015	1	424	425	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Emissions in Metric Tons CO_2E for each year calculated				NOTES
			Year	Direct	Indirect	Total	Green indicates verified inventory
Natural Resources Agency, continued							
		2007	2007	15,716	18,303	34,019	
		2008	2008	15,175	14,597	29,772	
		2009	2009	13,557	9,026	22,583	
		2010	2010	13,223	8,483	21,706	
		2011	2011	13,793	8,490	22,283	
		2012	2012	14,447	8,318	22,765	
		2013	2013	12,060	8,263	20,323	
		2014	2014	14,049	4,962	19,011	
- *Dept. of Fish & Wildlife*	Yes	2015	2015	13,549	7,553	21,102	
		2007	2007	14,299	3,226,250	3,240,549	DWR is in the process of verifying its 2015 GHG inventory.
		2008	2008	9,929	2,400,211	2,410,140	
		2009	2009	11,477	2,025,807	2,037,284	
		2010	2010	864,416	1,157,503	2,021,919	
		2011	2011	740,434	1,212,373	1,952,807	
		2012	2012	929,992	1,228,365	2,158,357	
		2013	2013	470,730	783,861	1,254,591	
		2014	2014	17,866	433,778	451,644	
- *Dept. of Water Resources*	Yes	2015	2015	15,010	585,828	600,838	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Emissions in Metric Tons CO_2E for each year calculated				NOTES
			Year	Direct	Indirect	Total	Green indicates verified inventory
Natural Resources Agency, continued							
		2010	2010	15,595	4,696	20,291	
		2011	2011	15,877	5,046	20,923	
		2012	2012	15,800	5,233	21,033	
		2013	2013	15,597	5,793	21,390	
		2014	2014	15,782	4,828	20,609	
- Dept. of Parks and Recreation	Yes	2015	2015	13,218	6,183	19,401	
Office of Planning & Research	Yes						OPR's inventory is included in DGS's report.
Government Operations Agency		2006	2006	56,135	80,434	136,569	The Department of General Services's inventory includes much of the operations (including buildings and vehicles) of many other agencies.
- The following Department calculates emissions separately:		2007	2007	58,124	90,739	148,863	
		2008	2008	60,256	83,678	143,934	
		2009	2009	55,324	80,009	135,333	
		2010	2010	55,144	70,272	125,416	
		2011	2011	55,342	70,225	125,567	
		2012	2012	50,048	62,340	112,388	
		2013	2013	43,767	65,778	109,545	
		2014	2014	42,398	59,956	102,355	
- Dept. of General Services	Yes	2015	2015	42,695	59,870	102,565	