

CDP's 2017 states and regions platform

Response ID:54; California Data

1. Welcome to CDP's states and regions platform

Please select which sections you would like to disclose publicly.

1. Introduction
2. Targets and actions
3. Emissions - Region-wide
4. Emissions - Government operations
5. Risks and adaptation
6. Governance

► **Only required when you've completed your response:** are you ready to submit your response?

Yes - I am ready to submit my response

Lookup ID

California

2. 1. Introduction

1.1: Please provide the following introductory details for your region. * ^

Government name : State of California
Country : United States of America
Leader title (e.g. Governor, Premier...) : Governor
Leader name : Edmund G. Brown Jr.
Land area (km2) : 423,470
Main cities or urban centres : Los Angeles, San Francisco, San Diego

1.2: Please describe your region's key sectors of administrative power. * ^

The powers of the State government are legislative, executive, and judicial. The State's key sectors of administrative power are: health and human services, education, public safety, natural resources, and environmental protection.

1.3: Please give a general description and introduction to your region. * ^

California is the most populous state in the United States with over 39 million people. It also has the nation's highest GDP at approximately \$2.5 trillion. Geographically located in the Western United States, California is currently ranked as the world's 5th largest economy and one of the most ecologically diverse places in the world.

California has made bold commitments to sustain our environment and is a leader in renewable energy and efficiency. California has established a series of ambitious environmental goals (e.g., the Renewable Portfolio Standard, Short-Lived Climate Pollutant Strategy, and a goal to reduce GHG emissions 40% below the 1990 level by 2030) that include efforts to reduce greenhouse gas emissions, develop a clean economy, and provide clean air and water for all residents. California is also fostering and building relationships with national and sub-national governments from around the world to address climate change.

1.4: Please provide details of your region's current population, annual operating budget, and gross domestic product (GDP).

* ^

Population

39200000

Population year

2016

Annual operating budget (US\$)

170862847000

Budget year

2016

GDP (US\$)

2600000000000

GDP year

2016

Comments: Annual operating budget for fiscal year 16-17 (July 1, 2016-June 30, 2017). <http://ebudget.ca.gov/2016-17/Enacted/agencies.html>

1.5 Please attach a historical population record and future population projection for your region. *[CA_90-00_Rpt.xls](#)[CA_2000-2010.xls](#)[CAProj_2010-2060_5-Year.xls](#)[BBStateGDP_\(1\).xls](#)

Comments: <http://www.dof.ca.gov/Forecasting/Demographics/> <http://www.census.gov/popest/data/historical/index.html>
<http://www.census.gov/population/projections/data/state/projectionsagesex.html>

1.6 Please attach a historical Gross Domestic Product (GDP) record and future GDP projection for your region. *[CA_2005-2015.xlsx](#)[BBStateGDP_\(1\).xls](#)[FR_CAFOR0417_CAEconomicForecast.xlsx](#)

Comments: <http://www.bea.gov/regional/histdata/> <http://www.dof.ca.gov/Forecasting/Economics/>

3. 2. Targets and climate actions

2.1: Please provide details of your emissions reduction, energy efficiency or renewables target(s) by selecting the corresponding image(s) below. *[Emissionsreduction.png](#)[Energy efficiency.png](#)[Renewables.png](#)**2.1a Please provide details of your emissions reduction target(s). *****Scale**

Region-wide

Target type

Fixed level

Target reduction (%)

N/A

Target year

2020

Base year

1990

**Base year emissions covered
by target (metric tonnes CO2e)**

431000000

Target gases

CO2

CH4

N2O

HFCs

SF6

PFCs

NF3

Target sectors

Energy

Transport

Industry

Agriculture

Waste

**Does target include emissions from
outside your regional boundary?**

Yes, emissions associated with imported electricity.

**Has a decarbonisation pathway(s)
been modelled for your target?**

Yes, it is in our Scoping Plan.

Short target summary

Reduce GHG emissions to 1990 levels by 2020.

Please detail and comment on any progress to reach target

Progress has included reductions from 444.3 million metric tonnes CO2e in 2013 to 441.5 million metric tons CO2e in 2014, based on GWPs from IPCC 4th Assessment Report. California's emissions were further reduced to 440.4 million metric tonnes CO2e in 2015. For more information, visit CARB's Greenhouse Gas Emission Inventory website at: <https://www.arb.ca.gov/cc/inventory/data/data.htm>

Scale

Region-wide

Target type

Base year emissions

Target reduction (%)

40%

Target year

2030

Base year

1990

**Base year emissions covered
by target (metric tonnes CO2e)**

431000000

Target gases

CO2
CH4
N2O
HFCs
SF6
PFCs
NF3

Target sectors

Energy
Transport
Industry
Agriculture
Waste
Other

**Does target include emissions from
outside your regional boundary?**

Yes, emissions associated with imported electricity.

**Has a decarbonisation pathway(s)
been modelled for your target?**

Yes, the scenario to achieve the 2030 target was modeled using E3's PATHWAYS model and is detailed in CARB's 2017 Scoping Plan Update.

Short target summary

Reduce GHG emissions to 40 percent below 1990 levels by 2030.

Please detail and comment on any progress to reach target

Current modeling shows the State is on track to be below the 2020 target. The 2017 Scoping Plan Update incorporates and leverages many existing and ongoing efforts while identifying new policies to achieve the 2030 GHG target and meet air quality goals. New policies in the Scoping Plan Update include recommendations for healthy and

resilient Natural and Working Lands (marked as "Other" for target sectors), in addition to agricultural lands.

Scale

Region-wide

Target type

Base year emissions

Target reduction (%)

80%

Target year

2050

Base year

1990

**Base year emissions covered
by target (metric tonnes CO2e)**

431000000

Target gases

CO2
CH4
N2O
HFCs
SF6
PFCs
NF3

Target sectors

Energy
Transport
Industry
Agriculture
Waste

**Does target include emissions from
outside your regional boundary?**

It is expected that emissions associated with imported electricity would continue to be included as before.

**Has a decarbonisation pathway(s)
been modelled for your target?**

The 2017 Scoping Plan Update is signaling the level of transformation and type of policies needed to meet this long-term goal; however, the specific measures to achieve it have not yet been modeled and proposed into an official administration plan. The 5-year interval Scoping Plan updates are expected to start addressing this 2050 goal.

Short target summary

Reduce GHG emissions to 80 percent below 1990 levels by 2050.

Please detail and comment on any progress to reach target

The 2030 GHG reduction target was codified by SB 32, followed by a strategy outlined in the 2017 Scoping Plan Update to meet this goal. CARB continues to deliver strong policy signals that will drive investments for a low carbon economy, and put California on the path to help achieve the 2050 goal.

2.1a: Please provide details of your energy efficiency target(s).

Scale

Region-wide

Target type

Increase efficiency

Target (%)

N/A

Target year

2030

Base year

2015

Target energy

Final energy

Target sectors

Consumers of electricity and natural gas.

Short target summary

Double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

Please comment and detail any progress to meet target

California households spend 25 percent less on electricity than the rest of the country, and our average household electricity use accounts for only one-third as much greenhouse gas emissions as that of the average U.S. household; California gets twice the economic output for every kilowatt-hour of electricity that it uses than the rest of the country does;

California has long been a global leader in energy efficiency – saving Californians \$74 billion over the past 30 years.

2.1a: Please provide details of your renewables target(s).

Scale

Region-wide

Target type

Renewable electricity consumption

Target (%)

33%

Target year

2020

**Current renewable production
or consumption**

77853

Unit type

MW

**Target renewable production
or consumption****Unit type**

MW

Short target summary

All retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020.

Please comment and detail any progress to meet target

Currently on track to meet this goal.

Scale

Region-wide

Target type

Renewable electricity consumption

Target (%)

50%

Target year

2030

**Current renewable production
or consumption**

77853

Unit type

MW

**Target renewable production
or consumption****Unit type**

MW

Short target summary

All retail sellers of electricity shall serve 50 percent of their load with renewable energy by 2030.

Please comment and detail any progress to meet target

Estimated to be on track.

2.1b: Please detail why you do not have an emissions reduction target.

2.1b: Please detail why you do not have an energy efficiency target.

2.1b: Please detail why you do not have a renewables target.

2.1b: Please detail why you do not have an emissions reduction target or energy efficiency target.

2.1b: Please detail why you do not have an emissions reduction target or renewables target.

2.1b: Please detail why you do not have an energy efficiency target and renewables target.

4. 2. Targets and climate actions

2.2 Please provide details of your climate actions in the following sector(s) by selecting the corresponding image(s) below.

- Agriculture
- Buildings and lighting
- Energy
- Finance and economy
- Governance
- Industry
- Land use
- Transport
- Waste
- Water

Agriculture

	Are you taking this climate action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		
1. Promote sustainable farming practices (e.g. low-till, waste reduction, etc.)	X			Limited implementation	The California Department of Food and Agriculture appropriated \$7.5 million in FY 2016-17 to develop and administer the Healthy Soils Incentives Program. This is a new incentive and demonstration program on the California Healthy Soils Initiative from the Greenhouse Gas Reduction Fund. The program's objective is to build soil carbon and reduce agricultural greenhouse gas emissions. For more information, visit: https://www.cdfa.ca.gov/oefi/healthysouls/ The State Water Efficiency and Enhancement Program (SWEEP) provides financial assistance in the form of grants to implement irrigation systems that reduce greenhouse gases and save water on California agricultural operations. See more at: https://www.cdfa.ca.gov/oefi/sweep/

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Buildings & Lighting

	Are you taking this climate action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		
1. Improve heating and cooling efficiency (e.g. audits, insulation, white roofs, etc.)	X				Limited implementation
2. Increase awareness/engage public on energy efficiency/clean energy programs	X			Comprehensive implementation	Appliance Efficiency Program Outreach & Education http://www.energy.ca.gov/appliances/outreach Outreach Program: http://www.energy.ca.gov/commission/diversity Energy Outreach & Education Schedule http://www.energy.ca.gov/title24/orc/schedule Energy Upgrade California is another resource public: http://www.energyupgradeca
3. Install biomass heating			X	Pilot stage	Large facilities in rural areas such as a university have implemented biomass heating in California. Governor issued an Executive Order S-06-06 on biomass and biofuels. Two important points are: by 2010, 20 percent of its biofuels need to be produced in California; increasing to 40 percent by 2020 and 100 percent by 2050. By 2010, 20 percent of the renewable electricity generated from biomass resources with maintaining this level through 2020. The Governor's Executive Order S-06-06, released California's Bioenergy Action Plan in 2006, released California's Bioenergy Action Plan http://www.energy.ca.gov/biomass
4. Install clean cook stoves	X				Limited implementation
5. Install combined heat and power	X			Comprehensive implementation	California has implemented a variety of policies to encourage CHP including interconnection standards, incentives, financial assistance, and additional supportive programs. 28 new CHP installations were completed in 2009. For more information, visit: http://database.aceee.org/s
6. Install energy efficient lighting systems (e.g. LED, CFL, etc.)	X			Comprehensive implementation	Appliance Efficiency Regulation for Lamps (LEL) (for general service): http://www.energy.ca.gov/appliances/documents/30_Regulatory_Advisory_Lighting.pdf The report recommends, "[Considering] enhanced energy efficiency air conditioners, light-emitting diode lighting, and energy efficiency improvements in industrial processes

					refrigeration, efficient street lighting)" (p
7. Install geothermal heating			X	Pilot stage	California has about 7,000 geothermal heat pu throughout the State: https://www.california-content/uploads/GHP-Whitepaper_FINAL-1 California's 2013 Integrated Energy Policy F acknowledges that geothermal heat pump syst percent to 50 percent less electricity. The 20 summarizes challenges faced by the industry Commission encouraged the industry to "devel Calculation Method application to model the produce a model local ordinance that could be ; jurisdictions, and promote the use of Calif geothermal heat pump standards..." (page 2 information, visit: http://www.energy.ca.gov/2013publications/C001/CEC-100-2013-001-CMF.pc
8. Install more efficient luminaires in streetlights/traffic lights (e.g. LED)	X			Comprehensive implementation	California has been implementing more efficie street and traffic lights since 2001. California Reduction Program (PLRP) provided low-inte other incentives for energy-efficient equipment, meters for commercial customers, sunlight-ref materials, energy consumption monitoring pla loans, and many more demand-reducing measi measures were managed by the California Ener LED traffic lights constitute one of the great suc resulted from the PLRP.
9. Install smart energy meters/sub-meters	X			Comprehensive implementation	The State's Investor Owned Utilities have alrea these devices. Publicly Owned Utilities are cont these technologies within their service territory. buildings, especially newer buildings, are insta to improve their ability to identify, monitor and energy use. For more information, v http://www.cpuc.ca.gov/General.aspx?i
10. Install solar electricity	X			Comprehensive implementation	The California Solar Initiative (CSI) program f billion between 2007 and 2016 with a go; approximately 1,940 MW of new solar generati more information, visit: http://www.gosolarcalifornia.ca.gov/about
11. Install solar heating/hot water	X				Limited implementation
12. Promote building energy performance rating/certification/benchmarking	X			Comprehensive implementation	The California Home Energy Rating System (H establishes a state-wide rating scale, procedu estimating utility bills, and upgrade recommen as training: http://database.aceee.org/state/ca Green Building Action Plan for Executive Orde energy and water use for all State facilities are annually into the Energy Star Portfolio Manage http://database.aceee.org/state/california#sthasl Source: http://database.aceee.org/state/californ 802 (Williams, Chapter 590, Statutes of 2015 Energy Commission to develop a statewide buil benchmarking and public disclosure program. program applies to nonresidential buildings a buildings greater than 50,000 square http://www.energy.ca.gov/benchar

13. Promote energy efficient appliances	X			Comprehensive implementation	The California Energy Commission provides a education website with information on the Appl Program. Visit: http://www.energy.ca.gov/applia
14. Set/strengthen appliance efficiency standards	X			Comprehensive implementation	California Code of Regulations, Title 20, Sectic create standards for twenty-one categories c including standards for both federally regula federally-regulated appliances. See r http://www.energy.ca.gov/applianc
15. Set/strengthen building energy codes/standards	X			Comprehensive implementation	The 2016 Building Energy Efficiency Stand January 1, 2017, are mandatory statewide ar International Energy Conservation Code (IECC residential & commercial buildings. See http://www.energy.ca.gov/title24/2016standa
16. Set/strengthen HVAC efficiency standards	X			Comprehensive implementation	Energy efficiency standards for HVAC systems the Title 24 Building Energy Efficiency Stand Code). The California Energy Commission st Energy Code every three years through a tr adoption cycle.
17. Set/strengthen lighting efficiency standards	X			Comprehensive implementation	The California Energy Commission adopts en standards for lighting as part of Title 20 Applia and Title 24 Building Energy Efficiency S
18. Switch from heating oil to natural gas	X			Comprehensive implementation	Two-thirds of California households use natur heating: https://www.eia.gov/state/analysis.i

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Energy

	Are you taking this action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		
1. Enable net metering	X			Comprehensive implementation	The State has a net metering program for customers who install small solar, wind, biogas, and fuel cell generation facilities to serve all or a portion of onsite electricity needs to ensure customer-side renewable distributed generation continues to grow. See more at: http://www.cpuc.ca.gov/General.aspx?id=3934
2. Expand/improve transmission to integrate renewables	X			Comprehensive implementation	In 2015, the State launched RETI 2.0 in response to the State's increasing Renewables Portfolio Standard targets. RETI 2.0 is a review of data on resource potential, costs and benefits of renewable energy resources in different areas of California and the western US, and information regarding the ability of the existing bulk transmission capacity to access resources into the California Independent System Operator (ISO) Control Area. In addition, per SB 350 (2015), the State is exploring an

renewables					(2015), the State is exploring an expansion of its grid operations into other western states to enhance energy flow to meet the West's demand for reliable, affordable, and sustainable power. The shift to a regional ISO would expand resource flexibility, improve transmission planning and grid reliability, and promote clean energy.
3. Install natural gas power	X			Limited implementation	The California Public Utilities Commission (CPUC) Long-Term Procurement Proceeding (LTPP) proceeding is currently reviewing resources in the CA market for 2022-2035. The intent is to identify existing and projected resources sufficient to meet future demand and authorize procurement of additional resources (including natural gas generation and preferred renewable resources) in the event that they are needed. As the State is moving towards decarbonization to meet climate targets, it is expected that coal-fired generation will decline in the near-term to help meet the requirements and needs for renewable energy.
4. Install biomass power			X	Limited implementation	Markets for biomass energy are complex and in flux. Biomass-fired biomass generation was common in the 1980s, when biomass was a significant economic condition. Generally, the number of biomass plants has diminished over time due to economic issues, including the rise of wind and solar generation and the decline of natural gas power. SB 1122 (Rubio) amended the feed-in tariff to new biomass plants that are 3 MW and less, but the Market Adjusting Tariff (MAT) for Biomass (BioMAT) tasks the three largest IOU-owned utilities (IOUs) to purchase 250 MW of bioenergy capacity allocated to facilities that are not from sustainable forestry. SB 1923 (Wood, 2016) amended the limits to allow electricity generation nameplate capacity while maintaining the export capacity at 100 MW. In addition, SB 808 requires IOUs and the larger utilities purchase the output of 125 MW of electricity from bioenergy facilities. The percentage of fuel from biomass in California is currently low.
					California Air Resources Board is currently developing a quantification methodology for carbon capture and storage (CCS). As with other

5. Install carbon capture and storage			X	Pilot stage	storage (CCS). As with other quantification methodologies, the CCS quantification methodology may be adopted for use in the Cap-and-Trade and Low Carbon Fuel Standard programs as determined appropriate in rulemaking(s) specific to these programs. See more at: https://www.arb.ca.gov/cc/ccs/ccs.htm	
6. Install combined heat and power or trigen	X			Limited implementation		The Scoping Plan set of additional CHP capacity 1613 (2007) created incentives to develop and incentivize the development of CHP. The Governor's Clean Energy Action Plan calls for an additional 2,000 MW of CHP capacity by 2020. The CHP directly supports CHP through the Self Generation Incentive Program (SGIP), which provides a variety of small-scale energy resources including conventional- and re
7. Install energy storage system	X			Comprehensive implementation	The State's three large investor owned utilities (IOUs) are in the process of acquiring 1.325 GW of energy storage as required by AB 2514 (2013). AB 2868 (2016) requires the California Public Utilities Commission (CPUC) to direct the IOUs to accelerate the deployment of distributed energy storage by filing applications for new programs and investments of up to an additional 500 MW to increase the market for energy storage in California.	
8. Install fuel cell power	X			Limited implementation		The State has a Fuel Cell Metering Program to encourage the development of fuel cell electrical generation technologies. The CPUC will achieve GHG reductions through modified and extended programs. https://www.arb.ca.gov
9. Install hydropower	X			Limited implementation		Hydroelectric power is California's electric generation capacity dependent on rainfall. California's electric generation capacity fall into two categories: large hydropower (greater than 100 MW) are called large hydro and small hydro (less than 100 MW) are called small hydro. The Renewables Portfolio Standard (RPS) for October 2016, in-Scope hydro generation capacity includes 4 MW
10. Install microgrids			X	Pilot stage	California Energy Commission (CEC) in collaboration with the CPUC and ISO is developing a Roadmap for the Commercialization of Microgrids in California. This Roadmap will be finalized by the end of 2017.	

11. Install nuclear power		X			NA	
12. Install smart grids			X		Limited implementation	Increasing level of intermittent renewable (e.g. solar PV) has produced challenges for the grid. The current need for IOL Grid technologies. CI Resources Plan underway will guide investment requests. Cases. The DRPs require planning and investment in a way that levels of distributed adoption than traditional processes have p
13. Install solar power (e.g. PV, CSP)	X			Comprehensive implementation	As of October 2016, in-State operating solar thermal capacity was 1300 MW and solar PV capacity was 13,000 MW (includes self-generation). New renewable capacity expected online in 2017 includes 785 MW of solar PV (not including self-generation). On the renewable distributed generation side, SB 1 (2006) provides up to \$3.3 billion in incentives for installation of residential, commercial, and institutional rooftop solar PV systems, with a goal of 3,000 MW of solar capacity and solar PV system on 50% of new homes by 2020. The law includes three programs: (1) California Solar Initiative (CSI) implemented by the CPUC for solar PV system installation on existing residential, existing or new commercial, agricultural, government and non-profit buildings; (2) New Solar Homes Partnership (NSHP) administered by the CEC for installation of solar systems on new residential buildings; and (3) publicly-owned utility (POU) component of the program, requiring the POU to offer financial incentives for solar systems to customers within their service areas. The State has exceeded the 3,000 MW goal with installation of 5,100 MW.	
14. Install geothermal power			X		Limited implementation	As of October 2016, geothermal capacity online in 2017; has projects totaling 360 environmental pe opera
					Wind energy plays an integral role in California's electricity portfolio. In 2016, turbines in land-based wind farms generated nearly 7% of the State's	

15. Install wind power (e.g. onshore, offshore)	X			Comprehensive implementation	<p>gross system power. Additionally, hundreds of homes and farms are using smaller wind turbines to produce electricity. 20 MW of new wind capacity began operating in 2016. In 2017, 132 MW of new wind capacity is expected to come online. Offshore wind power is in the planning and pilot stage. In October 2016, the U.S. Department of Interior's Bureau of Ocean Energy Management (BOEM) and the State of California convened the BOEM California Intergovernmental Renewable Energy Task Force (Task Force), a partnership of federal, state, local agencies and tribal governments, as a forum to provide information to the decision-making process for planning future offshore renewable energy development in federal waters offshore California. The Task Force is currently gathering environmental and use data for the entire coast of California to inform the offshore wind planning process. Initial emphasis for this effort is on the Central Coast region due to current commercial interest by offshore wind developers, readily available existing transmission infrastructure, and viable wind energy resources.</p>
16. Install ocean/tidal/wave power		X		Pilot stage	<p>Economics, environmental impacts, land-use, and grid interconnection constraints have limited how much of this resource can be extracted. Over the years there have been 12 FERC permits and applications for wave and tidal projects in California waters. See more at: http://www.energy.ca.gov/oceanenergy/</p>
17. Measure energy productivity (e.g. GDP per unit of energy)	X			Comprehensive implementation	<p>The U.S. Energy Information Administration provides statistics and analyses: https://www.eia.gov/state/analysis.php?sid=CA</p>
18. Promote demand-side management programs	X			Comprehensive implementation	<p>CPUC oversees programs and market mechanisms to help customer manage their energy use. Customers have a wide range of "distributed energy resources" (DERs) to choose from (e.g., energy efficiency, demand response, customer generation, energy storage, and water-energy conservation). A portfolio of DER solutions is available to customers through programs, tariffs, and procurements run directly by the utility of third-party implementers. In addition, CAISO's energy storage and distributed energy resources (ESDER) initiative is working to lower barriers and enhance the ability of transmission grid-connected DER to participate in</p>

					<p>the CAISO market. The number and diversity of these resources are growing and represent an increasingly important part of the resource mix. Integrating these resources will help lower carbon emissions and add operational flexibility.</p>
19. Reform utility revenue policies and rate structures	X			Comprehensive implementation	<p>In 2013, Assembly Bill 327 was enacted into law to reform residential rates, among other things. The CPUC implemented this law through rulemaking, R.12-06-013, the Residential Rate Reform Order Instituting Rulemaking, which established a regulatory pathway for realigning rates to reflect a number of guiding principles. These principles were outlined in the Assigned Commissioner's Ruling on Residential Rate Reform. In July 2015, Decision D.15.07-001 provided direction to the IOUs regarding specific steps that must be taken to reform the residential rate design structure resulting in an envisioned end-state of default time of use (TOU) rates and an optional two-tier rate. In addition, D.15-07-001 set a course for residential rate reform over the next few years. See more at: http://www.cpuc.ca.gov/General.aspx?id=12154 In 2016, CPUC submitted to the Governor and Legislature a report: Actions to Limit Utility Cost and Rate Increases. The report identifies some of the broader cost categories impacting the California Investor Owned Utilities' revenue requirement, while illustrating a few options for cost reduction (or sales growth) that the CPUC may wish to consider in future proceedings.</p>
20. Replace coal-fired/inefficient power stations	X			Comprehensive implementation	<p>The State continues to implement SB 1368 Regulations Establishing and Implementing a GHG Emission Performance Standard for Local Publicly Owned Electric Utilities which effectively prohibits utilities from making new long term investments in high-GHG emitting resources such as coal.</p>
21. Set energy					<p>CEC has been responsible for reducing the State's electricity and natural gas demand primarily by adopting new Building and Appliance Energy Efficiency Standards that have contributed to keeping per capita electricity consumption relatively low. These standards – coupled with the Energy Commission's programs to reduce energy consumption in existing buildings – are saving consumers money, reducing energy use and</p>

21. Set energy efficiency resource standards (EERS)	X			Comprehensive implementation	GHGs and creating clean energy jobs in California. In addition, SB 350 (2015) directs the CEC, by November 1, 2017, to establish energy efficiency targets that achieve a statewide, energy efficiency targets that achieve a statewide, cumulative doubling of energy efficiency savings in electricity and natural gas final end uses by 2030. In establishing these targets, SB 350 requires CEC to conduct a public process that engages with stakeholders. This public process is being carried out as part of the 2017 Integrated Energy Policy Report proceeding.
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Finance & Economy

	Are you taking this climate action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		
1. Adopt feed in tariff for renewables	X			Comprehensive implementation	The Renewable Market Adjusting Tariff (ReMAT) is a feed-in tariff program for small renewable generators less than 3 MW size. (Small bioenergy generators are procured through the Bioenergy Market Adjusting Tariff). Through the ReMAT program up to 493.6 MW of capacity are available to eligible projects through a fixed-price standard contract to export electricity to California's three large investor owned utilities (IOUs). Electricity generated as part of the ReMAT program counts towards the utilities' RPS targets. The ReMAT Program replaced the AB 1 Feed-in Tariff Program in 2013. For more information, visit http://www.cpuc.ca.gov/feedintariff/
2. Adopt reverse auction for renewables	X			Comprehensive implementation	Renewable Auction Mechanism Program: http://cpuc.ca.gov/Renewable_Auction_Mechanism/
3. Enable PACE (long term property tax based loans) financing	X			Comprehensive implementation	Property Assessed Clean Energy Programs: http://energycenter.org/policy/property-assessed-clean-energy/pace#PACE-FAQs
4. Establish GHG trading program	X			Comprehensive implementation	Cap-and-Trade Program: http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm
5. Increase awareness/engage public on financing mechanisms and incentives for energy efficiency/clean energy	X			Comprehensive implementation	The California Energy Commission increases awareness and engages the public on financing and incentive opportunities for clean, efficient energy with a host of resources including web fact sheets, tools, and public workshops.
					The California Energy Commission's Energy Research and Development program includes the Electric Program Investment Charge (EPIC) Program, and Natural Gas Research and Development Program. The Energy Commission's energy efficiency R&D focuses on technologies, tools, and strategies.

6. Invest in clean tech R&D	X			Comprehensive implementation	<p>maximize the efficiency of existing buildings and new construction, such as zero net energy buildings, and process improvements for the industrial, agriculture and water sectors.</p> <p>Learn more at: http://database.aceee.org/state/california#sthash.j7UcgPxB.d Scoping Plan, page 140: "The State will need to continue to coordinate and utilize funding sources, such as the Greenhouse Gas Reduction Fund (Cap-and-Trade auction proceeds), the Alternative and Renewable Fuel and Vehicle Technology Program (AB 118), Electric Program Investment Charge (EPIC) Program, Carl Moyer Program, Air Quality Improvement Program, and Proposition 39 to expand clean energy investments in California and further reduce GHG and criteria emissions. Additionally, programs including the Bioenergy Feed-In Tariff, created by Senate Bill 1122 (Rubio, Chapter 612 Statutes of 2012), Low Carbon Fuel Standard, Cap-and-Trade Self-Generation Incentive Program, Federal Renewable Fuel Standard, utility incentives pursuant to Assembly Bill 1900 (Gatto, Chapter 602, Statutes of 2012), and others provide important market signals and potential revenue streams to support projects to reduce GHG emissions."</p>
7. Issue green bonds	X			Comprehensive implementation	<p>Green bond issuance is growing in the State. California is determined to boost green bond issuance and acceptance. The challenge is to find a way to make bonds equally attractive to investors and environmentalists. In January 2017, the California State Treasurer released a report on growing the green bond market. For more information, visit: http://treasurer.ca.gov/greenbonds/publications/reports/1.pdf</p>
8. Promote on-bill financing	X			Pilot stage	<p>The California Public Utilities Commission has approved pilot on-bill repayment programs in the past: http://www.caleefinance.com/wp-content/uploads/2013/09/D1309044-FINAL-EE-Fin-decision.pdf</p>
9. Provide green mortgages	X			Comprehensive implementation	<p>Property assessed clean energy, or PACE, financing allows property owners to fund energy efficiency, water efficiency and renewable energy projects with little or no up-front costs. With PACE, residential and commercial property owners living within a participating district can finance up to 100% of their project and pay it back over time as a voluntary property tax assessment through their existing property tax bill. See more at: http://energycenter.org/policy/property-assessed-clean-energy/pace#PACE-FAQs</p>
10. Provide loans/guarantees for energy efficiency/clean energy	X			Comprehensive implementation	<p>Energy Efficiency Financing: http://www.energy.ca.gov/efficiency/financing/</p>
11. Provide tax incentives for clean energy	X			Limited implementation	
12. Support clean tech clusters	X			Limited implementation	

13. Support clean tech companies	X				Limited implementation
14. Support green manufacturing	X			Comprehensive implementation	The State Treasurer's Office serves as California's Green Bank. The California State Treasurer promotes California-based manufacturing and reduces greenhouse gases, air pollution, water pollution and energy consumption by providing financial assistance – in the form of a sales and use tax exclusion – for certain alternative energy, manufacturing and advanced transportation projects. For more information, visit: http://www.treasurer.ca.gov/greenbank/
15. Tax GHG emissions		X			NA

Whoops! It seems there was a reporting value mismatch.

Governance

	Are you taking this climate action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		
1. Collaborate with cities/local governments in reducing emissions/increasing resilience	X			Comprehensive implementation	The California Air Pollution Control Officers Association association of the air pollution control officers from all 35 agencies throughout California. CAPCOA was formed in clean air and to provide a forum for sharing of knowledge, information among the air quality regulatory agencies around the state. Association promotes unity and efficiency, and strives for consistency in methods and practices of air pollution control. For more information, visit: http://www.capcoa.org/abc
2. Collaborate with national governments in reducing emissions/increasing resilience	X			Comprehensive implementation	California collaborates with various national governments on climate change efforts. Some of these efforts are described below. China: In 2012, Governor Edmund G. Brown, Jr., signed a Memorandum of Understanding (MOU) with the Chinese National Development and Reform Commission (NDRC), which oversees China's efforts to address climate change as part of the government's economic strategy. This MOU was renewed in 2014 for a four-year term. This MOU was a first-of-its-kind agreement between the Chinese national government and a subnational entity. Pursuant to the MOU, CARB has held many meetings with officials responsible for the design of both China's provincial pilot emissions trading system and the national emissions trading system. Mexico: In July 2011, Governor Edmund G. Brown, Jr., and Mexico's Ministry of Natural Resources (SEMARNAT) Undersecretary Rodolfo Salazar signed the MOU to Enhance Cooperation on Climate Change with the Mexican Forestry Commission (CONAFOR) General Director Jorge Rodríguez. CARB leads the California-Mexico MOU's Working Group on Climate Change, and staff meets regularly by phone with counterparts from SEMARNAT and CONAFOR. The focus of the Working Group has been to exchange information on topics such as emissions trading, reporting, and verification of GHG emissions data, Cap-and-trade design issues, and forestry-related climate efforts. Others: CARB also exchanges information with many other national governments on climate change mitigation programs, Cap-and-Trade and other climate change mitigation programs, bilateral MOUs and the multilateral Under2 MOU, International Carbon Action Partnership, and Partners for Climate Readiness.
3. Collaborate with other states/regions in reducing emissions/increasing resilience	X			Comprehensive implementation	California has established joint implementation of cap-and-trade with Québec and Ontario to reduce greenhouse gas emissions with Québec and Ontario. CARB continues to discuss joint implementation with additional provinces.
4. Support businesses in reducing emissions/increasing resilience	X			Comprehensive implementation	California Climate Investments: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/auctionproceeds.htm

Whoops! It seems there was a reporting value mismatch.

Industry

	Are you taking this climate action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		

1. Improve energy efficiency of industrial processes

X

Limited implementation

2. Promote industrial symbiosis/industrial ecology programs			X	Pilot stage	<p>CalRecycle has developed an EPR Framework and Checklists to guide statutory proposals that would allow CalRecycle and other stakeholders to implement product stewardship programs. Over the years, CalRecycle's predecessor, the California Integrated Waste Management Board, engaged in a variety of program activities concerning products and their impact on the environment. These efforts continue as CalRecycle seeks a comprehensive approach for advancing EPR, building upon the efforts elsewhere in the world. See more at: http://www.calrecycle.ca.gov/epr/</p>
3. Promote reduced packaging	X			Comprehensive implementation	<p>Environmentally Preferable Purchasing (EPP): http://www.calrecycle.ca.gov/EPP/ Ban on Single-Use Carryout Bags (SB 270 / Proposition 67): http://www.calrecycle.ca.gov/plastics/carryoutbags/FAQ.htm</p>
4. Tax GHG-heavy industrial fuel consumption	X			Comprehensive implementation	<p>AB 32 authorized ARB to adopt a schedule of fees, known as the AB 32 Cost of Implementation Fee Regulation, to be paid by sources of GHG emissions. These fees are used to fund costs directly related to state agencies' development, administration, and implementation of AB 32 programs that reduce GHG emissions.</p>

Whoops! It seems there was a reporting value mismatch.

Land use sector

	Are you taking this climate action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		
1. Establish GHG reduction plan for LULUCF (e.g. REDD+, etc.)			X	Pilot stage	The Scoping Plan describes a broader goal of promoting infill and reducing natural land conversion. A Natural & Working Lands Action Plan will be developed for 2018.
2. Establish guidelines for siting renewable power					The 2017 Proposed Scoping Plan Update mentions this as a possibility (page 123).
					The Sustainable Agricultural Lands Conservation Program (SALC Program) is a component of the Strategic Growth Council's Affordable Housing and Sustainability Program (AHSC). The AHSC, administered by the Strategic Growth Council, aims "to reduce greenhouse gas emissions through project that implement

3. Promote conservation efforts for natural areas	X			Limited implementation		<p>land use, housing, transportation, and agricultural land preservation practices to support infill and compact development..." The SALC Program complements investments made in urban areas with the purchase of agricultural conservation easements, development of agricultural land strategy plans, and other mechanisms that result in GHG reductions and a more resilient agricultural sector. In future years, the SALC Program is proposed to support farm-scale conservation management practices that further promote reductions in GHG emissions and increases in soil carbon sequestration.</p>
4. Promote sustainable coastal ecosystem management	X			Comprehensive implementation	<p>The Coastal Conservancy's Climate Ready Program provides a focus for our work to protect important coastal resources and habitats from the current and future impacts of climate change. The Conservancy is collaborating with local partners and other agencies to reduce greenhouse gas emissions and prepare communities along the coast and within the San Francisco Bay for climate change. SB 1066 (Lieu) effective January 1, 2013 gave the Coastal Conservancy explicit authority to work with its partners on projects to address the effects of climate change on coastal resources along the coast and within the San Francisco Bay Area. The Conservancy has released the announcement for the next round of grants for the Climate Ready Program. Climate Ready Grant Round 4 will offer technical assistance to help vulnerable communities develop Climate Ready Projects. Applications are due June 30, 2017. See more at: http://scc.ca.gov/2013/04/24/climate-ready-program/</p>	
					<p>The California Forest Carbon Plan seeks to reverse negative climate change trends and firmly establish California's forests as a more</p>	

5. Promote sustainable forest management	X			Pilot stage	resilient and reliable long-term carbon sink, rather than a GHG and black carbon emission source. The Plan provides multiple strategies to promote healthy wildland and urban forests that protect and enhance forest carbon and the broader range of ecosystem services for all forests in California. It emphasizes working collaboratively at the watershed or landscape scale to restore resilience to all forestlands in the state. The FCP is available at: http://www.fire.ca.gov/fcat/
6. Undertake environmental impact assessment	X			Comprehensive implementation	The Scoping Plan mentions this as a possibility (page 123). The Scoping Plan has an environmental assessment, and land use projects are generally subject to CEQA and NEPA.

Whoops! It seems there was a reporting value mismatch.

Transport

	Are you taking this climate action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		
1. Mass Transit: Adopt bus rapid transit	X			Comprehensive implementation	Caltrans' Deputy Directive 98 Integrating Bus Rapid Transit and the Department's Policy on Bus Rapid Transit Imp (DP-27) show the Department's commitment to improve in the state. Along with the Director's Policy and Deputy Handbook provides guidance and direction to support that will benefit the Department, local governments, and private sector businesses in improving mobility in the information, visit: http://www.dot.ca.gov/hq/MassTransit Transit and Intercity Rail Capital Program, projects eligible Greenhouse Gas Reduction Fund include Bus rapid transit ferry transit investments to increase ridership and reduce emissions.
2. Mass Transit: Adopt high speed rail	X			Comprehensive implementation	Through the Greenhouse Gas Reduction Fund, \$800 million to date for High Speed Rail to support the planning, design, right-of-way acquisition of the initial operating https://www.arb.ca.gov/cc/capandtrade/auctionproceeds For more information, visit: http://hsr.ca
3. Mass Transit: Improve bus services				Comprehensive	The Low Carbon Transit Operations Program (LCTO) programs that are part of the Transit, Affordable Housing Communities Program established by the California Legislature Senate Bill 862. The LCTOP was created to provide assistance for transit agencies to reduce greenhouse gas emissions, improve mobility, with a priority on serving disadvantaged communities. Approved projects in LCTOP will support new or expanded services, expand intermodal transit facilities, and may include acquisition, fueling, maintenance and other costs to operate facilities, with each project reducing greenhouse gas emissions. to date has been funded to this program from the Greenhouse Gas Reduction Fund: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds

(e.g. increase routes, improve stops, reduce fares, etc.)	X			Comprehensive implementation	<p>The Transit and Intercity Rail Capital Program (TIRCP) the Greenhouse Gas Reduction Fund to fund transit improvements that will modernize California's intercity, rail systems, and bus and ferry transit systems to reduce greenhouse gases by reducing congestion and vehicle idling throughout California. For more information visit: http://www.dot.ca.gov/drm/sptirpc.html The LCTOP will provide operating and capital assistance for transit agencies to reduce greenhouse gas emission and improve mobility, with a priority on serving disadvantaged communities. Approved projects in LCTOP will support bus, light rail or rail services, expand intermodal transit facilities, equipment acquisition, fueling, maintenance and other transit services or facilities, with each project reducing greenhouse gas emissions. For more information visit: http://www.dot.ca.gov/d</p>
4. Mass Transit: Improve fuel efficiency of trains (e.g. efficient engines, regenerative braking, energy storage, etc.)			X	Pilot stage	<p>CARB submitted a petition to U.S. Environmental Protection Agency for national locomotive emission standards for significant air pollutants, criteria and toxic pollutants and greenhouse gas emissions from diesel locomotives (aftertreatment, on-board battery technology, and incentive for zero emission locomotives). The petition requests new standards to reduce toxic and criteria emissions from diesel locomotives and remanufacture (based on aftertreatment). ARB staff are reviewing the petition. The Environmental Protection Agency could require manufacturers to meet the new locomotive emission regulations by as early as 2020 for remanufactures and 2025 for newly manufactured locomotives. For more information, visit: https://www.arb.ca.gov/railyard/railyard.htm The California Climate Change Plan aims to "Accelerate use of clean vehicle and equipment and fuels of freight through targeted introduction of zero emission (ZE/NZE) technologies, and continued development of clean fuels" (page 102).</p>
5. Mass Transit: Improve metro services (e.g. increase routes, improve stations, reduce fares, etc.)	X				<p>Limited implementation</p>

6. Mass Transit: Improve rail services (e.g. increase routes, improve stations, reduce fares, etc.)			X	Pilot stage	Caltrans is beginning work on its new 2018 Rail Plan, an innovative framework for California's rail network, and to provide better rail and community connections in the State and beyond. See more at: http://www.dot.ca.gov
7. Mass Transit: Promote smart logistics (e.g. real-time information)			X	Pilot stage	As discussed in the California Sustainable Freight Action Plan, California agencies are working with stakeholders to conduct pilot projects, one being the Advanced Technology for Trucks (ATF Trucks, California). The goal of this pilot project is to work with manufacturers of new technologies that increase efficiencies and encourage the use of zero emission vehicles on primary freight corridors. MTC is exploring options for intelligent transportation systems, including autonomous vehicles technologies, collaborative logistics, and incentives for zero and near-zero emission trucks. The project will explore freight signal priority, traveler information systems, and intelligent systems infrastructure on arterial roads, as well as intelligent management on highways.
8. Mass Transit: Switch freight from trucks to rail			X	Pilot stage	California supports rail projects that address emissions reduction. The California Sustainable Freight Action Plan discusses ways to improve operational efficiency through practices such as handling international containers at on-dock rail facilities, use of intermodal slots, and slotted scheduling in shared-use corridors. Support will be provided with Class 1 railroads and seaports to develop on-dock rail facilities with terminals with advanced technology to reduce truck trips (page C-27). The California Sustainable Freight Action Plan also discusses various means to improve fuel efficiency and reduce emissions, including from zero/near-zero emission vehicle technology to
9. Private Transport: Increase awareness/engage public on private transport measures	X			Comprehensive implementation	SB 375 (2008) requires broad public stakeholder engagement and the required regional transportation and land use
10. Private Transport: Install electric vehicle charging infrastructure (i.e. home, work, highways, etc.)	X			Comprehensive implementation	The California Energy Commission provides money for California Energy Commission's Alternative and Renewable Technology Program (ARTP). The program is a competitive grant program that provides as much as \$100 million annually towards innovative transportation technologies that help California meet its energy, climate change goals. In 2014, the Energy Commission approved more than \$5 million to install 475 electric vehicle charging stations throughout California, including the cities of San Francisco and San Diego and the counties of Ventura, Santa Barbara, Orange, Riverside and Los Angeles. For more information, visit http://www.energy.ca.gov/drive/
11. Private Transport: Promote alternative fuel production (e.g.	X			Comprehensive implementation	California's Low Carbon Fuel Standard is designed to encourage the production of cleaner low-carbon fuels in California, encourage the use of alternative fuels, and therefore, reduce greenhouse gas emissions. The standard is expressed in terms of the "carbon intensity" (CI) of gasoline and their respective substitutes. The LCFS is performance-based, allowing the market to determine how the carbon intensity of California's transportation fuels will be reduced. For more

biofuels, natural gas, hydrogen, etc.)				implementation	California's transportation fuels will be reduced. For more information, visit: https://www.arb.ca.gov/fuels/lcfs/lcfs.htm The Alternative Regulation is intended to create a framework for these 10 times lower polluting, diesel fuel substitutes to enter the California, while mitigating any potential environmental impacts. For more information, visit: https://www.arb.ca.gov/fuels/lcfs/lcfs.htm
12. Private Transport: Set/strengthen fuel economy standards for cars/trucks			X	Comprehensive implementation	California is committed to increasing the use of cleaner fuels as well as their efficiency. The California Air Resources Board is committed to continue with the vehicle greenhouse gas emission reduction program for cars and light trucks sold in California by 2025. The U.S. Corporate Average Fuel Economy (CAFE) program reduce energy consumption by increasing the fuel economy for cars and light trucks. The National Highway Traffic Safety Administration is committed to increase CAFE levels rapidly over the next several years to improve our nation's energy security and save consumers money. For more information, visit: https://www.nhtsa.gov/laws-regs/average-fuel-economy
13. Private Transport: Set GHG emissions standards	X			Comprehensive implementation	SB 375 (2008) Regional Targets require percent reduction in greenhouse gas emissions from passenger vehicles relative to 2005 emissions. For more information, visit: https://www.arb.ca.gov/qa/ghg/ghg.htm State's 18 MPOs.
14. Private Transport: Set low-carbon fuel standard	X			Comprehensive implementation	California's Low Carbon Fuel Standard is designed to encourage the use of cleaner low-carbon fuels in California, encourage the use of cleaner fuels, and therefore, reduce greenhouse gas emissions. The LCFS is expressed in terms of the "carbon intensity" (CI) of gasoline and their respective substitutes. The LCFS is performance-based, allowing the market to determine how the carbon intensity of California's transportation fuels will be reduced. For more information, visit: https://www.arb.ca.gov/fuels/lcfs/lcfs.html
15. Private Transport: Set manufacturing requirements (e.g. zero-emission vehicle standard)	X			Comprehensive implementation	1.5 million zero-emission vehicles on California roadways by 2025 for in the ZEV Action Plan (2016). For more information, visit: https://www.gov.ca.gov/docs/2016_ZEV_Action_Plan.pdf
16. Private Transport: Switch to electric/hybrid vehicles in cars/taxis/government fleets	X			Comprehensive implementation	1.5 million zero-emission vehicles on California roadways by 2025 for in the ZEV Action Plan (2016). For more information, visit: https://www.gov.ca.gov/docs/2016_ZEV_Action_Plan.pdf The Center for Sustainable Energy for the California Air Resources Board (Increased Incentives for Public Fleets in Disadvantaged Communities Fleet Pilot Project) offers up to \$15,000 in rebates for the purchase of eligible zero-emission and plug-in hybrid light-duty vehicles. The Fleet Pilot Project replaces standard CVRP rebates with incentives for public agencies operating in California's most vulnerable and disadvantaged communities. For more information, visit: https://cleanvehiclerebate.org/eng/p/
17. Private Transport: Switch to other lower-carbon fuel in cars/taxis/government fleets (e.g. biofuels, hydrogen, etc.)	X			Comprehensive implementation	Assembly Bill 692, commencing January 1, 2017, would require, at least 3% of the aggregate amount of bulk purchases of transportation fuel by the State government to be procured from alternative transportation fuel sources. The bill would require, except as otherwise provided, the percentage to be increased by 1% each year thereafter. The bill would require the Department of General Services to submit a progress report to the Legislature.

Whoops! It seems there was a reporting value mismatch.

Waste

Are you taking this	If yes, what is the scale
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	Is the action a climate action?			Level of its implementation?	Short action description
	Yes	No	Planned		
1. Adopt source separation policies (e.g. collection for dry recyclables, organic compostable waste, etc.)	X			Comprehensive implementation	CalRecycle's SB 1826: Mandatory Commercial Organic's Recycling. CalRecycle's SB 1383: 20% edible food recovery and 75% organics recycling goal by 2025.
2. Establish waste reduction/recycling plan	X			Comprehensive implementation	CalRecycle AB 341 75% Waste Diversion Goal by 2020. The Short-Lived Climate Pollutant Strategy recommends waste reduction to meet landfill methane goals: https://www.arb.ca.gov/cc/shortlived/shortlived.htm CalRecycle's SB 1383 20% edible food recovery and 75% organics recycling goal by 2025.
3. Increase awareness/engage public on waste reduction/recycling measures			X		Limited implementation
4. Install advanced thermal treatment/waste to energy		X			Not required, but some companies are taking this action: http://altamontlandfill.wm.com/green-energy/index.jsp
5. Install anaerobic digestion			X		Limited implementation
6. Install landfill gas management/landfill gas to energy	X			Comprehensive implementation	Landfill Methane Regulation: https://www.arb.ca.gov/cc/landfills/landfills.htm Per SB 840, CPUC is evaluating siloxane and higher heating values of biogas (including landfill gas) for the purpose of pipeline injection.
7. Install mechanical biological treatment	X			Comprehensive implementation	SB 1826, CalRecycle's Mandatory Commercial Organic's Recycling: http://www.calrecycle.ca.gov/recycle/commercial/organics/ SB 1383: CalRecycle's initiative for 20% edible food recovery and 75% organics recycling goal by 2025.
8. Install municipal recycling points or centers (for residents or businesses)	X			Comprehensive implementation	SB 1826, CalRecycle's Mandatory Commercial Organic's Recycling: http://www.calrecycle.ca.gov/recycle/commercial/organics/ Per SB 1383, CalRecycle is implementing a goal of 20% edible food recovery and 75% organics recycling goal by 2025.
9. Install waste heat recovery	X				Limited implementation

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Whoops! It seems there was a reporting value mismatch.

Water

	Are you taking this climate action?			If yes, what is the scale of its implementation?	Short action description
	Yes	No	Planned		
1. Adopt wastewater to energy initiatives (e.g. methane recovery for reuse)	X			Limited implementation	The Bioenergy Market Adjustment Act requires the State's investor owned utilities to develop and implement 250 MW of renewable energy projects that could be completed by 2013 in three feedstock categories: (1) municipal solid waste treatment, municipal organic waste codigestion; (2) dairy and crop waste; and (3) sustainable forest management. The Act also requires the utilities to generate energy from agricultural waste for its own use and export to the grid. The exported energy will be sold to the grid.
2. Install smart water meters	X			Pilot stage	Some cities are taking this initiative, such as San Francisco. CPUC's Advanced Metering Initiative works with smart meters to monitor energy use. CPUC issued a decision on June 9, 2016, approving pilot programs by Pacific Gas and Electric Company (PG&E), Southern California Gas Company (SoCalGas) and Southern California Edison Company to test the impact of joint delivery of energy and water data to customers via Advanced Metering Infrastructure (AMI) on energy and water saving behaviors. For more information visit: http://www.cpuc.ca.gov/General.aspx?id=4850
3. Promote water recycling or reclamation			X	Limited implementation	The State has adopted a Reclamation Act of surface waters and groundwater. The Act requires the use of recycled water at industrial water conservation projects. The Act also requires water for potable water use. For more information visit: www.swrcb.ca.gov/water_is . Per AB 2282, the State is implementing new standards for installation of water recycling systems for newly constructed single-family and non-residential buildings. For more information visit: www.bsc.ca.gov/calend . The Act also provides assistance in the form of grants to help businesses reduce greenhouse gas emissions from agricultural operations. For more information visit: https://www.

Whoops! It seems there was a reporting value mismatch.

2.3: If you have any additional documents regarding your targets and climate actions, please upload them here.

5. 2. Targets and climate actions

2.4: Do you measure your region-wide SLCPs (i.e. black carbon, CH4, O3, HFCs)?

Yes

2.4a: Please detail which region-wide SLCPs you measure.

Black carbon and co-emitted pollutants

Methane (CH4)

Hydrofluorocarbons (HFCs)

2.5: Have you conducted an environmental assessment of the effects of your region-wide SLCPs?

Yes

2.6: Have you conducted an economic assessment of measures to mitigate your region-wide SLCPs?

Yes

2.7: Do you have a region-wide plan to reduce SLCPs?

Yes

2.7a: Please detail the scale of the plan's implementation.

Comprehensive implementation

2.7b: Is your region-wide plan to reduce SLCPs integrated into your broader region-wide mitigation policies and/or climate action strategy?

Yes

2.7c: Please comment on the plan, detailing any progress towards achieving the plan's objectives and its level of integration within your broader region-wide mitigation policies and/or climate action strategy.

SB 605 directed CARB to develop a comprehensive Short-Lived Climate Pollutant Strategy, in coordination with other State agencies and local air quality management and air pollution control districts to reduce emissions of SLCPs. SB 1383 directed the Board to approve and begin implementing the plan by January 1, 2018, and set statewide 2030 emission reduction targets for methane, fluorinated gases, and black carbon. The SLCP Reduction Strategy was approved in March 2017. SB 1383 also included a number of directives for addressing dairy and livestock sector methane emissions and landfill methane emissions via diversion of organic material from the waste stream. More information can be found at: <https://www.arb.ca.gov/cc/shortlived/shortlived.htm>

2.7d: Please briefly detail why you do not have a plan to reduce your region-wide SLCPs.

2.8: Please upload or link to any assessments or plans regarding your region-wide SLCPs.

[final_slcp_report.pdf](#)

Comments:

6. 3. Emissions - Region-wide

3.1: Please provide the dates for the accounting year or 12-month period of your region-wide GHG emissions inventory. *

Date from

01/01/2015

Date to

12/31/2015

3.2: Please select the category that best describes the boundary of your region-wide GHG emissions inventory. *

Boundary options

Geopolitical Boundary—physical areas over which your government has jurisdictional control

If other, please provide a comment

NA

3.3: Please select the name of the primary protocol, standard, or methodology you have used to calculate GHG emissions. *

Primary protocol

2006 IPCC Guidelines for National Greenhouse Gas Inventories

If "Other", please detail here

NA

3.4: Please explain your methodology (including use of additional protocols), methods of calculation (including how you account for emissions from electricity imported into your territory) and processes for data collection. *

The California GHG inventory follows the IPCC guidelines for emission inventories. The guidelines describe various methodologies to estimate emissions and allow for use of State-specific data and methodologies. Data collected through California's Mandatory Reporting of Greenhouse Gas Emissions (MRR) program provides third-party verified fuel through-put and emissions data at the facility- and entity-level. For other emission sources not subject to MRR, California Air Resources Board (CARB) draws data from various State and federal government agencies in estimating emissions.

3.5: Has the GHG emissions data you have reported been externally verified either fully or in part? *

Yes

3.5a: Please provide any other relevant information about the emission verification process, such as the verification standard or organisation, and whether the verification applies to all or just a section of your reported emissions. *

Name of verifier

CARB-accredited third party verifiers

Year of verification

2015

Comment

Approximately three quarters of the greenhouse gas emissions data are reported to CARB pursuant to California's MRR. Entities subject to MRR reporting that exceed the 25,000 metric tons of CO₂e threshold must have their annual emissions report verified by an CARB-accredited third-party verifier. CARB's accreditation and verification programs follow ISO standards for accreditation and verification.

3.5b: Please describe why not and your future plans to verify your emissions, if any. *

7. 3. Emissions - Region-wide

3.6: Please select which gases are included in your region-wide GHG emissions inventory. *

CO2 (Carbon dioxide)
 CH4 (Methane)
 N2O (Nitrous oxide)
 HFCs (Hydrofluorocarbons)
 PFCs (Perfluorocarbons)
 SF6 (Sulfur hexfluoride)
 NF3 (Nitrogen trifluoride)

3.7: Please provide your total region-wide GHG emissions and indicate if your emissions have changed since your last reported year. *

	GHG emissions (metric tonnes of CO2e)	Comment on emissions total	Change in emissions total from last reported year	Comment on any change in emissions total
Gross total (exclude sinks)	440,356,275	2015 emissions	Decreased	Emissions in 2015 decreased by 1.5 million metric tonnes of CO2e since 2014.
Net total (excludes sinks)				Sinks have not been quantified.
Target total (if different from Gross or Net)				

3.8: As you selected 1996 IPCC Guidelines for National Greenhouse Gas Inventories in 3.3: Please provide a breakdown of emissions by sector as defined in the 1996 IPCC Guidelines for National Greenhouse Gas Inventories. *

	Emissions (metric tonnes CO2e)	Comments
Energy (total)		
Energy (mobile combustion only)		
Industrial processes		
Solvents		
Land-use, land-use change and forestry		
Agriculture		
Waste		

3.8: As you selected 2006 IPCC Guidelines for National Greenhouse Gas Inventories in 3.3: Please provide a breakdown of emissions by sector as defined in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. *

	Emissions (metric tonnes CO2e)	Comments
Energy (total)	365,559,248	Sum of emissions under IPCC level 1 category "Energy." It includes fuel combustion emissions and fugitive emissions associated with fuels in all economic sectors.
Energy (mobile combustion only)	163,639,277	Sum of emissions under IPCC category "1A3- Energy: Transport."
Industrial processes and product use	32,493,511	Sum of emissions under IPCC level 1 category "Industrial Processes and Product Use."
Agriculture, forestry, and other land-use	31,676,129	Sum of emissions under IPCC level 1 category "Agriculture, Forestry, and Other Land Use."
Waste	10,627,388	Sum of emissions under IPCC level 1 category "Waste."
Other (indirect N2O and other)	0	All emissions are categorized into the above 4 categories. Indirect N2O emissions from fertilizer use and manure application are accounted in the "Agriculture, Forestry, and Other Land-Use" category.

3.8: As you selected Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC), (WRI, C40 and ICLEI) in 3.3: Please provide a summary of emissions by sector and scope as defined in the Global Protocol for Community GHG Emissions Inventories. *

	Emissions (metric tonnes CO2e)
Stationary Energy: energy use – Scope 1 (I.X.1)	
Stationary Energy: energy use – Scope 2 (I.X.2)	
Stationary Energy: energy use – Scope 3 (I.X.3)	
Stationary Energy: energy generation supplied to the grid – Scope 1 (I.4.4)	
Transportation – Scope 1 (II.X.1)	
Transportation – Scope 2 (II.X.2)	
Transportation – Scope 3 (II.X.3)	
Waste: waste generated within the city boundary – Scope 1 (III.X.1)	
Waste: waste generated within the city boundary – Scope 3 (III.X.2)	
Waste: waste generated outside the city boundary – Scope 1 (III.X.3)	
Industrial Processes and Product Use – scope 1 (IV)	
Agriculture, Forestry and Land Use – Scope 1 (V)	
TOTAL Scope 1 (Territorial emissions)	
TOTAL BASIC emissions	
TOTAL BASIC and BASIC+ emissions	

3.8: Please provide a breakdown of your total emissions by end user (buildings, water, waste, transport), economic sector (transportation, industrial, commercial and residential, agriculture, electricity), greenhouse gas (CO2, CH4, N2O, etc) or any

other classification system used in your region. *

End user / Economic sector / GHG / Other

Emissions (metric tonnes CO2e)

Comments

3.8a: Please upload a historical record(s) of your region-wide GHG emissions inventory. *

Comments:

3.8a: Please provide a breakdown of fuel use and emissions by subsector and scope as defined in the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), (WRI, C40 and ICLEI) and attach GHG emissions report.

Comments:

3.8a: Please upload a historical record(s) of your region-wide GHG emissions inventory. *

[California_Electricity_Data_2012-2015.xlsx](#)

Comments: The spreadsheet is California's electricity data for 2012-2015. California's detailed GHG inventory data, methodology, and documentations are available at: <http://www.arb.ca.gov/cc/inventory/inventory.html>

3.9: Does your region-wide GHG emissions inventory break emissions down into Scope 1, 2 and 3?

No

3.9a: Please provide your Scope 1, 2 and 3 emissions.

Scope 1 emissions (metric tonnes of CO2e)

Scope 2 emissions (metric tonnes of CO2e)

Scope 3 emissions (metric tonnes of CO2e)

8. 3. Emissions - Region-wide

3.10 Please detail your region-wide electricity consumption, generation and imports, and the associated GHG emissions. *

	Amount of electricity	Units	Associated emissions (metric tonnes of CO2e)	Comments
Electricity consumed	300,546	GWh	83,671,114	Electricity consumed includes electricity generated by power plants within California and electricity imported from sources outside of California. The GWh number excludes exports and electricity lost to transmission and distribution; and therefore, it does not equal the sum of "electricity generated" and "electricity imported."
Electricity produced	202,853	GWh	49,933,696	Electricity generated by sources within California includes those not transacted through the electricity grid (e.g., rooftop solar, on-site generation for on-site use, and cogeneration emissions attributed to electricity). The GWh number includes renewables; the CO2e number excludes biogenic CO2 emissions, consistent with the IPCC Guidelines. The numbers include electricity generated in-state but sold to out-of-state users.
Electricity imported	103,973	GWh	33,737,418	The GWh number includes renewables; the CO2e number excludes biogenic CO2 emissions, consistent with the IPCC Guidelines.

3.11: Please detail the energy mix of your region-wide electricity generation (%). *

Coal : 0.1
 Natural gas : 57.6
 Oil : 0.8
 Nuclear : 9.1
 Biomass : 3.3
 Geothermal : 5.9
 Hydro : 5.7
 Solar : 10.3
 Wind : 6

Comments: The energy mix information reported above represents electricity generated by California facilities. The energy mix of total electricity consumed by California, including imported electricity, would be different from the information reported above.

9. 4. Emissions - Government operations

4.1: Please provide the dates of the accounting year or 12-month period for which you are reporting a GHG emissions inventory for your government's emissions.

Date from

01/01/2016

Date to

12/31/2016

4.2: Please select the category that best describes the boundary of your government's GHG emissions inventory.

Boundary options

Departments, entities or companies over which operational control is exercised

If other, please provide a comment

4.3: Please indicate which of the following sources of emissions are included in your government's GHG emissions inventory.

Source of emissions

Buildings

Status

Included

If other, please provide a comment

Source of emissions

Vehicle fleet

Status

Included

If other, please provide a comment

4.4: Please give the name of the primary protocol, standard, or methodology you have used to calculate your government's GHG emissions.

Primary protocol

Local Government Operations Protocol (ICLEI/The Climate Registry/California Climate Action Registry/ California Air Resources Board)

Please provide a description of how the methodology is used.

All agencies use Operational Control methodology according to The Climate Registry's General Reporting Protocol 2.0.

4.5: Has the GHG emissions data you have reported here been externally verified either fully or in part?

No

4.5a: Please provide any other relevant information about the emission verification process, such as the verification standard or organisation, and whether the verification applies to all or just a section of your reported emissions.

Name of verifier

Year of verification

Comments

4.5b: Please describe why not and your future plans to verify emissions, if any.

We have internal data quality checks in place for all government departments that report GHG emissions. We may verify emissions in the future as more verification options become available.

10. 4. Emissions - Government operations

4.6: Please select which gases are included in your government's GHG emissions inventory.

- CO2 (Carbon dioxide)
- CH4 (Methane)
- N2O (Nitrous oxide)

4.7: Please provide total emissions (Scopes 1 and 2) for your government, and indicate if your emissions have changed since your last reported year.

	Total emissions (metric tonnes CO2e)	Comment on total emissions	Change in total emissions from last reported year	Comment on any change in total emissions
Total emissions (Scopes 1 & 2)	1,956,175		Increased	
Total emissions (Scope 1 only)	627,496		Decreased	
Total emissions (Scope 2 only)	1,328,679		Increased	

4.8: Where it will facilitate a greater understanding of your government emissions, please provide a breakdown of these emissions by department, facility, source, GHG or by any other classification system used by your government.

Department / Facility / Source / Fuel / Other

Scope

Emissions (metric tonnes CO2e)

4.9: Do you measure Scope 3 emissions?

No

4.9a: Please complete the below:

Source of Scope 3 emissions

Emissions (metric tonnes of CO2e)

Comments

4.9b: Please describe why not and your future plans to measure Scope 3 emissions in the future, if any.

Comments
Currently, there is no Protocol for reporting Scope 3 emissions.

11. 4. Emissions - Government operations

4.10: Please detail your government's electricity consumption, and the GHG emissions associated with these activities.

	Amount of electricity	Units	Associated GHG emissions (metric tonnes of CO2e)	Comments
Electricity consumed	5150000	MWh	1,328,679	https://www.epa.gov/sites/production/files/2017-02/documents/egrid2014_ghgoutputrates_v2.pdf

4.11: Please detail the energy mix of your government's electricity consumption (%).

Coal : 0

Comments: U.S. EPA eGrid subregion CAMX WECC California is used to report emissions from purchased electricity. Information on the mix of State electricity consumption is not currently available.

12. 5. Risks and adaptation

5.1: Do current and/or anticipated impacts of climate change present significant physical risks to your region? ^

Yes

5.1a: Please describe these current and/or anticipated impacts of climate change. ^

Climate change impact

More hot days

Impact seriousness

Extremely serious

Anticipated timescale

Current

Impact description

California and the world's climate are changing, posing an escalated threat to health, well-being, nature, and property. Extreme weather, rising sea levels, shifting snowpack, among other impacts will touch every part of peoples' lives in the next century. The state has already seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season and reduction of chill hours, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year.

These climate driven changes affect resources critical to the health and prosperity of California. For example, forest wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later. The state's water supply, already stressed under current demands and expected population growth, will shrink under even the most conservative climate change scenario. And as the Central Valley becomes more urbanized, more people will be at risk from intense heat waves.

Climate change impact

Hotter summers

Impact seriousness

Extremely serious

Anticipated timescale

Current

Impact description

Climate change threatens the health and well-being of all Californians through a variety of environmental changes including more severe extreme heat and other weather events, a decline in air quality, increases in allergenic plant pollen, more frequent wildfires, and altered environmental conditions that foster the spread of communicable and vector-borne diseases. Climate change also threatens the basic life support systems on which humans depend – our water, food, shelter and security. Among the segments of the population that are at greatest risk include the elderly, infants, individuals suffering from chronic heart or lung disease, persons with mental disabilities, the socially and/or economically disadvantaged, and those who work outdoors.

Climate change is expected to lead to an increase in ambient (i.e., outdoor) average air temperature, with greater increases expected in summer than in winter months. Larger temperature increases are anticipated in inland communities as compared to the California coast.

The potential health impacts from sustained and significantly higher than average temperatures include heat stroke, heat exhaustion, and the exacerbation of existing medical conditions such as cardiovascular and respiratory diseases, diabetes, nervous system disorders, emphysema, and epilepsy.¹ Numerous studies have indicated that there are generally more deaths during periods of sustained higher temperatures, and these are due to cardiovascular causes and other chronic diseases.² The elderly, infants, and socially-isolated people with pre-existing illnesses who lack access to air conditioning or cooling spaces are among the most at risk during heat waves.

Climate change impact

Sea level rise

Impact seriousness

Extremely serious

Anticipated timescale

Medium-term

Impact description

Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. Almost half a million Californians, many without the means to adjust to expected impacts, will be at risk from sea level rise along bay and coastal areas. California's infrastructure is already stressed and will face additional burdens from climate risks.

Climate change impact

More intense droughts

Impact seriousness

Extremely serious

Anticipated timescale

Current

Impact description

With California facing one of the most severe droughts on record, Governor Brown declared a drought State of

Emergency in January 2015 and directed State officials to take all necessary actions to prepare for water shortages. The State has continued to lead the way to make sure California is able to cope with unprecedented droughts. Various communities around the state are at a greater risk to the impacts of more intense drought periods depending on indicators such as health, age, geography, and socio-economic status. Natural ecosystems may also be at risk of collapse depending on the intensity of such droughts—events that could have wide-ranging effects on ecosystem services and biodiversity around the state.

Climate change impact

More frequent droughts

Impact seriousness

Extremely serious

Anticipated timescale

Current

Impact description

California's water resources support nearly 40 million people, many more millions of aquatic and terrestrial plants and animals including salmon and steelhead and California Redwoods and Sequoias, trillions of dollars of economic activity, millions of acres of the most productive farmland in the world, and a bountiful array of landscapes and ecosystems. But California's water supplies and water demands are not equally distributed throughout the state, and management and stewardship of water has been a constant source of tension throughout the history of California. Climate change adds new vulnerabilities and exacerbates historical challenges to California water management.

The water sector in California is influenced by a Mediterranean climate where water systems are designed to store water for dry months, provide winter and spring flood protection, and to address considerable year to year hydrologic variability. It is this very Mediterranean climate that enables the bountiful resources, diversity and economic vitality that is California. The major impacts of climate change on California's water sector may be changes in the timing, form, and amount of precipitation, changed runoff patterns, increases in the frequency and severity of extreme precipitation events (floods and droughts), and sea level rise.

California precipitation is variable not only between seasons (wet in winter and dry in summer), but also over the geographic range of the state. Many climate models predict that the disparity in precipitation between various parts of the state will be even greater in the future, with the southern part of California becoming drier.

Climate change impact

Reduced average annual snowfall

Impact seriousness

Extremely serious

Anticipated timescale

Current

Impact description

As temperatures increase, the proportion of annual precipitation that falls as snow will decrease. A trend toward "more rain, less snow" creates the need to adjust water management to accommodate the changes in precipitation timing and type. This impact is projected to grow as the climate warms, with year-to-year variability continuing, and the percentage of precipitation falling as rain increasing over time.

Climate change impact

Increased frequency of large storms

Impact seriousness

Extremely serious

Anticipated timescale

Medium-term

Impact description

Projected impacts of climate change will accelerate sea level rise and coastal erosion, and likely make storms more frequent and powerful. Increased frequency of large storms could exacerbate extremes like flooding, coastal erosion, and land and mud slides.

Another tipping element that could have a significant effect on California's long-term climate variability is the potential intensification of the El Niño Southern Oscillation (ENSO) cycles over the Pacific Ocean. ENSO is one key factor in California's wet year and drought year cycles and intensification would mean stormier wet years and even drier (or extended periods of) drought years. It would also mean more severe coastal storms during the winter months and hence more erosion and coastal flooding. Current research indicates that a tipping point of 6 to 11 °F could trigger this intensification of ENSO cycles.

In California's coastal areas precipitation falls almost exclusively as rain, even in winter. Coastal fog also plays a large role in providing the moisture required for the maintenance of terrestrial coastal ecosystems; changes in coastal fog density will impact coastal forest types. A general pattern of a drying climate over the 21st century could result in rainstorms that are fewer in number, but greater in intensity; and less coastal fog. Changes to the timing and intensity of freshwater input from rainstorms could impact marine and near shore species. Changing precipitation patterns will potentially increase the occurrences of flooding in coastal drainages. In coastal floodplain areas, runoff from land may coincide with the coastal storm surge (also higher due to sea-level rise) and lead to greater flooding risks in the immediate coastal zone.

Climate change impact

More intense heat waves

Impact seriousness

Serious

Anticipated timescale

Medium-term

Impact description

Extreme heat days will continue to increase throughout California, impacting public health, biodiversity, electricity reliability, wildfires, water management, and agriculture.

Climate change impact

Warmer water temperatures

Impact seriousness

Serious

Anticipated timescale

Current

Impact description

Warmer water temperatures pose increasing threats to aquatic and marine ecosystems. Species like salmon are exhibiting reduced fertility rates as rising temperatures not only shorten their spawning season but reduce the viable conditions for eggs to mature. As a result, fewer and fewer salmon reach adulthood. Numerous other flora and fauna affected by rising water temperatures are forced to adapt or otherwise may not survive.

5.1b: Please describe the adaptation actions you are taking to reduce the vulnerability of your region's citizens, businesses and infrastructure to the impacts of climate change identified in 5.1a. ^

Climate change impact

More hot days

Adaptation action

Heat mapping and thermal imaging

Action description

California is a global leader in using, investing in, and advancing scientific research to make proactive climate change policy. Its efforts to understand and communicate how climate change will affect our expansive and diverse state provide the foundation for state and local actions that make our communities safer from climate threats. The State is investing in the next generation of cutting-edge research that will inform the policies and actions in this report; as our climate continues to change, California will keep investing and utilizing the best available science to safeguard its people, environment, and economy.

In over a decade of state-sponsored climate research, California has developed critical methods to understand how climate change will impact different places in different ways, and to deliver that information to planners and decision makers. Residents living in Modoc County face very different challenges from climate change than those living in San Diego, so state government is providing resources, conducting research, and designing programs for climate conditions appropriate for individual communities through its Fourth Climate Change Assessment.

Heat island data and mapping can be found on the California Environmental Protection Agency website. For future projections of temperatures and extreme heat days, please refer to the Cal-Adapt tool on cal-adapt.org

California is constantly improving and expanding the body of science that informs policy and action, so it also provides important guidance to local governments, state agencies, and communities on how to best take action on evolving and increasingly sophisticated projections. Operationalizing climate considerations in state government and planning for climate risks in local planning efforts is required by law, so now state and local government can implement adaptation with more clarity and consistency.

Climate change impact

Hotter summers

Adaptation action

Projects and policies targeted at those most vulnerable

Action description

Preparing California and its most vulnerable populations for extreme heat scenarios through state-wide coordination by the California Public Health Department via the CalBRACE Program. CalBRACE enhances the California Department of Public Health's (CDPH) capability to plan for and reduce health risks associated with climate change

through coordinating climate vulnerability assessments for all counties. The California Natural Resources Agency offers an Urban Greening Grant Program. Increasing shade in urban areas through green infrastructure can help defend against heat-related public health risks. The Governor's Office of Emergency Services (Cal OES) developed a Heat Contingency Plan to help guide government and non-government organizations in managing heat related emergencies. Refer to www.caloes.ca.gov for a map of cooling centers and other heat-related resources.

Climate change impact

Sea level rise

Adaptation action

Sea level rise modelling

Action description

Sea level rise modelling will help guide the state in identifying the most vulnerable communities and coastal areas. The Fourth Climate Change Assessment utilizes various climate models. These models help inform departments that are investing in Climate Change Vulnerability Assessments (CCVA's) that inform decision makers about the areas most vulnerable to sea level rise. These projected scenarios can be used to help state and regional managers develop plans to help communities adjust and adapt to the inevitable changes to California's coast and design adaptation measures including wetland restoration efforts that will mitigate the effects of sea level rise on the coastline. The 2014 Safeguarding document provides general guidelines for Hazard Avoidance for coastal and ocean ecosystems and communities that are most vulnerable to sea level rise. California is in the process of updating the Sea-Level Rise Guidance Document to ensure the best available science is incorporated into specific policy guidance for state and local decision-makers.

Climate change impact

More intense droughts

Adaptation action

Projects and policies targeted at those most vulnerable

Action description

The Fourth Climate Change Assessment, led by investigators from UCD and UCB, iterates the continued drought planning efforts, identification of adaptation opportunities in California's water system, and determining various institutional vulnerabilities.

The Drinking Water State Revolving Fund Program offers grants and low-interest loans for planning and infrastructure improvements and related actions to meet safe drinking water standards, ensure affordable drinking water, or both as water becomes less accessible under worsening instances of drought.

The State Water Resources Control Board administers drought-related emergency grants and loans for drinking water. These assist in identifying and permitting alternative water supplies for public water systems anticipating severe shortages or water outages, particularly for disadvantaged communities and low-income households.

Refer to Cal-Adapt at cal-adapt.org for risk modeling projections derived by more intense droughts.

Climate change impact

More frequent droughts

Adaptation action

Promoting and incentivizing water efficiency

Action description

California's most recent energy efficiency and water standards require that water appliances consume less water, thereby using less energy while performing the same function.

Both the Department of Water Resources (DWR) and the State Water Resources Control Board (Water Board), along with other agencies, have updated their recommendations on how to make water systems more integrated, more resilient, and able to adapt to impacts of climate change. They manage grants and programs to increase regional planning and coordination to improve self-reliance, diversification of local water supplies, and increase water use efficiency. Refer to both <https://www.waterboards.ca.gov/> and <http://www.water.ca.gov/> for more information about ongoing projects and best management practices to address issues of drought in California.

The California Department of Food and Agriculture's State Water Efficiency and Enhancement Program offers financial assistance for the implementation of irrigation systems that reduce greenhouse gases and use water more efficiently on Californian agricultural operations.

Climate change impact

Reduced average annual snowfall

Adaptation action

Improve water supply distribution method

Action description

As average temperatures warm, Californians can expect heavier rain and less snow, which will increase peak flood runoff – and pressure against the Delta's aging, earthen Delta levees. A failure of levees could cause salt water to rush deep into the Delta toward the water project pumps. To avoid interruptions of water supply deliveries and restore more natural flow patterns in the Delta, the state proposes to build new water project intakes along the Sacramento River and 35-mile-long tunnels to convey water under the Delta to the existing pumping plants. At an estimated cost of \$17.1 billion, California WaterFix is the state's single most expensive and far-reaching climate change adaptation project.

Improving meadow and forest management to protect watershed health will be increasingly important as climate change continues to reduce snowpack and cause temporal changes in snowmelt and spring runoff that can lead to longer dry periods in summer months, reducing available moisture for forest plants.

Climate change impact

Increased frequency of large storms

Adaptation action

Flood defences – development and operation & storage

Action description

As climate change drives up average temperatures in California, research shows that it is more likely that low-precipitation years will tip into drought and precipitation will fall as rain, not snow stored in the Sierra Nevada and Cascade mountains. This will change the timing of storm and snowmelt runoff. Most runoff now occurs in May and June. By the end of the century, most runoff will happen in January and February – which is also the time when dam operators will be managing storms. Governor Brown announced a \$437 million near-term investment in flood control and emergency response that includes proposed legislation to require the owners of all 1,250 dams regulated by the

state to craft emergency action plans, including maps that show potential inundation areas in the event of dam failure.

The Department of Water Resources collaborates closely with the Governor's Office of Emergency Services (Cal OES) in the preparation of the 2018 Hazard Mitigation Plan to address extreme events such as flooding and other disasters requiring emergency support.

Climate change impact

More intense heat waves

Adaptation action

Projects and policies targeted at those most vulnerable

Action description

As part of the California 4th Climate Change Assessment, several projects are looking at the effects of Urban Heat impacts on vulnerable populations in the San Francisco Bay Area. In addition, a research project is investigating optimal urban heat mitigation strategies for vulnerable populations in a changing climate.

Climate change impact

Warmer water temperatures

Adaptation action

Biodiversity monitoring

Action description

California's Fourth Climate Change Assessment is using Mussels as a bio-indicator of ecological consequences related to changing marine temperatures.

The California Department of Fish and Wildlife has completed multiple regional climate change vulnerability assessments that have helped guide this effort and continues to update these assessments as new data becomes available. Refer to <https://www.wildlife.ca.gov/> for more information about the effects of climate change on natural ecosystems with regard to rising temperatures.

5.1c: Please explain why the anticipated impacts of climate change present no significant physical risks to your region. ^

5.2: Please detail any compounding factors that may worsen the impacts of climate change in your region. ^

Heat waves and droughts pressure farms and ranches that are among the most productive in the world. Our forests are at greater risk from wildfires that worsen in warmer weather. Recent studies indicate that climate change may also negatively impact indoor air quality. Outdoor air quality may worsen and intrude into buildings. Emissions from indoor sources, such as paints, pesticides, or building materials containing formaldehyde, may also be exacerbated by changing climate conditions such as increased heat.

5.3: Do you consider that these impacts of climate change threaten the ability of businesses to operate successfully in your region? ^

Yes

5.3a: Please explain the reasoning behind your response. ^

The ARKStorm study showed that an extreme winter storm in California could cost on the order of \$725 billion - with total direct property losses of nearly \$400 billion, of which \$20 to \$30 billion would be recoverable through public and commercial insurance, and business interruption costs of \$325 billion. In addition to extreme events, other impacts such as rising

temperatures will lead to declines in labor productivity, increased energy costs, worsened air pollution, and serious health risks for Californians. Rising sea levels along the California coast could put billions of dollars of property and infrastructure at risk. Extreme heat and shifting precipitation patterns from unabated climate change will impact California's water supply, exacerbate drought and wildfire, and threaten one of the richest agricultural regions in the world.

13. 5. Risks and adaptation

5.4: Do you foresee substantive risks to your region's water supply in the short or long term?

Yes

5.4a: Please identify the risks to your region's water supply as well as the timescale and level of risk.

Risks

Increased water stress or scarcity

Timescale

Current

Level of risk

Extremely serious

Risk description

California experienced one of the longest and most severe droughts in recorded history, which was interrupted by one of the wettest years on record. In most of California, the state of drought was lifted in 2017, but water management practices are still in place to promote efficiency and conservation.

Risks

Higher water prices

Timescale

Current

Level of risk

Serious

Risk description

Several water agencies have increased water rates and installed meters to manage demand.

Risks

Regulatory

Timescale

Current

Level of risk

Less serious

Risk description

During a typical year, approximately 40 percent of the state's total water supply comes from groundwater. During dry years, groundwater provides 60 percent (or more) of the state's total supply, and serves as a critical buffer against the impacts of drought and climate change. With the 2014 enactment of the Sustainable Groundwater Management Act (SGMA), which provides new authorities for local agencies to directly manage groundwater resources, the State is making progress on the recommendation to support regional groundwater management for sustainability and drought resiliency. Moving forward, state government needs to further its work to support the formation of groundwater sustainability agencies and implementation of groundwater sustainability plans in coordination with other flood and water management plans.

5.4b: Please explain why you do not consider your region to be exposed to any substantive water-related risk.

5.5: Please describe the actions you are taking to reduce the risks to your region's water supply identified in 5.4a.

Risks

Increased water stress or scarcity

Adaption action

Water use restrictions

Action description

The California Water Action Plan – originally released by the administration of Governor Brown in January 2014 – is a roadmap for the first five years of the state's journey toward sustainable water management. The 2016 update reflects both considerable progress toward and reaffirmation of the goals first set forth in January 2014.

California faces many challenges to its water management systems. Economic growth in California's formative years drove large-scale land-use alterations, unchecked timber operations, and other landscape changes. In turn, growing urban and rural communities and agricultural productivity drove the development of local and system-wide water management projects unaided by our current understanding of ecological process. Ongoing and future changes to the climate will drive rising sea levels, salinity encroachment, altered precipitation patterns, reduced Sierra Nevada snow pack, and other changes to California's hydrology. Every aspect of our water management system will be affected. Additionally, many California communities lack access to clean and affordable water supplies, an unacceptable fact that must be addressed, as all Californians have the right to clean and affordable water supplies.

At the core of the Action Plan are ten actions and associated sub-actions designed to address these challenges and support three overarching goals: reliability, restoration and resilience.

Risks

Inadequate or aging infrastructure

Adaption action

Investment in existing water supply infrastructure

Action description

see above

Risks

Higher water prices

Adaption action

Water metering

Action description

see above

Risks

Regulatory

Adaption action

Conservation awareness and education

Action description

see above

14. 5. Risks and adaptation

5.6: Does your region face any social risks as a result of climate change?

Yes

5.6a: Please complete the below.

Social risks

Fluctuating socio-economic conditions

Anticipated timescale

Current

Impact description

the California Department of Public Health (CDPH) has developed a Climate Change Population Vulnerability Screening Tool which supplemented an existing environmental justice screening method with metrics associated with climate change impacts and adaptive capacity, such as population sensitivities, air conditioning ownership, green space, and ecological risks. An interagency working group lead by CDPH is currently exploring further social vulnerability mapping for climate change and best practices for social vulnerability assessments.

Social risks

Increased incidence and prevalence of disease

Anticipated timescale

Current

Impact description

Climate change will result in new, progressively changing, average conditions as well as more extreme weather events, and these changes create significant new public health risks including risks associated with heat-related illness and mortality, respiratory impacts, infectious diseases, and changes in socioeconomic conditions that may impact well-being.

The following groups are mainly at risk of "classic" heat related illness: young children, the elderly, persons with preexisting chronic diseases (e.g. respiratory, cardiovascular, diabetes) (Green, 2010), pregnant women (Basu et al.,

2010), those who are socially isolated and those who have a disability.

Social risks

Increased demand for public services (including health)

Anticipated timescale

Current

Impact description

In California's largest county, the Los Angeles County Department of Public Health (LA Co DPH) has adopted an innovative "Five-Point Plan to Reduce the Health Impacts of Climate Change". Working with academic, governmental and community partners, the Department is striving to reduce health impacts of climate change while building healthy, sustainable and resilient communities, ensuring the climate change efforts are linked with ongoing health protection and health promotion in the county's diverse population.

The initiative includes five specific actions:

- o Inform general public about the nature of climate change and the health co-benefits associated with taking action to reduce carbon emissions;
- o Ensure that climate mitigation and health are incorporated into local planning and policies;
- o Provide guidance on climate preparedness to local government and communities that can reduce risks and create more resilient communities;
- o Build the capacity of LA Co DPH staff and programs to monitor impacts to improve climate preparedness and response; and
- o Adopt practices within LA Co DPH demonstrating leadership in sustainable operations and facilities for department itself.

Social risks

Increased risk to already vulnerable populations

Anticipated timescale

Current

Impact description

The following groups are mainly at risk of "classic" heat related illness: young children, the elderly, persons with preexisting chronic diseases (e.g. respiratory, cardiovascular, diabetes) (Green, 2010), pregnant women (Basu et al., 2010), those who are socially isolated and those who have a disability.

5.6b: Please explain why you do not consider your region to be exposed to any social risks as a result of climate change.

15. 5. Risks and adaptation

5.7: Has a climate change risk or vulnerability assessment been undertaken for your region? ^

Yes

5.7a: Please upload your climate change risk or vulnerability assessment. ^

[Final_Safeguarding_CA_Plan_July_31_2014.pdf](#)

5.7b: Please select the primary process or methodology used to undertake the climate change risk or vulnerability assessment to your region. ^

Primary methodology

IPCC models and climate change impact assessment guidance

Comments**5.8: Do you have a plan that addresses climate change adaptation? ^**

Yes

5.8a: Please provide the below details concerning your climate adaptation plan. ^**Publication title**

Safeguarding California: Reducing Climate Risk

Publication hyperlink

http://resources.ca.gov/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf

Year of publication

2014

5.8b: If not available online, please upload you climate adaptation plan. ^

[DRAFT-Safeguarding-California-Plan-2017-Update.pdf](#)

5.8c: Please explain why you do not have a climate adaptation plan and detail any future arrangements you have to create a plan. ^**5.9: Please detail any adaptation goals you have for your region. ^**

A Draft Safeguarding California Plan (2017 Update) is being reviewed and is attached. The file can also be found at: <http://resources.ca.gov/climate/safeguarding/>

16. 6. Governance

6.1: Please describe the process by which your regional government reviews its progress and manages overall responsibility for climate change.

California has an integrated process for reviewing progress and managing overall responsibility for climate change. This process includes collaboration among the Governor's Office and the various departments with climate change responsibilities including: the California Environmental Protection Agency, the California Air Resources Board, California Transportation Agency, Department of Fish and Wildlife, Department of Food and Agriculture, Department of Forestry and Fire Protection, Department of Resources Recycling and Recovery, Department of Transportation, Department of Water Resources, California Energy Commission, California Public Utilities Commission, Health and Human Services Agency, Natural Resources Agency, Government Operations Agency, Health and Human Services Agency, Business Consumer Services and Housing Agency, and State Water Resources Control Board. Cross-government coordination on climate change is facilitated by the Climate Action Team (CAT). CAT members work to coordinate statewide efforts to implement global warming emission reduction programs and the State's Climate Adaptation Strategy. The CAT members are State agency secretaries and the heads of agencies, boards and departments, led by the Secretary of CalEPA. The CAT includes a number of working groups, covering a range of issues from agriculture to public health and intergovernmental activities.

The full list of CAT working groups is available at: http://www.climatechange.ca.gov/climate_action_team/working_groups.html

6.2: Please describe the impact of national activities on your region's own climate change activities.

Various federal funding sources support California climate change actions. Federal activities have the potential to strengthen California's collaboration with regional, national, and international entities addressing climate change. States interested in multi-state approaches to meet climate rules could join RGGI, link with California's cap-and-trade program, or create similar programs that put prices on carbon pollution, such as taxes. Moreover, Section 209(b) of the Clean Air Act recognizes California's authority to issue air pollution standards for new motor vehicles that go above and beyond the federal standard.

6.3: Does your region incorporate desired GHG reductions into the master planning for the region?

Yes

6.3a: Please describe the ways that the master plan is designed to reduce GHG emissions.

ARB must develop a Scoping Plan, or climate action plan, and update it at least every five years. The AB 32 Scoping Plan provides details on several key sectors to reduce GHG emissions including: Energy, Transportation, Natural and Working Lands, Agriculture, Water, Waste Management, short-lived climate pollutants, and green buildings. In September 2016, the Legislature passed SB 32, which requires the Air Resources Board to ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030. The latest Proposed Scoping Plan Update reflects this target, and will be presented to the Board for approval in 2017. California's Cap-and-Trade program is designed to reduce GHG emissions to the 1990 level by 2020, with a declining cap and price on emissions. The 2017 Proposed Scoping Plan Update evaluates continuing Cap-and-Trade to meet the 2030 target.

17. 6. Governance

6.4: Does your region provide incentives for management of climate change issues, including the attainment of greenhouse gas (GHG) reduction targets?

Yes

6.4a: Please describe the incentives.

Who is entitled to benefit from these incentives?

Regional government agencies/departments

The type of incentives

Monetary

Incentive description

Greenhouse Gas Reduction Funds (GGRF)

6.5: Please list any climate change-related projects for which you hope to attract private sector involvement.

California's many policies and programs to drive emissions reductions are already attracting private sector investment into climate solutions, and we expect that to continue in all sectors, from industry to agriculture. Preparing for extreme events will also require extensive coordination between public and private sectors as well as between local governments and State agencies.

6.6: Does climate change provide any economic opportunities for your region?

Yes

6.6a: Please indicate the opportunities and describe how the region is positioning itself to take advantage of them.

Economic opportunity

Development of new business industries (e.g. clean tech)

Describe how the region is maximizing this opportunity

California's bet on green energy is paying off. Clean technology companies are creating more jobs and investing more money than their competitors in any other State. Governor Brown has said that "California energy policies are a road to real innovation that will drive business investment and development, in California and throughout the rest of the country." California regulatory agencies, State and local government, industry, and other non-governmental organizations are working together to optimize wind and solar power, energy conservation and efficiency, power storage and electric vehicles.

According to the 2016 report by the Advanced Energy Economy trade group, at just over 500,000 workers, advanced energy employs three times as many Californians as the motion picture, TV, and radio industry; more than agriculture, forestry, and fishing; and approaching construction. With one in every five advanced energy workers nationwide, California has the largest advanced energy industry by employment of any state in the country.

6.6b: If no, why not?

19. Thank you for submitting your response

Confirmation Email

Jul 03, 2017 15:20:12 Success: Email Sent to: chris.thorpe@cdp.net,statesandregions@cdp.net