California Environmental Protection Agency

2019

State Agency Greenhouse Gas Reduction Report Card

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This Report Card documents (1) the effectiveness of measures to reduce greenhouse gas (GHG) emissions in California and (2) GHG emissions from State agencies' operations. 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 82 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) that occurred in 2018. Each Report Card shows reductions that happened two years prior to publication.[1]

In 2016, California reached it 2020 GHG emissions target four years early and emissions continue to go down. The goal, set by AB 32 (Núñez, Chapter 488, Statutes of 2006), required getting GHG emission back to 1990 levels by 2020. The quantitative target was 431 $MMTCO_2e$. The GHG inventory for 2017 came to 424 $MMTCO_2e$.[2] The GHG reductions documented in the Report Card made this achievement possible.

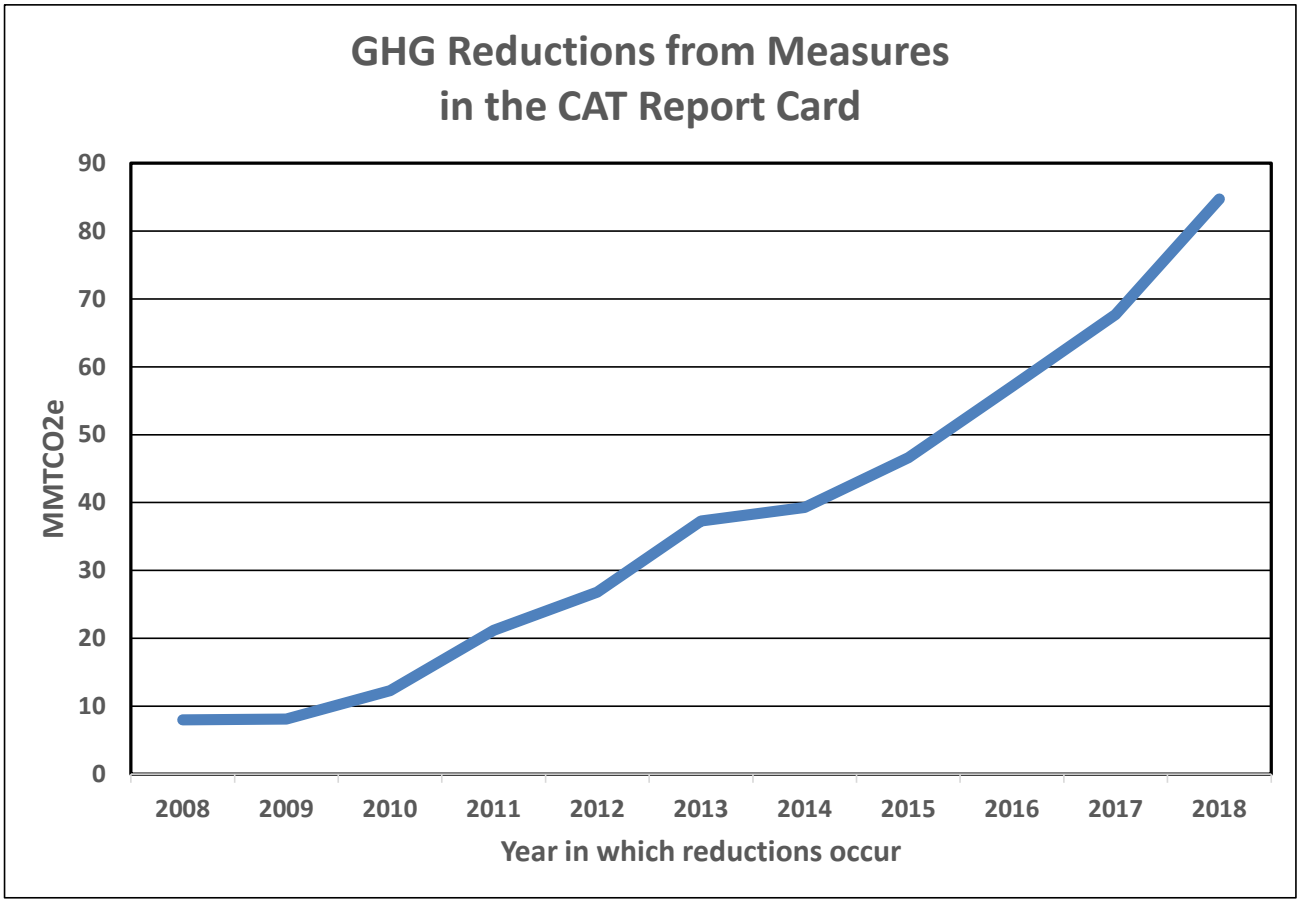

Figure 1

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

[2] California Air Resources Board, *California Greenhouse Gas Emissions for 2000 to 2017*, https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf

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 2019 for actual GHG reductions occurring in 2018. Projections of future GHG emissions were current as of October 2019, 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 because 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

CalEPA has organized the required information 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]. In addition, they do not include reductions that might occur out-of-state.

TABLE 2: On-going Measures and Reductions in 2018:

Table 2 looks back to 2018, 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 appear 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

[3] For example, consider the GHG reductions due to building efficiency standards. The GHG reductions that occur in 2018 are a consequence of cumulative installations that occurred over several years, not just in 2018.

not strictly additive (as recognized and explained in the 2008 Scoping Plan.[4] 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 status of the greenhouse gas inventory activities for each. The named agency or department provided the information in this Table to CalEPA.

The GHG inventories employ protocols established by The Climate Registry (TCR)[5]. Inventories identified as 'verified' have been verified by an approved third party and submitted to the registry. The verified inventory reports are on the registry's website: https://www.theclimateregistry.org/our-members/cris-public-reports/.

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Abbreviations

CAL FIRE – California Department of Forestry & Fire Protection
CARB – Air Resources Board
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

[4] http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm

[5] Originally chartered by the state of California as the California Climate Action Reserve.

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 2016[1]	GHG Emission Reductions Achieved in 2017[1]	GHG Emission Reductions Achieved in 2018[1]
CAL FIRE	2.1	4.5	4.8
CalRecycle	3.5	3.5	3.5
Caltrans	<0.1	<0.1	<0.1
CARB	25.3	28.8	31.9
CDFA	0.3	0.7	12.9
CEC	10.5	12.4	14.2
CPUC	14.0	16.4	16.0
DGS [3]	<0.1	<0.1	<0.1
DWR	1.4	1.4	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			17.0

TABLE 1b:
Agency GHG Targets for 2020

Agency	Expected GHG Emission Reductions in 2020 from Agency Measures [2]
CAL FIRE	0.8
CalRecycle [3]	1.0
Caltrans	0.2
CARB	81.4
CDFA	3.9
CEC	2.6
CPUC	36.0
DGS [4]	5.7
DWR	1.2
HCD [5]	0.0
HSR	0.0
OPR [5]	0.0
SWRCB	0.5
Total [6]	**133.3**

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 Department of Forestry and Fire Protection (CAL FIRE)	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	**Emission Reductions, MMTCO2e2**
Program Title		**2017**	**2018**
Sustainable Forests (various programs)	Existing state and federal regulations and assistance programs. Recent research shows California's forests remain net sinks, sequestering 31.8 MMTCO2e per year. This value is down slightly from the 2015 measurement cycle which estimated an average annual net sequestration rate of 33.6 MMT CO2e per year. Most of the difference appears to be due to increased mortality, in addition to some decreases in growth rates that may be related to the recent drought[1]. CAL FIRE activities contributing to current sequestration rates include:		
Forest Practices	Annual benefit to state, local, and private forestlands from California Forest Practice Act rule changes instituted in December 2004 as reported in the AB 1504 (Skinner, Chapter 534, Statutes of 2010) California Forest Ecosystem and Harvested Wood Product Carbon Inventory: 2007 – 2016.[2] https://bofdata.fire.ca.gov/projects-and-programs/ab-1504/	1.9	1.9
Urban Forestry	Under the authority of the Urban Forestry Act (PRC 4799.06 - 4799.12) the Urban & Community Forestry Program (UCF) works to expand and improve the management of trees and related vegetation in communities throughout California. Benefits estimated using Quantification Methodology approved by CARB for Urban and Community Forestry. http://www.fire.ca.gov/resource_mgt/resource_mgt_urbanforestry	0.1	<0.1
Forest Health	CAL FIRE funds reforestation, fuel reduction, prescribed fire, pest management, and biomass utilization. Estimated net GHG emission reductions is based on carbon sequestration on reforested lands and forests treated to prevent the spread of pests and disease, plus avoided future wildfire emissions.[3] http://www.fire.ca.gov/resource_mgt/resource_mgt_foresthealth_grants	2.5	2.9

California Department of Forestry and Fire Protection (CAL FIRE)	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	**Emission Reductions, MMTCO2e2**
Program Title		**2017**	**2018**
Forest Legacy	CAL FIRE's California Forest Legacy Program protects environmentally important forest land threatened with conversion to non-forest uses. Protection of California's forests through this program ensures they continue to provide such benefits as sustainable timber production, wildlife habitat, recreation opportunities, watershed protection and open space while contributing significantly to carbon storage and sequestration.[4] http://calfire.ca.gov/resource_mgt/resource_mgt_forestryassistance_legacy	<0.1	<0.1
Fire Prevention Grant Projects	CAL FIRE's Fire Prevention Grant Program reduces the risk of wildland fires to habitable structures and communities while minimizing the uncontrolled release of emissions emitted by wildfires. http://calfire.ca.gov/fire_prevention/firepreventiongrants	N/A	N/A
Vegetation Management Program (VMP)	CAL FIRE conducted fuel reduction on 5,000, 13,000, and 14,000 acres using mechanical or manual treatments and 4,409, 8,000, and 16,000 acres using prescribed burning in 2015, 2016, and 2017, respectively, as part of this program. http://calfire.ca.gov/resource_mgt/resource_mgt_vegetation	N/A	N/A
California Forest Improvement Program (CFIP)	The California Forest Improvement Program (CFIP) encourages private and public investment in, and improved management of, California forestlands and resources to ensure adequate high quality timber supplies, related employment and other economic benefits, and the protection, maintenance, and enhancement of a productive and stable forest resource system for the benefit of present and future generations. The program scope includes the improvement of all forest resources including fish and wildlife habitat, and soil and water quality. http://calfire.ca.gov/resource_mgt/resource_mgt_forestryassistance_cfip	<0.1	<0.1
CAL FIRE NOTES:	[1] CAL FIRE, AB 1504 California Forest Ecosystem and Harvested Wood Product Carbon Inventory: 2007 – 2016 [2] CAL FIRE, AB 1504 California Forest Ecosystem and Harvested Wood Product Carbon Inventory: 2007 – 2016, p. 15. [3] Benefits estimated using Quantification Methodology approved by California Air Resources Board for Forest Health. [4] Benefits estimated using Quantification Methodology approved by California Air Resources Board for Land Conservation.		

California Department of Transportation (Caltrans)	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
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.[1]	<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.[1]	<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.[1] https://dot.ca.gov/programs/equipment/greening-the-fleet	<0.1	<0.1

California Department of Transportation (Caltrans)	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
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.[1] https://dot.ca.gov/programs/transportation-planning	<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.[1] Office of Roadway Materials Testing Electrical Testing Branch http://www.dot.ca.gov/hq/esc/ttsb/electrical/lighting.htm	<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.[1] https://dot.ca.gov/programs/sustainability/sustainable-caltrans	<0.1	<0.1

California Department of Resources, Recycling and Recovery (CalRecycle)	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
Statewide Recycling	CalRecycle provides assistance to local jurisdictions, businesses and the public with their recycling efforts. In 2018, a per-resident disposal rate of 5.5 pounds/resident/day was calculated using SB 1016's measurement system. This is up from 4.9 pounds/resident/day in 2017. https://www.calrecycle.ca.gov/lgcentral/goalmeasure/disposalrate/MostRecent/	3.5 ± 0.5	3.5 ± 0.5

California Air Resources Board	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	**Emission Reductions, MMTCO2e2**
Program Title		**2017**	**2018**
	High Global Warming Potential (GWP) Gases[1,2,3,4]	**2.3 ± 0.3**	**1.8 ± 0.4**
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. More Information: https://ww2.arb.ca.gov/our-work/programs/small-containers-automotive-refrigerant	0.2	0.2
SF_6 Limits in Non-Utility and Non-Semiconductor Applications (H-2)	This regulation achieves GHG emissions reductions from sulfur hexafluoride (SF_6) use in non-semiconductor and non-utility applications through a phase-out of use over several years and by tracking sales with an end destination in California. The use and sales requirements exclude a limited number of uses such as use in eye surgeries. More Information: https://ww2.arb.ca.gov/our-work/programs/sulfur-hexafluoride-non-electric-non-semiconductor-sources	<0.1	<0.1
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 GHG emissions. 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. More Information: https://ww2.arb.ca.gov/our-work/programs/semiconductor	<0.1	<0.1
Global Warming Potential Use in Consumer Products (H-4)	This regulation sets Global Warming Potential (GWP) limits for compounds used in specific consumer products. More Information: https://www.arb.ca.gov/consprod/consprod.htm	0.2	0.2

California Air Resources Board	**Description of Measures**	**Emission Reductions, $MMTCO_2e$**	**Emission Reductions, MMTCO2e2**
Program Title		**2017**	**2018**
	High GWP Gases, continued		
Refrigerant Management Program (H-6)	This regulation requires facilities with large refrigeration systems containing more than 50 pounds of high-GWP refrigerant to register and report annual refrigerant purchase and use, conduct and report periodic leak inspections, repair leaks promptly, and keep service records on site. The regulation became effective January 1, 2011. Since 2012, the average annual leak rate has been reduced from 25% (estimated) to 15% for all systems at these facilities. More Information: https://ww2.arb.ca.gov/our-work/programs/refrigerant-management-program	1.5 ± 0.3	1.0 ± 0.4
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. More Information: https://ww2.arb.ca.gov/our-work/programs/elec-tandd	<0.1	<0.1
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 apply to new supermarket construction and new supermarket refrigeration installation beginning January 1, 2014. 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. More Information: https://www.arb.ca.gov/cc/commref/commref.htm	0.3	0.4

California Air Resources Board	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
	Recycling and Waste Management[1,2]	**0.3 to 1.7**	**0.3 to 1.7**
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. More Information: https://www.arb.ca.gov/cc/landfills/landfills.htm	0.3 to 1.7	0.3 to 1.7
	Transportation Sector[1,2,3,4,5]	**25.6**	**29.8**
Pavley (AB 1493) (National GHG Standard for 2012-2025 Model Year Light-Duty Vehicles ≤8,500 lbs. GVWR) and Advanced Clean Cars (T-1)	AB 1493 (Pavley, Chapter 200, Statutes of 2002) sets fleet-average GHG standards for new passenger vehicles, phasing in over 2009-2016. The Advanced Clean Cars Program achieves additional GHG emissions reductions from passenger vehicles for model years 2017-2025. The emissions reductions increase to 21 $MMTCO_2e$ annually in 2020 as the GHG standards are fully implemented. More Information: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program	12.2	14.9
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. More Information: https://www.arb.ca.gov/fuels/lcfs/lcfs.htm	10.0	11.2
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. More Information: https://www.arb.ca.gov/cc/tire-pressure/tire-pressure.htm	0.7	0.7

California Air Resources Board	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
	Transportation Sector, continued		
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. More Information: https://www.arb.ca.gov/ports/shorepower/shorepower.htm	0.2	0.1
Diesel Anti-Idling[6] (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. In addition to providing significant NOx reductions, the certified clean idle engine, widely used in 2008 and newer models, also offers some fuel savings. More Information: https://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm	0.2	0.2
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. More Information: https://ww2.arb.ca.gov/our-work/programs/drayage-trucks-seaports-railyards	0.1	0.1
Heavy-Duty Vehicle GHG Emission Reduction Measure TTGHG + Phase I + Phase 2 (above 8,500 lbs. GVWR) (T-7)	The California Phase 1 and Phase 2 medium and heavy duty GHG emission standards as well as Tractor-Trailer Greenhouse Gas regulation reduce GHG emissions from trailers and the tractors that pull them by increasing their fuel efficiency through improvements in aerodynamic drag and tire rolling resistance. Phase 1 and Phase 2 programs in California align with the federal Phase 1 and Phase 2 Regulations adopted by U.S. EPA in 2011 and 2016 providing nationwide consistency for engine and vehicle manufacturers while at the same time allowing CARB to enforce the requirements. More Information: TTGHG: https://www.arb.ca.gov/cc/hdghg/hdghg.htm#hdttghgreg Phase 1: https://ww2.arb.ca.gov/our-work/programs/greenhouse-gas-standards-medium-and-heavy-duty-engines-and-vehicles/phase1 Phase 2: https://ww2.arb.ca.gov/our-work/programs/ghg-std-md-hd-eng-veh	2.2	2.6

California Air Resources Board	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
	Transportation Sector, continued		
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. In FY 2018-19, the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project was allocated a total of $125 million. More Information: https://www.californiahvip.org/	<0.1	<0.1
CARB NOTES:	[1] For regulatory programs, emissions reductions reported are taken from the most recent emissions inventory and reflect the latest updates available from economic forecasts, technology performance, vehicle and equipment population estimates, among other factors. 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. [2] Ongoing measures administered by other agencies contribute emissions reductions to the Electrical and Natural Gas, High GWP, and Transportation Sectors. [3] Previous reports have included cumulative emissions reductions rather than annual emissions reductions. This report card utilizes a quantification methodology that has been updated to reflect the latest vehicle usage and fuel economy values, among other factors. [4] CARB programs that are undergoing evaluation or development will contribute emissions reductions to the Agricultural, High GWP, Industry, and Transportation Sectors. [5] The Cap-and-Trade Program contributes emissions reductions to the Electrical and Natural Gas, Industry, and Transportation Sectors. [6] The primary contributor to reduced GHG emissions savings since 2013 regarding diesel anti-idling 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.		

California Department of Food and Agriculture	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
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. The program has received $87.5 million to date from CCI and Prop 68 funds. The GHG emission reductions over project life of 10 years are reported here. https://www.cdfa.ca.gov/oefi/sweep/	0.1	0.4
Dairy Digester Research and Development Program	CDFA's Dairy Digester Research and Development Program (DDRDP) provides financial assistance for the installation of dairy digesters in California, which result in reduced greenhouse gas emissions. Dairy digesters are a renewable technology that uses livestock manure to produce methane, which is a renewable source of electrical energy generation and transportation fuel. CDFA receives funding from the California Climate Investments program for methane emissions reductions from dairy operations. Since 2015, the program has received $260 million (includes funding for AMMP noted below). The GHG emission reductions over project life of 10 years are reported here. https://www.cdfa.ca.gov/oefi/ddrdp/	0.5	11.8
Alternative Manure Management Program	CDFA's Alternative Manure Management Program (AMMP) provides financial assistance for the implementation of non-digester manure management practices in California, which will result in reduced greenhouse gas emissions. CDFA received $99 million from the Greenhouse Gas Reduction Fund in 2017 and plans to allocate between $19-$33 million for AMMP. CDFA receives funding from the California Climate Investments program for methane emissions reductions from dairy and livestock operations. The GHG emission reductions over project life of 5 years are reported here. https://www.cdfa.ca.gov/oefi/AMMP/	0.1	0.7

California Department of Food and Agriculture	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
Healthy Soils Incentives and Demonstration Programs	The Healthy Soils Program stems from the California Healthy Soils Initiative, a collaboration of state agencies and departments to promote the development of healthy soils on California's farmlands and ranchlands. The HSP has two components: the HSP Incentives Program and the HSP Demonstration Projects. The HSP Incentives Program provides financial assistance for implementation of conservation management that improves soil health, sequesters carbon and reduces greenhouse gas (GHG) emissions. The HSP has received a total of $22.5 million to date. The annual GHG emission reductions are reported here. https://www.cdfa.ca.gov/oefi/healthysoils/	<0.1	<0.1

California Energy Commission	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
Appliance Energy Efficiency Standards	The Appliance Efficiency Program increases 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. https://www.energy.ca.gov/appliances/	6.6	7.6
Building Energy Efficiency Standards	The Building Energy Efficiency Standards are designed to increase the efficiency of all newly constructed residential and nonresidential buildings, as well as 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. https://www.energy.ca.gov/title24/ https://www.energy.ca.gov/title24/orc/	3.2	3.2
Comprehensive Publicly Owned Utility Customer Energy Efficiency Programs	Publicly owned utilities in California have electricity efficiency programs that benefit its ratepayers. The publicly owned utilities began reporting electricity program savings in 2007. https://ww2.energy.ca.gov/pou_reporting/ https://ww2.energy.ca.gov/pou_reporting/background/metrics.html	1.6	1.8

California Energy Commission	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
Clean Transportation Program	The Clean Transportation Program (formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program) was authorized by AB 118 (Núñez, Chapter 750, Statutes of 2007) to transform California's fuel and vehicle types to help attain climate change and air quality goals of the state. The program provides up to $100 million annually for projects, and the program was extended through 2024, by AB 8 (Perea, Chapter 401, Statutes of 2013). https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program	0.9	1.5
California Clean Energy Jobs Act: Proposition 39 (K-12) Program	The Energy Commission was authorized to implement the California Clean Energy Jobs Act (Proposition 39 K-12 Program) by SB 73 (Committee on Budget and Fiscal Review, Chapter 29, Statutes 2013). The program launched in 2014, and final funds will be distributed by June 30, 2019. Program guidance was initially published in December 2014, and has been revised throughout the program as requirements have been revised and refined. https://www.energy.ca.gov/efficiency/proposition39/	0.1	0.1

California Public Utilities Commission	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
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. http://www.cpuc.ca.gov/General.aspx?id=6043	2.1	2.1
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. http://www.cpuc.ca.gov/General.aspx?id=3753	<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/	0.2	tbd

California Public Utilities Commission	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
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. Note: 2018 emissions numbers are preliminary and have not been formally evaluated. http://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/Organization/Divisions/Office_of_Governmental_Affairs/Legislation/2018/13-15%20Energy%20Efficiency%20Report_Final.pdf	4.2	4.8
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. The RPS program is codified in Public Utilities Code Sections 399.11-399.20. Under SB 100 (De León, Chapter 312, Statutes of 2018), the RPS program administered by the CPUC requires each retail seller to increase its total procurement of eligible renewable energy resources so that 60 percent of retail sales are served by eligible renewable energy resources no later than December 31, 2030. Note: the CPUC does not officially calculate the emissions savings attributable to RPS-eligible procurement, so the numbers included here are a rough estimate of savings that have occurred since a 2007 baseline, calculated by multiplying RPS-eligible procurement (MWh) by an estimated baseline emissions factor for each utility. http://www.cpuc.ca.gov/RPS_Homepage/	8.6	9.1

Department of General Services (DGS)	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
Green Buildings - LEED	This measure reduces GHG emissions associated with the design and construction of state-owned or state-leased buildings. During 2018, seven additional new, renovated, or existing buildings totaling 602,013 sq. ft. were completed and LEED certified, as well as a number of existing buildings recertified.	<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 2019, a total of 71.33 MW had been installed at state facilities, with more being installed over the next two years. Efforts continue to expand distributed generation programs further. Additionally, DGS has 39 MW of community solar contracted for 20 years with SMUD through its SolarShares program to increase its offsite renewable energy 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 over 30 energy savings retrofit projects using Energy Service Companies (ESCOs) are in progress statewide. New streamlined methods have been developed with utility companies to deliver energy savings projects in addition to the DGS ESCO program. DGS is implementing	<0.1	<0.1

California Department of Water Resources (DWR)	Description of Measures	Emission Reductions, $MMTCO_2e$	Emission Reductions, MMTCO2e2
Program Title		**2017**	**2018**
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"). Of note, the reported emissions reduction is due to reduced energy use related to reduced water use, and thus is included in the reductions from other measures in the energy sector. https://water.ca.gov/Programs/Water-Use-And-Efficiency/SB-X7-7	1.4	1.4

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.

$MMTCO_2$ - Million Metric Tons of CO_2 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
	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.		On-going
F-1: sub-strategy 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.	<0.1	Implementation Timeline: 2005-2020.
F-1: sub-strategy 2	CAL FIRE / BOARD OF FORESTRY	Forest Conservation	Prevent conversion of forestlands through publicly and privately funded acquisitions and easements.	0.1	Implementation Timeline: 2005-2020.
F-1: sub-strategy 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.	0.2	Implementation Timeline: 2005-2020.
F-1: sub-strategy 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).	0.5	Implementation Timeline: 2005-2020.
F-1: sub-strategy 5	CAL FIRE / BOARD OF FORESTRY	Afforestation/Reforestation	Reforest state, private and federal lands to produce sequestration benefits.	Included in sub-strategy 3	Implementation Timeline: 2005-2020.
Total Reductions Expected from CAL FIRE Led Strategies				**0.8**	

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.

All emissions reductions are made using information from California Air Resources Board approved emissions quantification methodology and carbon flux reporting from CAL FIRE's Fire and Resource Assessment Program's Resource Assessment Report. Numbers listed are estimates for the activity based on an average annual emissions reduction calculation and the number of years those activities were funded between 2005-2020.

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	CARB, 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. https://www.arb.ca.gov/cc/landfills/landfills.htm	1.5 *	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. https://www.calrecycle.ca.gov/climate/landfill	<0.1	CalRecycle teamed up with CARB to secure a $700K contract with Cal Poly to further refine existing emission estimates. The researchers measured 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. Field work is complete and ARB and CalRecycle are reviewing the draft report.
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 and renewable energy production that will aid in meeting the Renewable Portfolio Standards goal and compliance with the Low Carbon Fuel Standard. https://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/	2.0 **	Ongoing
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. https://www.calrecycle.ca.gov/recycle/commercial https://www.calrecycle.ca.gov/recycle/commercial/organics	5.0 **	Ongoing

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). https://www.calrecycle.ca.gov/epr	<0.1 **	Ongoing
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. https://www.calrecycle.ca.gov/organics/compostmulch	2.0 **	Ongoing
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. https://www.calrecycle.ca.gov/Organics/Landscaping/	<0.1	Ongoing
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. https://www.calrecycle.ca.gov/climate/landfill	1.0	Ongoing In 2018 the Altamont Landfill produced about 2.7 million gallons of LNG biofuel (about 1.6 million diesel gallon equivalents).
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 http://www.calrecycle.ca.gov/lgcentral/goalmeasure/disposalrate/MostRecent/	3 [5]	CalRecycle provides assistance to local jurisdictions, businesses and the public with their recycling efforts. In 2018, a per-resident disposal rate of 5.5 pounds/resident/day was calculated using SB 1016's measurement system. This is up from 4.9 pounds/resident/day 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
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. https://www.calrecycle.ca.gov/75percent	20 ****	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. https://www.calrecycle.ca.gov/climate/grantsloans	1.0	Through the Greenhouse Gas Reduction Fund (GGRF), CalRecycle awarded the following in 2019: • 3 grants to plastic and glass recycling projects, totaling $9 million; and • 32 grants to food waste prevention and rescue projects, totaling $9.4 million.
Total Reductions Expected from CalRecycle Led Strategies				22 *****	

CalRecycle NOTES:

* Reduction included under CARB's totals

** GHG emission reduction estimates for RW-3 sub strategies are included in "AB 341 – California's 75 Percent Recycling Initiative" below.

*** Split responsibility for Sub strategy 3: CalRecycle is lead for EPR, and DGS is lead for EPP.

**** GHG emission reduction estimate for this measure is in Appendix C, First Update to the Climate Change Scoping Plan, May 2014. Includes GHG reductions for all RW-3 sub strategies.

***** The total is the sum of GHG emission reductions from: RW-2 - "Increasing the Efficiency of Landfill Methane Capture"; "Watershed Friendly Landscape Guidelines"; "Liquefied Natural Gas from Landfill Gas Measure"; "AB 341 -- California's 75 Percent Recycling Initiative"; and "Greenhouse Gas Reduction Grans & Loans Program."
The total does not include RW 1 (Landfill Methane Control Measure) because its reduction is included under CARB's reductions or "Achieve 50 Percent Statewide Recycling Goal" because it pre-dates the Scoping Plan.

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
	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, electric vehicle charging stations and secure-access bicycle parking. Projected GHG emission reductions in 2020 are 7,000 $MTCO_2$. https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/caltrans-climatechangerprt-final-april-2013-a11y-.pdf	<0.1	Ongoing
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. https://dot.ca.gov/programs/sustainability/zero-emission-vehicles	<0.1	Ongoing
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. Office of Roadway Materials Testing Electrical Testing Branch: http://www.dot.ca.gov/hq/esc/ttsb/electrical/lighting.htm	<0.1	Ongoing
	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. https://dot.ca.gov/programs/maintenance/asphalt-pavements	0.1	Ongoing
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 at least 25 percent supplementary cementitious material. 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. Projected GHG emission reductions in 2020 are 50,000 MTCO2. https://dot.ca.gov/programs/maintenance/concrete-pavements	0.1	Ongoing
	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. https://dot.ca.gov/programs/sustainability/sustainable-caltrans	<0.1	Ongoing
Total Reductions Expected from Caltrans Led Strategies				**0.2**	

Caltrans NOTES: *For more information, see:

http://www.dot.ca.gov/transplanning/ocp/climate-change.html

https://green.ca.gov/Documents/CALTRANS/CALTRANS_2018-2019_Roadmap_Complete_Document.pdf

http://www.dot.ca.gov/transplanning/ocp/docs/Caltrans_ClimateChangeRprt-Final_April_2013.pdf

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emissions Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	CALIFORNIA AIR RESOURCES BOARD (CARB) MEASURES				
	HIGH GLOBAL WARMING POTENTIAL (GWP) GASES				
H-1	CARB	HFC Reduction Strategies, Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional	This regulation requires a self-sealing valve on small cans of refrigerant, and a deposit and recycling program for the cans. More Information: https://ww2.arb.ca.gov/our-work/programs/small-containers-automotive-refrigerant	0.3	Implementation ongoing.
H-2	CARB	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. More Information: https://ww2.arb.ca.gov/our-work/programs/sulfur-hexafluoride-non-electric-non-semiconductor-sources	< 0.1	Implementation ongoing.
H-3	CARB	GHG Emission Reductions from Semiconductor Operations (Discrete Early Action)	This regulation requires semiconductor operations (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 $MMTCO_2e$ per year. Reduction of GHG emissions from this measure began in 2012. More Information: https://ww2.arb.ca.gov/our-work/programs/semiconductor	<0.1	Implementation ongoing in collaboration with local air districts.
H-4	CARB	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. More Information: https://www.arb.ca.gov/consprod/consprod.htm	0.2	Implementation ongoing.
H-5	CARB	Low GWP Refrigerants for New Vehicle Air Conditioning Systems	This 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 separately accounted for. More Information: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program	Included in T-1	Implementation ongoing.
H-6	CARB	High GWP Reductions from Stationary Sources: 1) High-GWP Refrigerant Management Program for Stationary Sources Refrigerant Registration /Reporting/Repair Program	This measure reduces 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. More Information: https://ww2.arb.ca.gov/our-work/programs/refrigerant-management-program	1.5****	Implementation ongoing.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emissions Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	HIGH GWP GASES, continued				
		2) Specifications for Commercial and Industrial Refrigeration Systems	This measure reduces both direct emissions of high GWP refrigerants resulting from the design and installation and indirect emissions resulting from energy consumption of large supermarket refrigeration systems. More Information: https://www.arb.ca.gov/cc/commref/commref.htm		Implementation ongoing.
		4) SF_6 Emission Reductions from Gas Insulated Switchgear	This measure sets a maximum SF_6 emission rate for gas insulated switchgear. More Information: https://ww2.arb.ca.gov/our-work/programs/elec-tandd		Implementation ongoing.
	INDUSTRY SECTOR				
I-1	CARB	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. CARB released all five industrial sector public reports in 2013 and 2014. More Information: https://www.arb.ca.gov/cc/energyaudits/energyaudits.htm	N/A	Complete.
I-2	CARB	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. More Information: https://ww2.arb.ca.gov/our-work/programs/oil-and-natural-gas-production-processing-and-storage	0.5	Implementation ongoing in collaboration with local air districts.
I-3	CARB	GHG Leak Reduction from Natural Gas Transmission and Distribution	SB 1371 (Leno, Chapter 525, Statutes of 2014), 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. More Information: https://www.arb.ca.gov/cc/gas-trans/gas-trans.htm	0.5	Continuing to evaluate. Currently working with CPUC on implementing SB 1371 through 26 best practices.
I-5	CARB	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. More Information in CARB's District Rule Database: https://www.arb.ca.gov/drdb/drdb.htm	N/A	Under evaluation in collaboration with local air districts.
	RECYCLING AND WASTE MANAGEMENT				
RW-1	CARB	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. More information: https://www.arb.ca.gov/cc/landfills/landfills.htm	1.8***	Implementation is ongoing by CARB and air districts.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emissions Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	TRANSPORTATION SECTOR				
T-1	CARB	Pavley I and Advanced Clean Cars	California's first passenger vehicle GHG emission standards (Pavley I) became effective in 2009 and started applying with the 2012 model year, under Assembly Bill 1493 (Pavley, Chapter 200, Statutes of 2002), covering 2009-2016 model year vehicles. After U.S. EPA adopted federal GHG standards, California amended its program to accept compliance with the federal standards. Then, beginning with the 2017 model year, California's standards evolved to coordinate limits on smog-causing pollutants and GHG emissions, and promote plug-in hybrids and zero-emission vehicles (ZEV), under the Advanced Clean Cars program, covering 2017-2025 model year vehicles. After federal GHG standards were again adopted, California continued to accept compliance with them. Under these harmonized programs, emission rates fell while sales, including ZEV sales, set records. More Information: Pavley I: https://www.arb.ca.gov/cc/ccms/ccms.htm Advanced Clean Cars: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program	21	Implementation ongoing.
T-2	CARB	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 California market meets, on average, a declining standard for GHG emissions measured in CO_2 equivalent grams per energy unit of fuel sold. More Information: https://www.arb.ca.gov/fuels/lcfs/lcfs.htm	15	Implementation ongoing.
T-3	Local Governments / CARB / Caltrans / HCD / OPR / Regional Planning Agencies	Regional Transportation-Related Greenhouse Gas Targets	The Sustainable Communities and Climate Protection Act (SB 375) supports the State's climate goals by helping reduce GHG emissions through coordinated transportation, housing, and land use planning. SB 375 requires regional metropolitan planning organizations (MPO) to develop Sustainable Communities Strategies (SCS), or long-range plans, which align transportation, housing, and land use decisions toward achieving GHG emissions reduction targets set by CARB. SB 375 also establishes CEQA streamlining incentives to encourage projects consistent with SCS implementation. More Information: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-and-climate-protection-program	3.0	Implementation ongoing. CARB released its first program performance report to the State Legislature late 2018, which assessed progress made toward the 2020 SB 375 targets, best practices, and challenges to further progress. This report has indicated that California is not on track to meet the 2020 targets.
T-4	CARB	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. More Information: https://www.arb.ca.gov/cc/tire-pressure/tire-pressure.htm	0.7	Implementation ongoing.
T-5	CARB	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. More Information: https://www.arb.ca.gov/ports/shorepower/shorepower.htm	0.2	Implementation ongoing. Staff is proposing a new At Berth Regulation on December 5, 2019, to expand upon the reductions to include ro-ro and tanker vessels and to include additional ports and marine terminals. Upon Board approval, the new regulation would become effective January 1, 2021.

2008 Scoping Plan: Measure Number or Chapter / Section	Agency[1] and Sector	Name	Brief Description	Expected GHG Emissions Reductions in 2020[2] ($MMTCO_2e$)	Activities since last Report Card or Implementation Timeline
	TRANSPORTATION SECTOR, continued				
T-6	CARB	Goods Movement Efficiency Measures:	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. Some of these sub-measures achieve GHG emissions reductions through greater fuel efficiency. More Information: https://www.arb.ca.gov/gmp/sfti/sfti.htm	3.5	Implementation of the following goods movement measures is ongoing, and details on each program are below.
		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 emissions reductions are attained by the reduction of black-carbon emissions and GHG co-benefits through increased fuel efficiency. More Information: https://ww2.arb.ca.gov/our-work/programs/drayage-trucks-seaports-railyards		CARB is 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 (TRU) are powered by external combustion engines. TRUs are already required to meet in-use ultra-low emissions PM regulations. This measure would limit the amount of time TRU engines could operate while stationary at applicable cold storage facilities and grocery stores. More Information: https://ww2.arb.ca.gov/our-work/programs/transport-refrigeration-unit/new-transport-refrigeration-unit-regulation		Continuing to evaluate and expand the focus to zero and near-zero emission technology options. There are no 2020 emissions reductions expected.
		3) Diesel Anti-Idling, and Cargo Handling Equipment	The Regulation for Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards was approved and began implementation in 2006, and was amended in 2012. CARB will investigate and potentially develop additional measures to transition cargo handling equipment to zero emission to further reduce toxic air contaminants, criteria pollutants, and associated GHG emissions. More Information: https://ww2.arb.ca.gov/our-work/programs/cargo-handling-equipment		Continuing to evaluate and expand the focus to zero and near-zero emission technology options. Additional requirements for cargo handling equipment will be presented for Board consideration in 2022.
		4) Goods Movement System-Wide Efficiency Improvements	The System-Wide Efficiency Improvement actions may provide emissions 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. More Information: https://dot.ca.gov/programs/transportation-planning/freight-planning		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	The Commercial Harbor Craft (CHC) Regulation reduces emissions of diesel particulate matter (PM), oxides of nitrogen (NOx), and Reactive Organic Gases from diesel engines used on CHC operated in Regulated California Waters (within 24 nautical miles of the California coast). CARB staff will propose additional requirements for Commercial Harbor Craft to include more stringent new and in-use vessel requirements for both freight-related and passenger vessels. More Information: https://ww2.arb.ca.gov/our-work/programs/commercial-harbor-craft		Continuing to evaluate and expand the focus to zero and near-zero emission technology options. Additional requirements for Commercial Harbor Craft will be presented for Board consideration in 2020.
		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. More Information: http://www.cleanairactionplan.org/strategies/ships/		Continuing to evaluate and expand the focus to zero and near-zero emission technology options. Voluntary actions are occurring in the South Coast Air Quality Management District.
		7) Vessel Speed Reduction (VSR)	This measure proposes to primarily require reduction of NOx emissions as well as diesel PM, oxides of sulfur, and CO_2 emissions resulting from reduced fuel consumption from speed reduction. More Information: https://www.arb.ca.gov/ports/marinevess/vsr/vsr.htm		Continuing to evaluate and expand the focus to zero and near-zero emission technology options. A VSR initiative has been reducing GHGs, NOx, and PM in ports within South Coast Air Quality Management District since 2001.

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	TRANSPORTATION SECTOR, continued				
T-7	CARB	Phase I and Tractor-Trailer Heavy-Duty Vehicle GHG Emission (TTGHG) Reduction Measures; TTGHG + Phase 1 and Phase 2 (above 8,500 lbs. GVWR)	The Tractor-Trailer Greenhouse Gas Regulation as well as Phase 1 and 2 HD GHG standards reduces GHG emissions from trailers and the tractors that pull them by increasing their fuel efficiency through improvements in aerodynamic drag and tire rolling resistance. CARB's Phase 1 and Phase 2 standards align with federal Phase 1 and Phase 2 Regulations, adopted by U.S. EPA in 2011 and 2016. The alignment provides nationwide consistency for engine and vehicle manufacturers, and allows CARB to enforce the requirements. More Information: TTGHG: https://www.arb.ca.gov/cc/hdghg/hdghg.htm#hdttghgreg Phase 1: https://ww2.arb.ca.gov/our-work/programs/greenhouse-gas-standards-medium-and-heavy-duty-engines-and-vehicles/phase1 Phase 2: https://ww2.arb.ca.gov/our-work/programs/ghg-std-md-hd-eng-veh	3.5	Implementation ongoing.
T-8	CARB	Medium- and Heavy-Duty Vehicle Hybridization: 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	Implementation ongoing.
		2) Zero-Emission Truck and Bus Pilot Projects	These projects 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. More Information: https://www.arb.ca.gov/msprog/agip/hvip.htm	< 0.1	Implementation ongoing.
	OTHER SECTORS / STRATEGIES				
Appendix C, Sections 3 and 4	CARB	Cool Communities	This guidance document 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. More Information: https://coolcalifornia.arb.ca.gov/cool-roofs	N/A *	Implementation ongoing.
Scoping Plan Chapter IV, Section B	CARB	Small Business Toolkit	This toolkit provides guidance and informational resources to local businesses on best practices, emissions calculation methods, case studies, cost-effectiveness information, and other tools to assist in reducing GHG emissions. More Information: https://coolcalifornia.arb.ca.gov/small-business	N/A *	Implementation ongoing.

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Appendix C, Section 3	CARB	Local Government Toolkit	Local governments can use this toolkit to help California meet its AB 32 (Núñez, 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. As part of the toolkit, the Climate Action Portal Map (CAP-Map) provides an interactive tool for local jurisdictions to identify best practices and climate action strategies that have already been adopted by other municipalities. More Information: https://coolcalifornia.arb.ca.gov/local-government	N/A *	Implementation ongoing. Developed and launched the CAP-Map in 2018.
Scoping Plan Chapter II, Section B	CARB	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. More Information: https://www.arb.ca.gov/cc/protocols/localgov/localgov.htm	N/A *	Implementation ongoing.
Scoping Plan Chapter II, Section C.1.	CARB	Cap-and-Trade Program	The California Cap-and-Trade Program is a market-based approach that provides a limit, or "cap," on GHG emissions from the electricity, industrial, commercial, and residential fuels and transportation fuels sectors. The Program provides compliance flexibility by allowing trading of allowances, quarterly auctions, and the limited use of approved compliance offset protocols. The California Program may link with other programs to create a regional market system that will achieve greater environmental and economic benefits for the State. The Program linked with the Cap-and-Trade system in Québec starting January 1, 2014. More Information: https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm	23**	Implementation ongoing. In December 2018, the Board approved amendments to comport with the direction contained in AB 398 (Garcia, E., Chapter 135, Statutes of 2017).
Total Reductions Expected from CARB-Led Strategies				**74.7**	

CARB NOTES:

* These measures facilitate reductions through voluntary actions.

** Set at a level needed to help achieve the GHG emissions reduction target for 2020.

*** Adjusted using a 100-year GWP of 25 for methane.

**** This projected value was updated in 2019 to account for removal of previously included measures now deemed unfeasible, as well as inclusion of impact of additional regulations currently being adopted.

Note: The term "approved" indicates the Board's action at the hearing. This is an interim step in the administrative process; final action by CARB 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
	CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE (CDFA) MEASURES				
	AGRICULTURAL SECTOR				
A-1	CDFA, CARB	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. https://www.cdfa.ca.gov/oefi/ddrdp/	12.8	Ongoing
Not in Scoping Plan	CDFA, CARB	Manure Management at Dairies	CDFA's Alternative Manure Management Program (AMMP) provides financial assistance for the implementation of non-digester manure management practices in California, which will reduce the anaerobic storage of manure to curtail GHG emissions https://www.cdfa.ca.gov/oefi/AMMP/	0.7	Ongoing
Not in Scoping Plan	CDFA, CARB	Soil carbon sequestration	The Healthy Soils Program stems from the California Healthy Soils Initiative, a collaboration of state agencies and departments to promote the development of healthy soils on California's farmlands and ranchlands. The HSP Incentives Program provides financial assistance for implementation of conservation management that improves soil health, sequesters carbon and reduces greenhouse gas (GHG) emissions. https://www.cdfa.ca.gov/oefi/healthysoils/	<0.1	Ongoing
Not in Scoping Plan	CDFA. CARB. 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. https://www.cdfa.ca.gov/oefi/sweep/	0.8	Ongoing
Early Action Item	CDFA, CARB, 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. https://www.cdfa.ca.gov/is/frep/Default.aspx	N/A [4]	This research has been completed.
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 FCEVs.	0.1	Ongoing

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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]	Ongoing
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]	ongoing
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. https://www.cdfa.ca.gov/Specialty_Crop_Competitiveness_Grants/FFY2018.html	N/A [4]	ongoing
Total Reductions Expected from CDFA Led Strategies				**14.4**	

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 ENERGY COMMISSION (CEC) MEASURES				
	ELECTRIC AND NATURAL GAS SECTORS				
E-1	CEC	Comprehensive Publicly Owned Utilities Efficiency Program	Publicly owned utilities (POUs) will potentially implement components of SB 350 (De Leon, Chapter 547, Statutes of 2015), AB 802 (Williams, Chapter 590, Statutes of 2015), and AB 758 (Skinner, Chapter 470, Statutes of 2009) to reduce energy consumption and associated GHG emissions. SB 350 adjusted cumulative electricity savings targets for POUs to 496 GWh by 2030. Per SB 1037 (Kehoe, Chapter 366, Statutes of 2005), POUs report annually to the Energy Commission electricity savings from its energy efficiency programs. This is the only strategy that contributes to the total expected GHG emission reduction. https://ww2.energy.ca.gov/pou_reporting/ https://ww2.energy.ca.gov/pou_reporting/background/metrics.html http://www.ncpa.com/policy/reports/energy-efficiency/	2.6	In coordination with CEC staff over the last year, POUs have developed a new cost-effectiveness tool and reporting platform (CET/RP) to improve the tracking and evaluation of energy efficiency
E-1	CEC	Building Energy Efficiency Standards	The Energy Commission updates the Building Energy Efficiency Standards (Energy Standards) on a triennial cycle through an extensive public stakeholder process, including input from the building industry, governmental entities, and utilities. California's minimum Energy Standards must be technically feasible and cost-effective for building design and construction. The first Energy Standards were adopted in 1978, and apply to newly constructed buildings, and additions and alterations to existing buildings. https://www.energy.ca.gov/title24/ https://www.energy.ca.gov/title24/orc/	5.4	The 2019 update to the Energy Code (including the new requirement to install solar PV on new low-rise residential buildings) becomes effective January 1, 2020. Staff are in the beginning stages of the 2022 update cycle and are working with stakeholders on proposal development.
E-1	CEC	Appliance Energy Efficiency Standards	The Energy Commission creates energy efficiency standards for appliances not covered by federal standards by seeking information from manufacturers, industry associations, advocates, utilities, and other stakeholders. Once standards are approved, they are added to the state's *Appliances Energy Efficiency Database* , which lists all appliances certified by the Energy Commission as meeting current standards. Cumulative energy savings from appliance standards in 2020 from a 2008 base year are estimated to be 24.7 TWh and 418 million therms of natural gas. https://www.energy.ca.gov/appliances/	9	The Energy Commission adopted more stringent efficiency standards and labelling requirements for portable electric spas and new efficiency standards for portable air conditioners in 2018. The Energy Commission began implementing efficiency standards for state-regulated LED lamps (tier 1), small diameter directional lamps, small-scale servers, and workstations. Technical amendments were made to standards and the MAEDbS appliance database system. Staff continued to comment on federal appliance efficiency rulemakings to advocate for improvements to energy efficiency of federally-regulated appliances.
	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. https://ww2.energy.ca.gov/2005publications/CEC-999-2005-016/CEC-999-2005-016.PDF http://www.whitehouse.gov/the-press-office/2014/12/09/fact-sheet-increasing-safety-and-efficiency-while-saving-money-pump http://www.safercar.gov/tires/pages/tires_fuelefficiency.html	TBD	The Energy Commission continues to review federal actions, which include the analysis of wet grip traction data for the new rulemaking for minimum standards for fuel efficiency and wet traction, which was mandated by the Fixing America's Surface Transportation Act.
Total Reductions Expected from CEC Led Strategies				**17.0**	

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	CALIFORNIA PUBLIC UTILITIES COMMISSION (CPUC) MEASURES *				
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. http://cpuc.ca.gov/energyefficiency/ http://cedars.sound-data.com	11.7	In August 2019 the Commission adopted a simplified fuel substitution test. This removed barriers for fuel substitution measures to be included in energy efficiency programs in the interest of reaching GHG emission reduction goals. Also in August 2019, the Commission adopted the energy efficiency energy savings goals for ratepayer-funded energy efficiency program portfolios for 2020-2030.
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. http://www.cpuc.ca.gov/General.aspx?id=5432	2.7	Ongoing.
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. Under SB 100 (De León, Chapter 312, Statutes of 2018), the main targets are 50 percent by 2026 and 60 percent by 2030. http://cpuc.ca.gov/RPS_Overview/	19.3	The Implementation of RPS is ongoing.
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. http://gosolarcalifornia.org/about/index.php	2.2	The CPUC continues oversight of the CSI program. The CSI General Market Program closed to new applications on 12/31/2016. An evaluation of the entire program is currently underway and is expected to be completed in Q4 2019.
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. http://www.cpuc.ca.gov/General.aspx?id=3753	<0.1	While applications will be accepted until its end date, he CSI Thermal program is preparing for close-out in July 2020. Per the legislation, a Cost Effectiveness Study of the program is scheduled to be completed by end 2019.
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. http://www.cpuc.ca.gov/sgip/	TBD	The CPUC recently adopted two SGIP decisions - one establishing new operational, monitoring and enforcement rules to ensure SGIP energy storage projects reduce GHGs; and a second to establish an Equity Resiliency budget to provide incentives for storage projects to medical baseline and other vulnerable customers in high wildfire threat districts.

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 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 and the CA Industry Assistance Credit. Additionally, the Commission reviews and approves the utilities' procurement authorities, strategies, and associated costs to comply with the Cap-and-Trade Program. www.cpuc.ca.gov/industryassistance www.cpuc.ca.gov/climatecredit	Reduction included in ARB totals.	Ongoing.
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. http://www.cpuc.ca.gov/General.aspx?id=12181	Incremental to 33 percent RPS goals. TBD	The Implementation of GTSR is ongoing.
Not In Scoping Plan	CPUC	Alternative Fuel Vehicles (Natural Gas and Electric Vehicles)	The CPUC develops policies to support the deployment of Zero-Emission Vehicles (ZEV). To this end, the CPUC works with utilities to provide rebates, rates, charging infrastructure, and vehicle-grid integration technologies to ZEV drivers. This work supports the state's goals to on renewable energy, air quality, and climate change. http://www.cpuc.ca.gov/zev	TBD	Ongoing.
Total Reductions Expected from CPUC Led Strategies				**36.0**	

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, Zero Net Energy, Retro-commissioning, Retrofit projects, and on-site and off-site clean generation projects (details included in sub-strategies described below).	Reductions specified by sub-strategy (below)	22 DGS buildings became part of the DGS Zero Net Energy portfolio through 2018.
GB-1: sub-strategy 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 the past.	0.3	Two new buildings and one leased building that DGS were involved in design, construction or leasing, became LEED certified in 2018.
GB-1: sub-strategy 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	Three more existing buildings became LEED certified in 2018.
GB-1: sub-strategy 3	State Architect, Office of Public School Construction, Department of Education	Schools	Conduct education and outreach to school districts to provide them with resources to increase sustainability and energy efficiency of schools through the commissioning process.	0.2	Ongoing
GB-1: sub-strategy 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: sub-strategy 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 2023. Installations will consist of Solar Photovoltaic, Wind and Solar Thermal generation projects.	0.2	DGS installed an additional 9.6 MW of on-site renewable energy at state facilities in 2018. Battery Storage will be included in future projects as this technology becomes economically viable. Storage can have a positive impact on the electrical grid as well as providing reliable clean backup power for state facilities. DGS will work with utilities and the PUC to promote policies responsive to generation and storage and creating reserves for state facilities.

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GB-1: sub-strategy 6	DGS, State Agencies, CIWMB, DTSC	Environmentally Preferable Purchasing (EPP)	Develop environmentally preferable purchasing (EPP) 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.	*	In 2018, the EPP team reviewed 17 commodity contracts in an effort to increase EPP language in our specifications. In May of 2019, DGS won an EPEAT Purchaser Award for our purchases made in 2018. In 2019 DGS launched the green buyer site which provides purchasing data for state agencies that shows EPP purchases since 2016.
GB-1: sub-strategy 7	California Building Standards Commission, CEC, DGS, State Architect, HCD, OSHPD	Green Building Code Development	In 2009 the nation's first green code took effect in California. The Green Building Standards Code (CALGreen) is part of California Code of Regulations, Title 24, Part 11. It now includes both mandatory standards for all state buildings, as well as voluntary standards which local authorities could adopt as mandatory regulations within their jurisdictions. Every code cycle the Building Standards Commission continues 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. https://codes.iccsafe.org/content/document/658?site_type=public	2.9	The 2019 CALGreen code addresses statewide goals for green house gas reduction increasing the requirements for Electric Vehicle Supply Equipment (EVSE) for all new construction. . Additionally, alignment with ARB's required use of low Volatile Organic Compounds (VOC) materials and products, as well as increased options for reduced water consumption to align with the Energy Commission mandate for use of efficient plumbing fixtures.
GB-1: sub-strategy 8	DGS, State Agencies	Clean Renewable Energy Purchases	Purchase clean renewable energy generated from off-site projects providing energy for state facilities. This can include long-term community solar, renewable REC's, and other sources off-site renewable energy.	0.2	Negotiating additional offsite renewable energy agreement with SMUD that may take effect in 2020.
GB-1: sub-strategy 9	DGS, State Agencies	Zero Net Energy	All new construction beginning design after October 23, 2017 shall be ZNE. Additionally, 50% of existing building area shall be ZNE by 2025.	1.0	22 DGS buildings became part of the DGS Zero Net Energy portfolio through 2018.

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				
Appendix C, Section 2.A.	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. There are three assets that are involved in a litigation hold, but will be disposed of when the hold is lifted. All other assets identified have been surrendered by departments.
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	This activity is completed and a process is in place for continual fleet replacement with lower emitting vehicles.
Appendix C, Section 2.C.	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	In April of 2019, DGS issued its final AB 236 Report on the state fleet's progress in reducing the consumption of petroleum products, which reports that as of January 1, 2017 the state fleet met and exceeded its 20 percent goal of reducing petroleum consumption from 2003 levels. As a result of strong zero-emission vehicle purchasing policies and the mandated use of alternative fuels, such as renewable diesel, that state fleet met and exceeded this goal three years early. As a result of this success, the state has established a subsequent goal to reduce petroleum consumption by 50 percent by 2030 (based on 2015 baseline data).
Total Reductions Expected from DGS Led Strategies				**6.7**	

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). https://water.ca.gov/Work-With-Us/Grants-And-Loans/Water-Energy-Grant-Programs	1.4 [3]	Ongoing; work has expanded to include more recent water conservation legislation
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. https://water.ca.gov/Programs/All-Programs/Climate-Change-Program/Climate-Action-Plan	1.2	Ongoing; in 2018, Department adopted new mid-term GHG emissions reduction goal of 60% below 1990 levels by 2030
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 and coordinate and integrate with the Sustainable Communities Strategy and Regional Transportation Plan. HCD is required to approve region RHNA Plans and local gov't housing elements that describe local land-use decisions regarding housing siting and consideration of factors relevant to achieving reductions in vehicle trips and GHG emissions.	N/A **	Since the last update HCD has developed and issued 6 RHNA determinations throughout the State. The majority of these determinations were the result of jurisdictions who elected to align their RHNA plan with the development of the RTP.
	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.	N/A [4]	HCD conducted a series a regional open house forums aimed at implementation of new planning tools and resources, including SB 2 Planning Grants, that streamline the development of housing in infill areas. In collaboration with the Governor's Office of Planning and Research, HCD is also developing an online mapping tool showing areas of the state where housing projects may qualify for CEQA exemptions or streamlining based on transportation-efficiency.
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, and participating in interagency efforts to help facilitate changes to transportation-funding programs to better align funded projects with VMT reduction.	N/A [4]	In 2018-19, HCD provided staff support in the implementation of AHSC Round 4, awarding approx. $402M to 25 new projects that reduce GHGs. In 2019, HCD also participated in the H+T Coordination Workgroup to facilitate changes to Transit & Intercity Rail Capital Program & Solutions to Congested Corridors Program, to reduce VMT.
C-49	HCD	Local Assistance on GHG Reduction Strategies	HCD staff makes 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]	Ongoing
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 64 housing elements finding 26 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.

** Not Applicable. Regional transportation entities provide GHG reduction information to Air Resources Board.

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 119 miles. over 120,000 tons of material were recycled or reused, 99 percent of all construction and demolition waste.
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	Construction underway, expected completion date is 2021.
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. http://www.opr.ca.gov/news/2018/12-28.html	N/A [4]	Ongoing.
Not in Scoping Plan	OPR	Comprehensive General Plan Guidelines Update	The General Plan Guidelines, last updated in 2017, contains recommendations for how a community should plan for future growth. The General Plan Guidelines includes a robust discussion on climate change evaluation and response in terms of both planning to reduce GHG emissions and adapting to climate change. http://opr.ca.gov/planning/general-plan/guidelines.html	N/A [4]	Ongoing
Chapter II Section B	OPR	Technical Assistance	OPR advises state and local agencies on preparing climate action plans that integrate with CEQA, planning and zoning law and climate change legislation. On an on-going basis, OPR provides technical advice, including training on climate action planning and related implementation measures, to local and state agencies.	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]	Completed
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 SB 246 (Wieckowski, Chapter 606, Statutes of 2015), OPR launched the Integrated Climate Adaptation and Resiliency Program (ICARP) that will address co-benefits and overlapping priorities of GHG emissions and adaptation. http://opr.ca.gov/planning/icarp/	N/A [4]	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
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 to replace the use of imported water with the use of recycled water by increasing the production and use of recycled water 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 replaces existing sources with higher energy intensities. https://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/ https://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/recycledwater_research.html#links	0.3 [3]	In 2018, the Board administered more than $236 million in construction grants and loans for recycled water projects, which are projected to yield 41,800 acre-feet per year. The Board adopted regulations for augmenting surface water reservoirs with treated recycled water to indirectly supplement drinking water supplies. The Board also updated its Recycled Water Policy to maximize the use of recycled water in areas where groundwater is in a state of overdraft, and to support the use of recycled water.
W-4	SWRCB	Storm Water Use	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, and technology is available, 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 replaces existing sources with higher energy intensities. https://www.waterboards.ca.gov/water_issues/programs/stormwater/	0.2 [3]	In 2018, the State Water Board continued to execute planning and implementation grants awarded in response to the 2016 Storm Water Grant Program (Proposition 1) solicitation. Collectively, the funded projects have the potential to capture and infiltrate 70,000 acre-feet of storm water per year. Additionally, the Board is funding analysis of statewide stormwater capture and use calculation methodologies.
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.

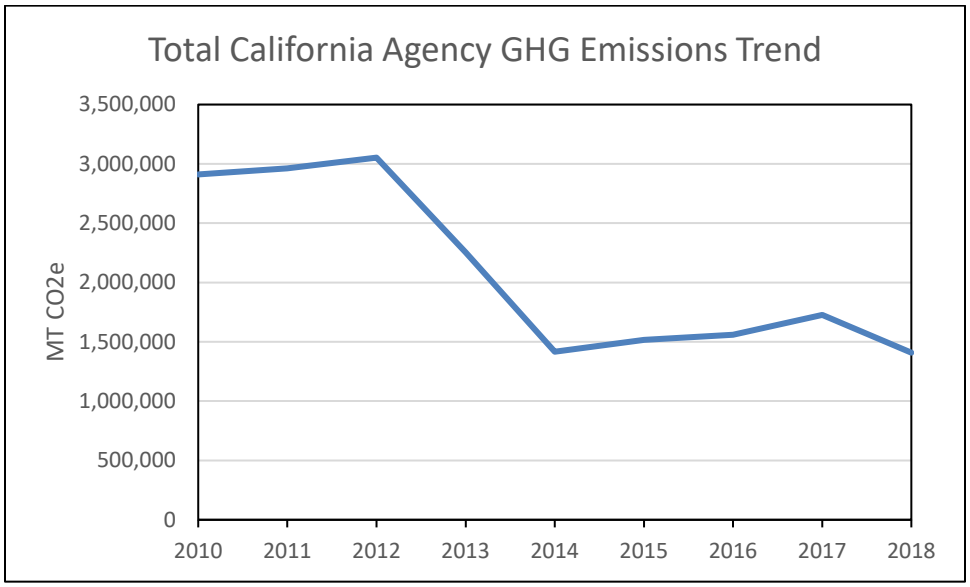
4. These measures will not result in direct reductions of GHG emissions but will facilitate reductions through associated voluntary actions and potential future regulatory efforts.

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 Registry's *General Reporting Protocol*. Executive Order B-18-12 required 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 addition, Executive Order N-19-19 requires that every aspect of state government redouble its efforts to reduce greenhouse gas emissions. Currently, over 40 state agencies report their annual GHG emissions to The Climate Registry Information System. Figure 2 shows the total GHG emissions from State agency operations from 2010 to 2018. State agency GHG inventories can be viewed at www.green.ca.gov.

From 2010-2018, state agencies have reduced emissions by 52% primarily due to the California Department of Water Resources' (DWR) divestiture of the Reid Gardner coal-fired power plant in mid-2013. Many State agencies continued to reduce their GHG emission between 2014 and 2018. The decrease in total emissions in 2018 is due almost entirely to DWR emissions, which fluctuates year to year depending on the weather.



2010 Emissions	2011 Emissions	2012 Emissions	2013 Emissions	2014 Emissions
2,910,122	2,963,102	3,052,593	2,253,155	1,415,977
2015 Emissions	**2016 Emissions**	**2017 Emissions**	**2018 Emissions**	**2010-2018 Change**
1,515,151	1,558,451	1,727,957	1,408,544	-52%

Figure 2

Additional GHG reduction measures that agencies continue to implement include: identifying vehicles for zero emission vehicle/plug-in hybrid replacement, instituting energy conservation principles, increasing use of renewable diesel, 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)	Year in with emissions occurred	DIRECT Emissions in Metric Tons CO2E for each year calculated	INDIORECT Emissions in Metric Tons CO2E for each year calculated	YOTAL Emissions in Metric Tons CO2E for each year calculated	NOTES
							Green indicates verified inventory
Calfornia State Transportation Agency							
The following Boards and Departments calculate		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	
		2015	2015	116,001	48,172	164,173	
		2016	2016	87,615	40,829	128,444	
		2017	2017	81,725	36,957	118,682	
- *CalTrans*	Yes	2018	2018	100,910	20,158	121,068	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Year in with emissions occurred	DIRECT Emissions in Metric Tons CO2E for each year calculated	INDIORECT Emissions in Metric Tons CO2E for each year calculated	YOTAL Emissions in Metric Tons CO2E for each year calculated	NOTES
							Green indicates verified inventory
California Environmental Protection Agency							
-Totals include inventory data for the ARB,		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	
		2015	2015	1,921	4,474	6,395	
		2016	2016	1,866	3,953	5,819	
		2017	2017	1,969	3,964	5,933	
	Yes	2018	2018	1,842	4,336	6,178	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Year in with emissions occurred	DIRECT Emissions in Metric Tons CO2E for each year calculated	INDIORECT Emissions in Metric Tons CO2E for each year calculated	YOTAL Emissions in Metric Tons CO2E for each year calculated	NOTES
							Green indicates verified inventory
		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	
		2016	2016	5,432	1,688	7,120	
		2017	2017	4,853	786	5,639	
California Department of Food and Agriculture	Yes	2018	2018	4,988	1,479	6,467	
		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	
		2016	2016	2,558	1,495	4,053	
		2017	2017	3,163	732	3,895	
California Governor's Office of Emergency Services	Yes	2018	2018	2,475	821	3,296	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Year in with emissions occurred	DIRECT Emissions in Metric Tons CO2E for each year calculated	INDIORECT Emissions in Metric Tons CO2E for each year calculated	YOTAL Emissions in Metric Tons CO2E for each year calculated	NOTES
							Green indicates verified inventory
		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	
		2016	2016	206	680	886	
		2017	2017	187	668	855	
CA Public Utilities Commission	Yes	2018	2018	348	713	1,061	
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	
		2015	2015	4,785	294	5,079	
		2016	2016	4,572	273	4,845	
		2017	2017	5,295	286	5,581	
- *Department of Public Health*	Yes	2018	2018	4,997	298	5,295	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Year in with emissions occurred	DIRECT Emissions in Metric Tons CO2E for each year calculated	INDIORECT Emissions in Metric Tons CO2E for each year calculated	YOTAL Emissions in Metric Tons CO2E for each year calculated	NOTES
							Green indicates verified inventory
Natural Resources Agency							
- The following Boards and Departments calculate		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	
		2015	2015	44,389	5,413	49,802	
		2016	2016	57,623	4,031	61,654	
		2017	2017	64,555	4,610	69,165	
- CalFire	Yes	2018	2018	57,538	4,345	61,883	
	Yes	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	
		2015	2015	1	424	425	
		2016	2016	1	1	2	
		2017	2017	0	1	1	
- CA Energy Commission	Yes	2018	2018	0	1	1	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Year in with emissions occurred	DIRECT Emissions in Metric Tons CO2E for each year calculated	INDIORECT Emissions in Metric Tons CO2E for each year calculated	YOTAL Emissions in Metric Tons CO2E for each year calculated	NOTES
							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	
		2015	2015	13,549	7,553	21,102	
		2016	2016	12,773	3,671	16,444	
		2017	2017	12,669	6,050	18,719	
- Dept. of Fish & Wildlife	Yes	2018	2018	12,857	5,125	17,982	
		2007	2007	14,299	3,226,250	3,240,549	DWR is in the process of updating and re-verifying its 2010-2018 GHG inventories. DWR's previous inventories used CARB emission factors for net pump load, and DWR plans on updating using the TCR default EF (eGRID).
		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	
		2015	2015	15,010	585,828	600,838	
		2016	2016	9,856	1,013,999	1,023,855	
		2017	2017	17,979	1,362,935	1,380,914	
- *Dept. of Water Resources*	Yes	2018	2018	13,737	782,737	796,474	

INVENTORY STATUS >	Member of The Climate Registry	Inventory Completed (CY)	Year in with emissions occurred	DIRECT Emissions in Metric Tons CO2E for each year calculated	INDIORECT Emissions in Metric Tons CO2E for each year calculated	YOTAL Emissions in Metric Tons CO2E for each year calculated	NOTES
							Green indicates verified inventory
Natural Resources Agency, continued							
- *Dept. of Parks and Recreation*		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	
		2015	2015	13,218	6,183	19,401	
		2016	2016	13,248	5,080	18,328	
		2017	2017	11,187	4,333	15,520	
	Yes	2018	2018	15,587	3,860	19,447	
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	
		2015	2015	42,695	59,870	102,565	
		2016	216	40,456	24,234	64,690	
		2017	2017	39,112	14,559	53,671	
- *Dept. of General Services*	Yes	2018	2018	40,894	4,797	45,691	