



2020-2021

Sustainability Roadmap

DEPARTMENT OF FORESTRY AND
FIRE PROTECTION

Sustainability Roadmap 2020-2021

Department of Forestry and Fire Protection (CAL FIRE)

Progress Report and Plan for Meeting
the Governor's Sustainability Goals for California
State Agencies

Department of Forestry and Fire Protection
Gavin Newsom, Governor



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Department of Forestry and Fire Protection Roadmap

Sustainability Road Map 2020-2021

Department of Forestry and Fire Protection

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Executive Summary

In response to the Governor's Executive Orders B-18-12, B-16-12, and B-29-15, which directed State departments to make efforts to reduce energy usage, support and facilitate the commercialization of zero-emission vehicles, and reduce potable water usage, the California Department of Forestry and Fire Protection (CAL FIRE) developed the following Roadmap to report on the status of its efforts to achieving the objectives, targets, and requirements of the Executive Orders.

CAL FIRE is an emergency response and resource protection department whose primary mission is to serve and safeguard the people and protect the property and resources of California. With the responsibility to protect and preserve over 31 million acres of California's privately-owned timberlands, wildland, and urban forests, CAL FIRE responds to more than 5,750 wildland fires that burn an average of over 265,000 acres each year. In addition, Department personnel answer hundreds of thousands of calls for other emergencies including structure fires, automobile accidents, medical aids, swift water rescues, civil disturbances, search and rescues, hazardous material spills, train wrecks, floods, and earthquakes.

Created in 1905, CAL FIRE has over 6,472 permanent employees and another 3,172 seasonal firefighters located statewide within 21 operational units, two regions, and its Sacramento Headquarters programs. The Department manages a portfolio of 456 state-owned and/or operated facilities (including 237 Fire Stations, 31 Conservation Camps, 13 Air Attack Bases, 10 Helitack Bases, 25 Unit and Region Headquarters offices, plus 124 communications tower and vault sites) located from Hornbrook Fire Station in Siskiyou County to Potrero Fire Station in San Diego County near the California/Mexico border.

CAL FIRE handles its implementation of green initiatives through its Deputy Director of Management Services and Deputy Director of Resource Management, who coordinate with the Department's Technical Services Unit and Resource Management staff on updates and progress towards accomplishing goals and objectives. The Department has assigned specific staff from both Technical Services and Resource Management to participate in the quarterly and monthly meetings of both the Sustainability Task Force and the Sustainable Building Working Group.

Balancing our critical emergency response mission against such factors as an aging infrastructure, a geographically diverse building portfolio with many remote facilities, and a sizeable maintenance, repair, and replacement

backlog due primarily to lack of historical funding, CAL FIRE continues to make strides in meeting some of the green initiatives laid out by the Governor. In looking to the future, the Department recognizes the need to reduce energy and potable water consumption in all its activities as much as possible and will continue to explore strategies to enable it to meet the objectives of Executive Orders B-18-12, B-16-12, and B-29-15.

All the proposed actions incorporated into this Roadmap are contingent upon two primary factors: (1) the ability to continue to carry out our mission; and (2) the availability of funding and, most importantly, staffing.

With an average age that exceeds 50 years, most of CAL FIRE's facilities were originally constructed in the 1930s, 1940s and 1950s. Because so many of these facilities house public safety employees performing critical emergency response activities, the Department is constantly working to support this aging infrastructure through improvements and new construction. Examples of projects include repairing potable and non-potable water systems and wastewater disposal systems; replacing collapsed mountaintop radio transmission towers; modifying apparatus buildings that are too small to accommodate modern, larger fire engines; retrofitting buildings with seismic risk due to structural instability; and relocating entire facilities due to lease terminations or urban encroachment.

As we work to replace these aging facilities, CAL FIRE continues to seek to improve energy efficiency and potable water usage throughout our building portfolio. Our Technical Services staff work closely with the Department of General Services (DGS) on building design and construction, seeking opportunities to meet LEED Silver and the Green Code standards. In fact, CAL FIRE is proud to include four LEED certified facilities in its portfolio, Bautista Conservation Camp in Hemet, the Nevada City Fire Station, and Lone Academy new dormitory, all of which have achieved LEED Silver status. Our new CAL FIRE - CAL OES - USFS Southern Operations Headquarter Joint-Use facility in Moreno Valley has achieved LEED Gold status.

CAL FIRE also seeks to identify sites that are well suited for photovoltaic and wind power production and to install systems where it is economically and environmentally feasible, retrofit facilities for higher-efficiency electrical and mechanical equipment and systems, replace worn electrically-driven equipment with new, more-efficient equipment, evaluate water usage and look for ways to mitigate excessive water consumption or leaking systems, and explore the feasibility of installing electric vehicle charging stations at appropriate locations at CAL FIRE facilities.

CAL FIRE staff continue to coordinate with all of the electrical energy and natural gas providers from whom we get power in order to facilitate their ability to automatically upload all electrical and water consumption for each applicable meter into the Energy Star database.

Despite the significant work ahead of the Department, CAL FIRE staff are excited continue to work toward achieving all the targets and requirements of Executive Orders B-18-12, B-16-12, and B-29-15. CAL FIRE is committed to reducing energy and potable water consumption and will continue to balance the need to do so with our critical emergency response and resource protection mission, as well as the public safety needs of all Californians.

The 2020-2021 Sustainability Roadmap will be the Department's first and will only address facility progress at CAL FIRE owned facilities. In future years CAL FIRE will work towards the inclusion of leased facilities.

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Anthony P. Favro

Deputy Director, Management Services



ENTERING
JACKSON
DEMONSTRATION
STATE FOREST



DEPARTMENT OF FORESTRY AND FIRE PROTECTION
STATE OF CALIFORNIA

Chapter 1

Pictured - CAL FIRE Jackson Demonstation Forest

CLIMATE CHANGE ADAPTION

CHAPTER 1 - CLIMATE CHANGE ADAPTATION

[Executive Order B-30-15](#) directs California State Agencies to integrate climate change into all planning and investment. Planning and investment can include the following:

- Infrastructure and capital outlay projects
- Grants
- Development of strategic and functional plans
- Permitting
- Purchasing and procurement
- Guidance development
- Regulatory activity
- Outreach and education

Climate Change Risks to Facilities

For all infrastructure, it is important to assess the risk that a changing climate poses to an asset or project (e.g., wildfire risk or increasing daily temperatures). It is also important to recognize the impact that an infrastructure project has on the surrounding community and the impacts on individual and community resilience (e.g., heat island impacts).

California is susceptible to many climate risks, with many locations at risk from multiple impacts per year (for example, wildfires and mudslides in the same year). Factoring in the consequences of these disruptions and being a Fire Life Safety department, emergency incidents cannot negatively impact CAL FIRE operation and readiness. As climate change intensifies throughout California, CAL FIRE and its facilities need to be prepared for any disruption. There are consequences for CAL FIRE's operational readiness that affect vulnerable populations, critical natural systems, and critical infrastructure. Facility disruptions that impact operational readiness pose an unacceptable risk to the public health and safety.

The passage of the California Infrastructure Act (AB 1473) in 2002-03 implemented five-year planning and reporting requirements for State agencies' infrastructure replacement and improvement needs. While CAL FIRE has always conducted infrastructure replacement planning on a long-term basis, the comprehensive, five-year planning requirements of AB 1473 has provided the

Department with the impetus to examine the evolving and diverse infrastructure needs more thoroughly of each of its major program areas.

The design life span of most of the Department's replacement facilities is 50 years; however, some facilities, such as Emergency Command Centers (ECC) and Radio Communications System (COM) facilities have a shorter 25-year design life span due to rapidly changing technologies. To create a steady replacement cycle, factoring in a 50-year life span, two percent of our facilities would need to be replaced each year. Two percent of CAL FIRE facilities amounts to 10 replacement projects a year, which would exceed our average yearly budget.

The lack of logistics staff to address CAL FIRE's aging infrastructure has been a challenge. In the past, there have been decreases in facility maintenance and repair funding. Over the past several years, CAL FIRE has been utilizing its growing budget to address these infrastructure shortfalls. With fire season increasing year after year, and a corresponding increase in facility use, the updates and renovations are becoming progressively more important. The significant number of facilities that need basic improvements will negatively impact CAL FIRE's ability to respond to climate change as it worsens in the State. All improvements to CAL FIRE sites allow the Department to focus on how it contributes to the State's climate change goals. CAL FIRE is committed to adapting sites to be more sustainable and to meet the ambitious goals outlined in this roadmap.

CAL FIRE has a unique need to combat climate change issues. The Department is at the forefront of innovative solutions to forest climate change, drought, carbon sequestration, and greenhouse gas emissions as they relate to the State's forests. CAL FIRE actively promotes and conducts research on innovative new wood products (such as mass timber) on sustainable forest management practices in the face of an uncertain climate future.

Natural Infrastructure to Protect Facilities

EO B-30-15 directs State agencies to prioritize the use of natural and green infrastructure solutions. Natural infrastructure is the *"preservation or restoration of ecological systems or the utilization of engineered systems that use ecological processes to increase resiliency to climate change, manage other environmental hazards, or both. This may include, but need not be limited to, flood plain and wetlands restoration or preservation, combining levees with restored natural systems to reduce flood risk, and urban tree planting to mitigate high heat days"* (Public Resource Code Section 71154(c)(3)).

CAL FIRE's Resource Management Program plays an integral role in the management and protection of California's natural resources through its Forest Practice, Urban Forestry, Fuel Reduction, Demonstration State Forest, Pest Management, Landowner Assistance, Environmental Protection and Regulation, Archaeology, and Nursery programs. These programs contribute to CAL FIRE's goals of adapting to climate change and pivot the Department towards a more sustainable future.

CAL FIRE has identified five forestry strategies for reducing or mitigating greenhouse gas emissions. They are:

- Reforestation to sequester more carbon
- Forestland conservation to avoid forest loss to development
- Fuel reduction to reduce wildfire emissions and utilization of those materials for renewable energy
- Urban forestry to reduce energy demand through shading, increase sequestration, and contribute biomass for energy generation
- Improved management to increase carbon sequestration benefits and protect forest health

CAL FIRE is also working with stakeholders and other agencies to identify ways to reduce or adapt to unavoidable impacts to forest ecosystems and communities from climate changes that have already begun to occur. Adaptation can be defined as any action or adjustment to natural or human systems to minimize harm or take advantage of benefits from climate change.

Understanding Climate Risk to Existing Facilities

Risk from Changing Extreme Temperatures:

Under a changing climate, temperatures are expected to increase – both at the high and low end. As a result, facilities will experience higher maximum temperatures and increased minimum temperatures. In addition to changing average temperatures, climate change will increase the number of extreme heat events across the State. Extreme events are already occurring, and they are likely to occur sooner than changes in average temperatures.

Table 1.1: Top 5-10 Facilities that Will Experience the Largest Increase in Extreme Heat Events

Facility Name	Extreme heat threshold (EHT) °F	Average # of days above EHT (1961-1990)	Average # of days above EHT (2031-2060)	Change from Historical to projected average # of days above EHT (2031-2060)	Avg. # days above EHT (2070-2099)	Change from historical to projected average # of days above EHT (2070-2099)	Increase in # of days above EHT by mid-century (2031-2060)	Increase in Avg. # days above EHT by end of century (2070-2099)
CSR-TUU Woodlake FS	104	4	44	39	77	72	39	37
CSR-FKU Squaw Valley FS	100	4	43	38	75	70	38	37
CSR-FKU Sand Creek FS	99	4	42	38	75	70	38	37
CSR-TUU Three Rivers FS	103	4	42	37	73	69	37	36
CSR-TUU Badger FS	95	4	41	37	72	67	37	35
CSR-TUU Bear Creek FS	98	4	40	35	73	69	35	38
CSR-FKU Piedra FS	103	4	39	35	70	66	35	36
CSR-FKU Blasingame FS	104	4	38	33	68	64	33	35
CSR-TUU Tulare HQ	103	4	38	33	69	65	33	36
CSR-FKU Shaver Lake FS	91	4	37	33	69	65	33	36

In Table 1.1, there is a clear pattern established. The most impacted facilities will be in Southern California. In selecting the data, Southern California locations have the most intense change over time. The locations listed are not the only ones affected, but these locations will see an additional 30+ days of extreme heat days in the next 40 years and doubling by the end of the century.

Table 1.2 a: Top 5-10 Facilities Most Affected by Changing Temperature – Annual Mean Max. Temp

Facility Name	Historical Annual Mean Max. Temp. (1961 – 1990)	Annual Mean Max. Temp. (2031 – 2060)	Change from Historical to Annual Mean Max. Temp (2031-2060)	Annual Mean Max. Temp. (2070-2099)	Change from Historical to Annual Mean Max. Temp (2070-2099)
CSR-RRU San Jacinto FS	81	86	5	90	9
CSR-RRU Elsinore FS	80	85	5	89	9
CSR-RRU Riverside FS/UH/ECC	80	85	5	88	9
CSR-RRU West Riverside FS	79	84	5	88	9
CSR-BDU San Bernardino UH/ECC/COM/RMO/SFM/FS	79	84	5	88	9
CSR-RRU Corona FS	78	84	5	87	9
CSR-RRU Sage FS	79	84	5	87	9
CSR South OPS (Riverside RHQ) Surplus Property	78	84	6	87	9
CSR-RRU Beaumont FS	77	83	6	87	9
CSR-MVU Rincon FS	78	83	5	87	9

As with Table 1.1, Table 1.2 a illustrates the same issue. Southern California will be most affected by changing temperatures. Most locations will rise in mean max temperatures by almost 10 degrees. Among other issues, this will lead to more energy usage to combat the extreme temperatures.

Table 1.2 b: Top 5-10 Facilities Most Affected by Changing Temperature- Annual Mean Min Temp

Facility Name	Historical Annual Mean Min. Temp. (1961 – 1990)	Annual Mean Min. Temp. (2031 – 2060) °F	Change from Annual Mean Min. Temp (2031-2060)	Annual Mean Min. Temp. (2070-2099) °F	Change from Annual Mean Min. Temp (2070-2099)
CSR-MVU Rincon FS	51	56	5	60	9
CSR-BDU San Bernardino UH/ECC/COM/RMO/SFM/FS	51	56	5	60	9
CSR-MVU Red Mountain FS	51	56	5	60	9
CNR-SCU Smith Creek FS	51	56	4	60	9
CSR-RRU West Riverside FS	51	56	5	59	9
CNR-SHU Hayfork FS	51	56	4	59	8
CSR-MVU Miller FS	51	55	5	59	9
CSR-MVU San Diego UH/ECC/FS	51	55	4	59	8
CNR-SHU Redding FS/AAB	51	55	4	59	8
CNR-SHU Latour SF Generator	51	55	4	59	8
CNR-SHU Redding HQ UH/ECC/FS	51	55	4	59	8

Extreme temperatures affect the efficient use of energy, water, and materials throughout a building's life cycle, and could potentially affect the indoor and outdoor air quality as well as State employee health and productivity. Extreme heat could decrease a building's service life by degrading roofs and walls, heating, ventilation, and air conditioning (HVAC) systems, and insulation, as well as increasing wear and tear on building materials — leading to higher facility maintenance and operation costs. These events could create unsafe working conditions and lead to negative health affects for employees. Side effects from extreme heat could include general discomfort, respiratory difficulties, heat cramps and exhaustion, non-fatal heat stroke, and heat-related mortality.

Furthermore, additional energy and water use in buildings will result in an increase in air pollutants and GHG emissions. Extreme heat could damage electrical infrastructure and HVAC equipment, increasing the possibility of premature or accelerated deterioration of equipment and a reduction of design safety factors. More extreme heat events could also overload local power infrastructure, requiring utility companies to impose rolling brownouts or blackouts to avoid power outages, exacerbating dilatory effects to productivity, and working conditions.

Preparing for changing conditions will require a variety of potential adaptation strategies. CAL FIRE will need to strengthen its preparedness for extreme heat events. The Department will likely need to modify components of buildings. Some adaptation strategies might be readily implemented, while others will require additional planning, consultation, and resources. Therefore, next steps will include discussions with each impacted program to identify adaptation strategies specific to at-risk facilities and to consider whether a strategy can be implemented using existing resources or if there will be additional costs associated with implementation.

The top facilities with the warmest average temperatures include locations in the Central Valley. Each location will feel the effects of increased temperature ranges due to their locations in climates that do not have the stabilizing benefits of other locations in less affected parts of the State.

Extreme heat days cause cooling equipment failures in buildings, leading to an increase in heat-related illnesses and loss of productivity if buildings have to be shut down. Building maintenance staff have to work more hours to maintain and repair overworked equipment to keep buildings at acceptable temperature levels. Extreme temperatures could cause buildings to deteriorate prematurely, shortening their service life and requiring more frequent maintenance and repair. Maintenance crews would have to work at night to avoid heatstroke. Additionally, increased temperatures and extreme heat days may cause wildfires to grow in scale and frequency. A more active wildfire season means increased facility use and disbursement of personnel across the State for wildfire response.

Heating and Cooling Degree Days

A Heating Degree Day (HDD) is defined as the number of degrees by which a daily average temperature is below a reference temperature (i.e., a proxy for when heat would be needed). The reference temperature is typically 65 degrees Fahrenheit, although different utilities and planning entities sometimes use different reference temperatures. The reference temperature loosely

represents an average daily temperature *above which* space heating is not needed. The average temperature is represented by the average of the maximum and minimum daily temperature. Similarly, a Cooling Degree Day (CDD) is defined as the number of degrees by which a daily average temperature exceeds a reference temperature. The reference temperature is also typically 65 degrees Fahrenheit, and different utilities and planning entities sometimes use different reference temperatures. The reference temperature loosely represents an average daily temperature *below which* space cooling (e.g., air conditioning) is not needed.

Table 1.3: Top 5-10 Facilities that will be Most Impacted by Projected Changes in Heating and Cooling Degree Days (HDD/CDD)

Facility Name	Heating/Cooling Degree Days (1961-1990) (HDD/CDD)	Heating/Cooling Degree Days (2031-2060) (HDD/CDD)		Heating/Cooling Degree Days (2070-2099) (HDD/CDD)	
CNR-SKU Fort Jones FS	5858 / 336	4,723	907	3,886	1,544
CNR-LMU Lassen-Modoc UH/FS	6334 / 331	4,678	989	3,851	1,605
CNR-SKU Hornbrook FS	6028 / 325	4,531	875	3,776	1,426
CNR-SHU Weaverville FS	5783 / 323	4,548	837	3,714	1,402
CNR-SKU McCloud FS	5796 / 304	4,750	793	3,988	1,316

The Department can take various steps to reduce the impact on the climate as well as employees during these heating and cooling days.

Specific strategies for buildings could include:

- Shading buildings with vegetation (i.e., trees); use solar panels as canopies
- Insulating buildings more effectively
- Reviewing and improving use of air conditioning and other indoor cooling strategies

- Using cool roofing materials
- Applying energy efficiency measures, such as wall insulation and energy efficient windows
- Applying current Energy Star efficient systems
- Using heat tolerant AC materials

Urban Heat Islands

Urban heat islands are areas with localized spikes in temperature, which impact human health, increase pollution, and elevate energy demand. Urban heat islands occur during the hot summer months in areas with higher percentages of impervious surface and less vegetation. This is likely in areas with large parking lots, dense development, and lower tree density and shading. Urban heat islands can be mitigated (i.e., reduced) through tree planting and other greening strategies, cool roofs (e.g., lighter roofing materials that reflect light), cooler pavements, and other measures.

Table 1.4: Facilities Located in Urban Heat Islands

Facility Name	Located in an urban heat island (yes/no)
HQ - Davis Mobile Equipment	Yes
HQ-McClellan AMU	Yes
CNR Northern Region Headquarters - Santa Rosa	Yes
CNR-AEU El Dorado FS	Yes
CNR-AEU Pilot Hill FS	Yes
CNR-CZU Burrell FS	Yes
CNR-CZU Corralitos FS	Yes
CNR-CZU Saratoga Summit FS	Yes
CNR-LNU Glen Ellen FS	Yes
CNR-LNU Gordon Valley FS	Yes
CNR-LNU Healdsburg FS	Yes
CNR-LNU Hilton FS	Yes
CNR-LNU Napa FS	Yes
CNR-LNU Occidental FS	Yes
CNR-LNU Petaluma FS	Yes
CNR-LNU Santa Rosa FS	Yes

CNR-LNU Sonoma AAB	Yes
CNR-NEU Auburn (Nevada-Yuba-Placer) UH/ECC/FS	Yes
CNR-SCU Alma FS/HB	Yes
CNR-SCU Almaden FS	Yes
CNR-SCU Castle Rock FS	Yes
CNR-SCU Coyote FS	Yes
CNR-SCU Del Puerto FS	Yes
CNR-SCU Santa Clara UH/ECC/FS	Yes
CNR-SCU Smith Creek FS	Yes
CNR-SCU Sunol FS	Yes
CNR-SCU Sunshine FS	Yes
CSR RHQ Fresno	Yes
CSR South OPS (Riverside RHQ) Surplus Property	Yes
CSR-BDU Devore FS	Yes
CSR-BDU Hesperia (Phelan) FS	Yes
CSR-BDU San Bernardino UH/ECC/COM/RMO/SFM/FS	Yes
CSR-BDU Yucaipa FS	Yes
CSR-BEU Carmel Hill FS	Yes
CSR-BEU Hollister AAB	Yes
CSR-BEU Hollister FS	Yes
CSR-BEU San Benito-Monterey UH/FS/ECC	Yes
CSR-FKU Coalinga FS	Yes
CSR-FKU Millerton FS	Yes
CSR-FKU Sanger #84/HQ's UH/FS	Yes
CSR-MVU De Luz FS	Yes
CSR-MVU Del Dios FS- (San Marcos new)	Yes
CSR-MVU Flinn Springs FS	Yes
CSR-MVU Lyons Valley FS	Yes
CSR-MVU Miller FS	Yes
CSR-MVU Ramona Hwy 67 FS	Yes
CSR-MVU Red Mountain FS	Yes
CSR-MVU Rincon FS	Yes
CSR-MVU San Diego UH/ECC/FS	Yes
CSR-MVU Valley Center FS-	Yes

CSR-MVU Witch Creek FS	Yes
CSR-RRU Beaumont FS	Yes
CSR-RRU Corona FS	Yes
CSR-RRU Elsinore FS	Yes
CSR-RRU Hemet Ryan AAB HB	Yes
CSR-RRU Riverside FS/UH/ECC	Yes
CSR-RRU Sage FS	Yes
CSR-RRU San Jacinto FS	Yes
CSR-RRU Temecula FS	Yes
CSR-RRU West Riverside FS	Yes
CSR-SLU Nipomo FS	Yes
CSR-SLU Parkhill FS	Yes
CSR-South Operations HQ Center	Yes

In Table 1.4, 66 CAL FIRE facilities (27%) are in Urban Heat Islands. Urban greening and the use of green infrastructure could be utilized and expanded as part of cooling strategies whenever CAL FIRE constructs new buildings.

Potential strategies include:

- Planting trees in parking areas
- Using alternative vegetative solutions to alleviate urban heat islands
- Shading open spaces with trees, especially in parking lots and impervious areas needed for operational facility use that generate high levels of heat
- Installing parking lot canopies with photovoltaic cells to shade parked vehicles while collecting solar energy
- Studying the feasibility of green roofs, additional wall insulation, energy efficient windows, and heat-tolerant air conditioning materials

Further studies are also needed on developing a CAL FIRE facility energy plan for urban heat island effects at buildings. Additional studies are also needed on the potential applicability of green roofs, additional wall insulation, energy-efficient windows, and heat tolerant air conditioning materials.

CAL FIRE has variety of facilities type, ranging from fire stations, unit headquarters, emergency command centers, air attack bases, helitack bases, fire training centers, and conservation camps. These facilities have large impervious surfaces to accommodate parking for State vehicles and employee

vehicles that range from typical family style cars and light-duty pick-up trucks, to large firefighting equipment, such as fire trucks and bulldozer transport equipment. The air attack bases are located at regional airports. Large staging areas are required to park and service the aircraft with pathways to the adjacent runways.

A typical modern fire station does have large pavement area to accommodate fire protection operations with our large fire engines and heavy equipment like a bulldozer being transported by large truck and lowboy trailer. The large fire engine requires a large turning radius to park in the fire station bays. The heavy equipment transported by lowboy trailers require even larger area to accommodate the turning radii. The paving areas at our facilities are designed to withstand the heavy weight of the equipment and to have a design life of 50 years. They also must withstand the impact of heavy equipment tires cutting into the pavement surface while making tight turns. There is also limited parking area for fire fighters who are housed at the fire station.

CAL FIRE typically uses reinforced concrete for our facilities' pavement areas for the durability required for a 50-year design life and to meet LEED Silver standard. Asphalt concrete (AC) paving does not have the durability and design life and thus would cost more to maintain over time. Concrete has the require durability and lower lifetime cost but also has a much higher solar reflectance compared to AC.

In limited application, permeable pavers have been used in place of concrete to provide a permeability surface for light duty vehicle parking. Due to the pavement structural durability requirements, permeable pavers are not a viable solution for most of the surface area at a facility.

CAL FIRE is taking steps to help reduce facilities' contributions to Urban Heat Islands. As mentioned above, concrete paving surface is used for parking area because of the better solar reflectance value compared to AC. Metal roofing are typically used on our fire stations. Building orientation is also considered.

Most modern fire stations are designed with steep-slope metal roofs that will last through the 50-year life design. Many of our fire stations are in snow areas of the Sierra Mountain and must be able to withstand heavy snow loads. The metal roofs allow the snow to flow off the roof to minimize impact of heavy snow loads on the building. Fire stations located in the mountains are shut down over winter and thus no staff are available to manually remove the snow load.

Besides having a long design life and ability to shed snow for facilities in snow country, metal roofs have a much better solar reflectance and emittance

values compared asphalt shingles roofing. Fire stations are designed to meet LEED Silver design standards and Title 24 standards. In addition to using metal roofs, CAL FIRE uses foil back plywood sheeting that provides additional solar reflectance to the roof.

Building site orientation can have an impact on urban heat island effect and the overall building energy usage. When possible, building orientation to improve energy usage is incorporated into the design. Landscaping design is also included to help with build energy usage. In order to provide a defensible fire break for buildings in rural areas, tall shade trees are typically removed near the buildings.

Risks from Changes in Precipitation

The impacts of climate change on the amount of precipitation that California will receive in the future are slightly less certain than the impacts on temperature. However, it is expected that California will maintain its Mediterranean climate pattern (dry summers and wet winters), but more precipitation will fall as rain than as snow. It is also likely that extremes will intensify, in both drought and heavy precipitation events. Larger rains can result in flooding but will also result in shifts in runoff timing (earlier) and runoff volumes (higher). More rain will also result in decreased snowpack. Since the snowpack provides California with roughly 30 percent of the State’s water supply, less snow would also affect reservoir levels and potentially lead to water shortages during the summer.

Table 1.5: Top 5-10 Facilities that will be Most Impacted by Projected Changes in Precipitation

Facility Name	Annual Mean Max. Precip. (1961 – 1990) (in/yr)	Annual Mean Precip. (2031 – 2060) (in/yr)	Percent Change by mid-century	Annual Mean Precip. (2070 – 2099) (in/yr)	Percent change by end of century	Extreme Precip (1961-1990) (in/day)	Extreme Precip (2031-2060) (in/day)	Extreme Precip (2070-2090) (in/day)
CNR-SKU Weed FS	25	33	34.6%	34	38.6%	6	6	6
CNR-LNU Wilbur Springs FS	20	26	30.2%	28	38.9%	4	5	6
CNR-LNU Brooks FS	17	21	29.2%	23	41.2%	4	5	6

CSR-BEU Gonzales FS	9	11	24.8%	12	35.5%	2	2	3
CNR-TGU Vina HB FS	17	21	24.6%	23	33.9%	3	3	4
CNR-LNU Leesville FS	20	25	24.4%	27	34.2%	4	5	6
CNR-SCU Sweetwater FS	17	20	22.9%	22	30.3%	3	4	4
CNR-LMU Lassen- Modoc UH/FS	13	16	22.7%	17	36.5%	3	4	5
CSR-BEU Tularcitos FS	19	23	22.4%	25	31.6%	5	5	6
CNR-LNU Boggs Mountain HB/SF	64	78	21.9%	85	32.2%	15	19	22

The State has been plagued by recent multi-year droughts. Reduced rainwater influx has reduced groundwater and potable water supplies. Given CAL FIRE's responsibility to extinguish fires, reducing water is not always possible. As droughts worsen so do wildfires, which leads to CAL FIRE needing more water to protect California. Although we do see increased precipitation at many northern region sites, which would help mitigate wildfire and drought risk near these facilities, many of our sites use ground water, due to the remote nature of the facilities. Increased precipitation in these areas means less resources needed to upkeep the facility.

The precipitation changes that are projected to change by mid-century vary widely depending on the location in the State. Many of CAL FIRE's facilities are in the Sierra Nevada mountains or along the coast and currently receive high levels of rain and snow. These buildings have been designed to withstand high precipitation to maintain the structural integrity and protect the occupant health and safety. Most facilities located in the Sierra Nevada mountains are only operated during the fire season and closed during the winter.

Facilities located in the Central Valley, foothills and Southern California currently have modest rainfall amounts with little or no snow. These facilities are impacted more by the higher summer temperatures that increase building energy usage and structural integrity to provide safe environment for fire fighter health and safety.

Facilities located in dry climates of California can be impacted by the availability of potable water. Over half of CAL FIRE's facilities use potable well water. The current drought has resulted in numerous locations where existing wells have gone dry. New deeper wells have been drilled to provide dependable water sources to our facilities. In some cases, potable water is trucked and stored onsite in tanks to provide the fire fighters water to keep the station open. Chemical toilets are also brought to locations experiencing potable water shortages. Immediate funding may not be available to drill new deeper wells, so trucking water into the facility is the only option.

Mid-century predicted precipitation will vary widely depending on the location in the State. Comparing 1961-1990 to 2031-2060, predicted precipitation will vary from -5.1% to a high of 34.6%. There are eight facilities where mid-century average precipitation is predicted to decrease. Approximately 95% of our facilities are predicted to have increased precipitation by mid-century.

An annual increase in average precipitation may not have any significant impact on CAL FIRE's facilities. Individual heavy storms or series of back-to-back heavy storms could cause local flooding at older facilities that may have not been designed to current standards to manage excess rainfall. Flooding of retention ponds or septic fields may be a problem at some facilities.

Risks from Sea Level Rise

Increasing global temperatures are contributing to rising sea levels. Rising sea levels will result in inundation of coastal areas and increased flooding due to storm surges.

CAL FIRE does not have any State owned or leased facilities that will be impacted by rising sea levels. All CAL FIRE structures are classified as essential facilities for emergency response and thus not located in existing or predicted sea rise flood plain.

Table 1.6: All Facilities at Risk from Rising Sea Levels

Facility Name	Tide Chart Region	2050 Water Level (ft)	Exposed at 2050? (y/n)	2100 Water Level (ft)	Exposed at 2100? (y/n)
NA	NA	NA	NA	NA	NA

Risks from Wildfire

Wildfire is a serious hazard in California. Several studies have indicated that the risk of wildfire will increase with climate change. Importantly, we are already seeing more extreme wildfire seasons that are longer and with more dangerous wildfires. By 2100, if greenhouse gas emissions continue to rise, one study found that the frequency of extreme wildfires would increase, and the average area burned statewide would increase by 77 percent.

Wildfire hazard is also a critical present issue. Eight of California's largest fires all occurred in between 2017-2021, and 2020 previously set records as the most destructive fire seasons in California's history¹. To contextualize how wildfire hazards already impact California's facilities, consider that 1 in 5 California children were affected by wildfire-related school closures during the 2018-2019 school year².

CAL FIRE strategically places facilities in high wildfire risk zones to be close to any potential fire. Over 120 locations are purposely in the high or very high Fire Hazard Severity Zone. While this does pose a threat to our facilities, it is needed due to the nature of Departmental operations. Currently we have 49 facilities (12%) in the moderate severity zone, 43 (10%) in the high severity zone, and 79 (19%) in the very high severity zone, totaling 41% of our facilities. Any of the other facilities not placed strategically in Fire Hazard Severity Zones are usually Unit Headquarters, or administrative facilities. Many of the facilities most at risk to current wildfire threats are fire stations staffed during the fire season.

1 <https://www.fire.ca.gov/incidents/2017/>; <https://www.fire.ca.gov/incidents/2018/>

2 <https://calmatters.org/projects/california-school-closures-wildfire-middletown-paradise-disaster-days/>

Table 1.7: Top 5-10 Facilities that will be Most Impacted by Projected Changes in Wildfire

Facility Name	Acres Burned (1961-1990)	Acres Burned (2031-2060)	Acres Burned (2070-2099)
CNR-SHU Big Bend FS	23	31	72
CNR-SHU Hillcrest FS	19	29	65
CNR-SHU Burney FS/RMO	15	27	55
CSR-BEU Tularcitos FS	18	25	26
CSR-SLU La Panza FS	23	24	19
CNR-SHU Buckhorn FS	16	24	52
CNR-SKU Ponderosa FS	14	23	47
CNR-HUU Klamath FS	10	23	24
CNR-SHU Whitmore FS	15	23	49
CSR-MVU Cuyamaca FS	17	22	22

Summarizing Natural Infrastructure Actions to Protect Existing Facilities

CAL FIRE is a unique department, with a goal of protecting California from the devastating effects of climate change. Through our mission and the Department’s work, every year combatting and mitigating wildfire risk, we are helping to reduce the impact the State has on the Earth’s climate.

CAL FIRE maintains its goals to providing resources and action to many different avenues of combating climate change, including taking steps to make sites more sustainable, actively working to install solar and wind to many facilities, adding charging stations, and updating and constructing more efficient buildings over the long term.

Understanding the Potential Impacts of Facilities on Communities

It is important to recognize the impact that an infrastructure project has on the surrounding community and the impacts on individual and community resilience (e.g., heat island impacts).

Climate change disproportionately impacts vulnerable communities, with certain populations experiencing heightened risk and increased sensitivity to climate change and having less capacity to recover from changing average

conditions and more frequent and severe extreme events. Several factors contribute to vulnerability, often in overlapping and synergistic ways. These can include social and economic factors and can be determined by existing environmental, cultural, and institutional arrangements. Vulnerable populations can include, but are not limited to, people living in poverty, people with underlying health conditions, incarcerated populations, linguistically or socially isolated individuals, communities with less access to healthcare or educational resources, or communities that have suffered historic exclusion or neglect.

CAL FIRE facilities are often located in remote rural locations where their presence is significant in terms protecting and managing wildland fires. A typical CAL FIRE fire station is in a rural area, and as such, many of the stations are the first responders in these areas. CAL FIRE responds to car accidents, medical calls, etc. Our mission is to serve and safeguard the people and protect the property and resources of California. We provide fire prevention and protection, emergency response, and natural resource protection services to California, including in vulnerable communities. During a disaster or emergency, a fire station may be the only public shelter available with potable water, communications, and emergency electrical power. CAL FIRE is making a concerted effort to provide renewable energy resources at all locations across the State, to help mitigate the effects of climate change.

Disadvantaged Communities

California is required to invest certain funding streams in disadvantaged communities. Many State programs that have disadvantaged community funding requirements use CalEnviroScreen, a tool that ranks census tracts based on a combination of social, economic, and environmental factors, to identify disadvantaged communities. While it does not capture all aspects of climate vulnerability, CalEnviroScreen is one tool that is available, and it does include several relevant characteristics. The Department’s facilities located in these communities can contribute or alleviate the vulnerability of these disadvantaged communities.

Table 1.8: Facilities located in disadvantaged communities

Facility Name	CalEnviroScreen Score	Is it located in a disadvantaged community? Yes/No
CDF McClellan AMU	91-95%	Yes
CNR-SCU Coyote FS	86-90%	Yes
CNR-SCU Del Puerto FS	76-80%	Yes

CNR-SCU Santa Clara UH/ECC/FS	76-80%	Yes
CSR Fresno RHQ	76-80%	Yes
CSR South Operation HQ Geographic Area Coordination Center	96-100%	Yes
CSR South OPS Riverside RHQ	81-85%	Yes
CSR-MMU Los Banos FS	91-95%	Yes
CSR-RRU Elsinore FS	81-85%	Yes
CSR-RRU Riverside UH/ECC/FS	86-90%	Yes
CSR-RRU West Riverside FS	81-85%	Yes
CSR-TUU Porterville FS	96-100%	Yes

CAL FIRE currently has 12 facilities of 245, in disadvantaged communities. Many of the facilities are in rural areas, which tend to have higher CalEnviroScreen Scores. CAL FIRE, in concert with its mission, protects these communities by combating wildfires. Fire stations interact with surrounding communities by protecting properties and educating locals on best fire practices to help keep everyone safe.

Table 1.8 lists 12 facilities considered to be in disadvantage communities with a CalEnviroScreen score greater than 75%. Approximately 4% of CAL FIRE owned facilities are in disadvantaged communities. The 3% is a low value because most of CAL FIRE's facilities are in rural areas.

The disadvantaged community facilities in Table 5 all provide fire prevention, fire protection, emergency response, and natural resources protection services. CAL FIRE's mission is to serve and safeguard the people and protect the property and resources of California. Emergency information is shared with the community that is impacted.

Understanding Climate Risk to Planned Facilities

Table 1.9 a-g: Climate Risks to New Facilities

a.1

Facility Name	Historical Annual Mean Max. Temp. (1961 – 1990)	Annual Mean Max. Temp. (2031 – 2060)	Change from Historical to Annual Mean Max. Temp (2031-2060)	Annual Mean Max. Temp. (2070-2099)	Change from Historical to Annual Mean Max. Temp (2070-2099)
Cuyamaca Fire Station - Relocate Facility	65	71	5	74	9
CNR-NEU Nevada City FS	67	72	5	76	9
CSR-MVU Warner Springs FS	75	80	5	84	9
CNR-BTU Forest Ranch FS	69	74	5	78	9
CNR-AEU Garden Valley FS	71	76	5	80	9
CNR-SHU Fawn Lodge Sta 61 FS	65	69	5	73	9
CNR-SCU Del Puerto FS	75	79	5	83	8
CNR-TGU Elk Creek FS	74	79	5	83	9
CNR-MEU Boonville FS	69	74	5	77	8
CNR-MEU Howard Forest/Mendocino UH/FS/ECC/HB	68	71	3	75	7
CNR-HUU Thorn FS	62	66	4	70	7
CNR-NEU Colfax FS	71	76	4	80	9
CNR-LNU Cloverdale FS	72	76	4	79	7
CNR-MEU Point Arena FS	63	69	6	72	9

a.2

Facility Name	Historical Annual Mean Min. Temp. (1961 – 1990)	Annual Mean Min. Temp. (2031 – 2060) °F	Change from Annual Mean Min. Temp (2031-2060)	Annual Mean Min. Temp. (2070-2099) °F	Change from Annual Mean Min. Temp (2070-2099)
Cuyamaca Fire Station	39	44	5	47	8
CNR-NEU Nevada City FS	40	45	5	50	9
CSR-MVU Warner Springs FS	42	47	5	51	9
CNR-BTU Forest Ranch FS	42	47	5	51	9
CNR-AEU Garden Valley FS	48	52	4	56	8
CNR-SHU Fawn Lodge Sta 61 FS	34	38	4	42	8
CNR-SCU Del Puerto FS	47	52	5	56	9
CNR-TGU Elk Creek FS	45	50	5	54	9
CNR-MEU Boonville FS	43	47	4	50	8
CNR-MEU Howard Forest/Mendocino UH/FS/ECC/HB	38	42	4	46	8
CNR-HUU Thorn FS	42	46	4	50	8
CNR-NEU Colfax FS	46	51	4	55	8
CNR-LNU Cloverdale FS	45	49	4	52	8
CNR-MEU Point Arena FS	45	49	4	52	7

b.

Facility Name	Annual Mean Maximum precipitation (1961-1990) (in/yr)	Annual Mean precipitation (2031-2060) (in/yr)	Extreme Precip (1961-1990) (in/day)	Extreme Precip (2031-2060) (in/day)
Cuyamaca Fire Station	33	33	0.4%	35
CNR-NEU Nevada City FS	55	63	15.4%	67
CSR-MVU Warner Springs FS	16	16	-0.9%	17
CNR-BTU Forest Ranch FS	58	67	14.7%	71
CNR-AEU Garden Valley FS	37	42	12.4%	43
CNR-SHU Fawn Lodge Sta 61 FS	40	43	9.2%	45
CNR-SCU Del Puerto FS	10	12	14.9%	13
CNR-TGU Elk Creek FS	20	24	20.5%	26
CNR-MEU Boonville FS	46	53	15.6%	56
CNR-MEU Howard Forest/Mendocino UH/FS/ECC/HB	53	59	11.0%	63
CNR-HUU Thorn FS	83	91	9.9%	95
CNR-NEU Colfax FS	47	53	12.7%	56
CNR-LNU Cloverdale FS	48	56	17.9%	60
CNR-MEU Point Arena FS	36	42	16.5%	44

c.

Facility Name	Extreme heat threshold (EHT) °F	Average number of days above EHT (1961-1990)	Average number of days above EHT (2031-2060)	Increase in number of days above EHT
Cuyamaca Fire Station		92	4	28
CNR-NEU Nevada City FS		96	4	31
CSR-MVU Warner Springs FS		101	4	29
CNR-BTU Forest Ranch FS		98	4	26
CNR-AEU Garden Valley FS		101	4	30
CNR-SHU Fawn Lodge Sta 61 FS		99	4	21
CNR-SCU Del Puerto FS		103	4	22
CNR-TGU Elk Creek FS		105	4	20
CNR-MEU Boonville FS		96	4	22
CNR-MEU Howard Forest/Mendocino UH/FS/ECC/HB		96	4	14
CNR-HUU Thorn FS		92	4	7
CNR-NEU Colfax FS		100	4	25
CNR-LNU Cloverdale FS		101	4	13
CNR-MEU Point Arena FS		88	4	20

e.

Facility Name	Current Fire Hazard Severity Zone (low, medium, high, very high)
Cuyamaca Fire Station -	Very High
CNR-NEU Nevada City FS	Very High
CSR-MVU Warner Springs FS	High
CNR-BTU Forest Ranch FS	High
CNR-AEU Garden Valley FS	Moderate
CNR-SHU Fawn Lodge Sta 61 FS	Very High
CNR-SCU Del Puerto FS	Unzoned-N/A
CNR-TGU Elk Creek FS	Very High
CNR-MEU Boonville FS	Moderate
CNR-MEU Howard Forest/Mendocino UH/FS/ECC/HB	Very High
CNR-HUU Thorn FS	Very High
CNR-NEU Colfax FS	Very High
CNR-LNU Cloverdale FS	Unzoned-N/A
CNR-MEU Point Arena FS	Unzoned-N/A

f.

Facility Name	Acres Burned (1961-1990)	Acres Burned (2031-2060)
Cuyamaca Fire Station -	17	22
CNR-NEU Nevada City FS	7	20
CSR-MVU Warner Springs FS	13	18
CNR-BTU Forest Ranch FS	11	17
CNR-AEU Garden Valley FS	12	15
CNR-SHU Fawn Lodge Sta 61 FS	10	13
CNR-SCU Del Puerto FS	7	12
CNR-TGU Elk Creek FS	10	9
CNR-MEU Boonville FS	6	9
CNR-MEU Howard Forest/Mendocino UH/FS/ECC/HB	5	8
CNR-HUU Thorn FS	4	7
CNR-NEU Colfax FS	10	5
CNR-LNU Cloverdale FS	3	4
CNR-MEU Point Arena FS	1	1

g.

Facility Name	Heating/Cooling Degree Days (1961-1990) (HDD/CDD)	Heating/Cooling Degree Days (2031-2060) (HDD/CDD)
Cuyamaca Fire Station -	5124/359	3602/908
CNR-NEU Nevada City FS	4610/498	3428/1284
CSR-MVU Warner Springs FS	3357/910	2163/1778
CNR-BTU Forest Ranch FS	4269/680	3027/1502
CNR-AEU Garden Valley FS	3364/1295	2410/2250
CNR-SHU Fawn Lodge Sta 61 FS	6024/273	4750/793
CNR-SCU Del Puerto FS	2687/1267	1756/2206
CNR-TGU Elk Creek FS	3304/1296	2229/2225
CNR-MEU Boonville FS	3649/352	2600/998
CNR-MEU Howard Forest/Mendocino UH/FS/ECC/HB	4527/187	3466/572
CNR-HUU Thorn FS	4740/93	3474/351
CNR-NEU Colfax FS	3390/1172	2450/2042
CNR-LNU Cloverdale FS	3059/658	2153/1286
CNR-MEU Point Arena FS	4166/67	2581/409

For both Tables 1.10 and 1.11, CAL FIRE chooses locations of new facilities based on need and safety. While the data above provides a picture of how our facilities will be impacted with climate change and considering our local community, CAL FIRE will continue to choose facility locations based on the best strategic locations to protect the people and resources of the State of California.

Natural Infrastructure

EO B-30-15 also directs agencies to prioritize natural and green infrastructure solutions. Natural infrastructure is the “preservation or restoration of ecological systems or the utilization of engineered systems that use ecological processes to increase resiliency to climate change, manage other environmental hazards, or both. There are not many opportunities for CAL FIRE to include natural infrastructure in capital outlay projects, but, when possible, CAL FIRE does factor natural infrastructure into the Department’s construction process.

Full Life Cycle Cost Accounting

EO B-30-15 directs State agencies to employ full life cycle cost accounting in all infrastructure investment. Lifecycle cost accounting includes:

- Considering initial investment costs, as well as lifetime operation and maintenance costs under changing climate conditions, including changing average conditions and increases in extreme events
- Applying non-market evaluation methods such as travel cost, avoided costs or contingent valuation to capture hard to quantify benefits and costs

CAL FIRE considers initial and long-term operating costs of facilities, while meeting environmental impact reduction goals. Some building systems, such as HVAC, have a normal life span of 15-20 years before needing replacement, so climate change anticipated within the system life span must be considered. Building envelope design, such as building insulation and exterior finishes, generally have a much longer life span, and it is in the State's best interest to invest in well-insulated, durable building envelope components that can perform well in future climate change scenarios.

CAL FIRE Technical Services staff employs lifecycle considerations in new facility design and operations by following and incorporating the design criteria outlined and intended by the most recent version (2016) of the California Building Standards Commission (CBSC) California Building Code (Parts 1-12), the California Code of Regulations (CCR) Title 24, and the California Green Building (CALGreen) Verification Guidelines Mandatory Measures Checklist.

Lifecycle considerations are given to all building elements, including the structure itself, foundations and footings, materials, equipment, and finishes. Operations and maintenance considerations are included in the design and selection of materials, equipment, and functions of these items.

Integrating Climate Change into Department Planning and Funding Programs

EO B-30-15 extends beyond infrastructure to broader planning efforts. As stated in our 2019 CAL FIRE Strategic Plan, the Department is committed to adapting to our changing climate and helping to reduce harmful actions.

Table 1.10: Integration of Climate Change into Department Planning

Plan	Have you integrated climate?	If no, when will it be integrated?	If yes, how has it been integrated?
CAL FIRE Strategic Plan	Yes		Through Natural Resource Protection

Table 1.11: Engagement and Planning Processes

Plan	Does this plan consider impacts on vulnerable populations?	Does this plan include coordination with local and regional agencies?	Does this plan prioritize natural and green infrastructure?
CAL FIRE Strategic Plan	Yes	Yes	Yes

Table 1.12: Climate Change in Funding Programs

Grant or funding program	Have you integrated climate change into program guidelines?	If no, when will it be integrated ?	Does this plan consider impacts on vulnerable populations?	Does this program include coordination with local and regional agencies?
DGS Water Grant	Yes		No	Yes
CalOES EV ARC Grant	Yes	-	No	Yes

Currently CAL FIRE is utilizing grant money from CalOES to fund plug in charging station installation across the State. CAL FIRE is partnering with Beam Global to install the EV ARC charging system at five locations. Beam Global EV charging infrastructure products are transportable, off-grid, and require no construction, permitting, or electrical work--providing fleet vehicles with access to clean, resilient EV charging. Wind rated to 120mph, flood-proof to 9 ½ feet, and featuring an emergency power panel, the EV ARC™ systems also serve as emergency preparedness sustainable generators for fleet operators and first responders, as they continue to operate during grid failures and provide power

in locations without access to the utility grid. This is an important step forward for CAL FIRE and the fleet.

Measuring and Tracking Progress

CAL FIRE faces numerous challenges from climate change, especially to resources and buildings. CAL FIRE buildings face flood risks from heavier precipitation and heat waves from increasing temperatures. CAL FIRE currently does not have a structured method for tracking changing climate conditions at facilities but will work to establish and implement a tracking methodology.

CAL FIRE is working with climate scientists, foresters, other State agencies, and local and regional partners to develop new planning and design methods that incorporate climate change. In order to build flexibility and adaptability into long-term planning, CAL FIRE must understand the probability and range of multiple future climate scenarios, and then make decisions accounting for the associated risks of climate change. This requires close coordination between all stakeholders, since decisions must incorporate the best estimates of climate change, costs, impact to communities, and impact of these decisions on the safety of wildlife and the people of California.



Chapter 2

Pictured - Solar Powered EV Arc Charging Station
Tech Services HQ Sacramento

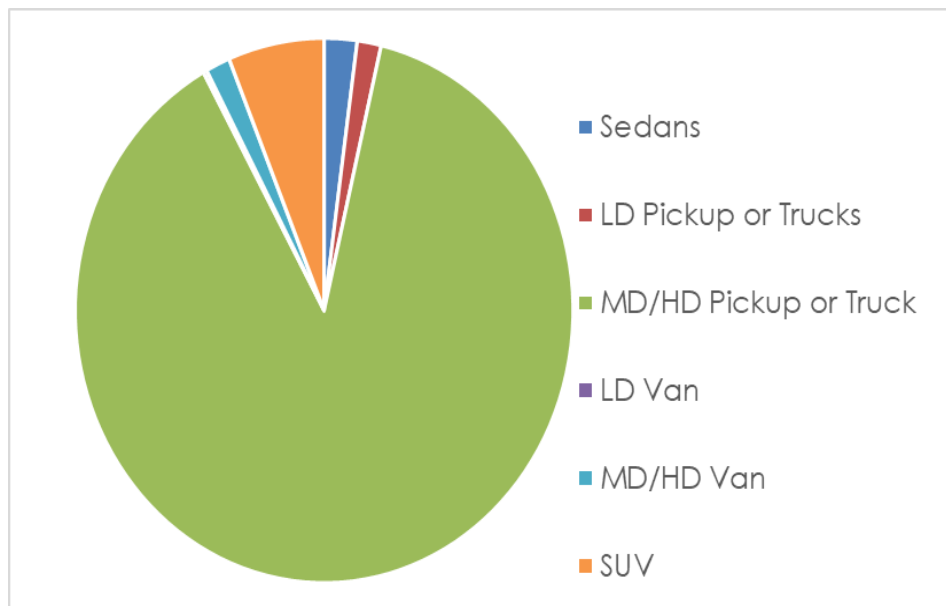
ZERO ADMISSION VEHICLES

CHAPTER 2 – ZERO-ADMISSION VEHICLES

Department Mission and Fleet

The Zero Emission Vehicle (ZEV) Report and Plan demonstrates to the Governor and the public the progress the Department has made toward meeting the Governor’s sustainability goals related to Zero Emission Vehicles. This report identifies successful accomplishments, ongoing efforts, outstanding challenges, and future efforts for CAL FIRE.

Graph 2.1: 2020 Composition of Vehicle Fleet



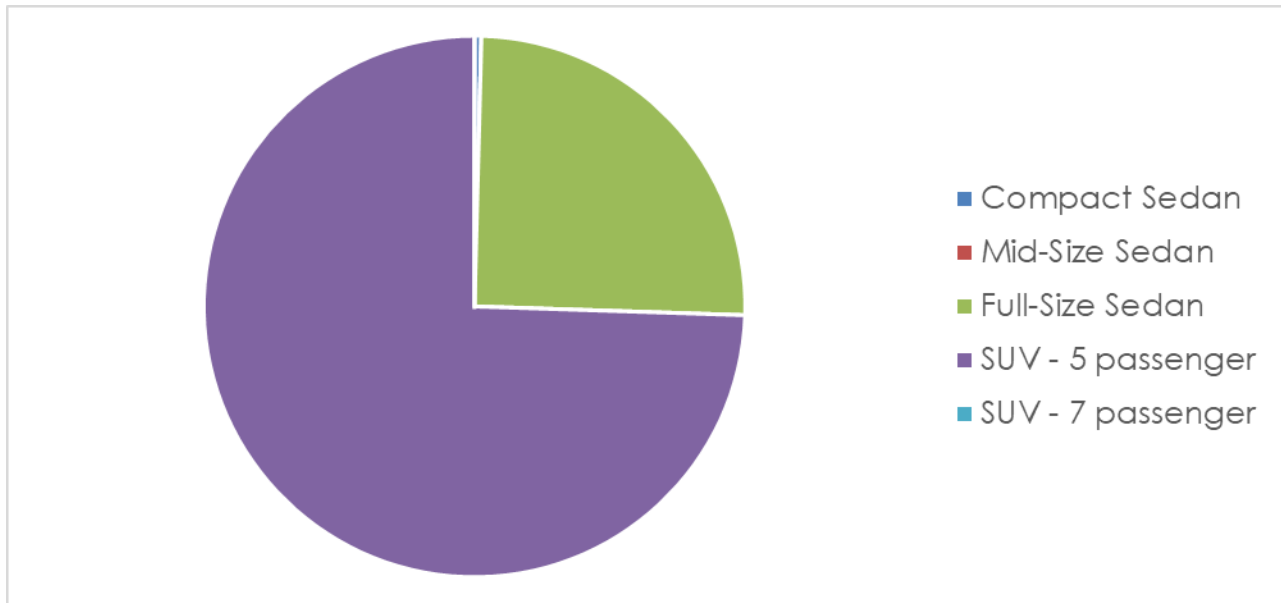
Sedans	LD Pickup or Trucks	MD/HD Pickup or Truck	LD Van	MD/HD Van	SUV
62	45	2561	7	46	181

Light Duty Fleet Vehicles

Approximately 20% of CAL FIRE's fleet are light duty vehicles that include sedans, smaller SUVs, ½ ton pickup trucks, and smaller vans (7–8 passengers). Light duty pickup trucks presently represent approximately 13% of the total fleet of both light and heavy-duty vehicles. Due to revised equipment hauling requirements, ¾ ton pickups are being purchased to replace ½ ton pickup trucks. Excluding

light duty pickup trucks, the light duty fleet is approximately 7% of the total fleet and includes sedans (hybrid & police intercept), SUVs (police intercept), and passenger/cargo vans. Graph 1 below shows the break-down of the 20% of light duty vehicles.

Graph 2.2: Composition of Light Duty Vehicle Fleet



Compact Sedan	Mid-Size Sedan	Full-Size Sedan	SUV - 5 passenger	SUV - 7 passenger
1	0	61	181	0

CAL FIRE's analysis of light duty vehicle miles per gallon (MPG) is skewed. Many of our vehicles spend time running idle to operate pumps, power facility infrastructure, and running emergency incident operations. CAL FIRE's mission is incident response, first and foremost, and because of this, the Department can ill afford to change fuel and operating habits that might put the lives and property of California at risk.

Because of the nature of CAL FIRE's mission, replacing vehicles with high MPG rating is limited to very small percentage (7%) of the total light duty vehicles. Of the 7% vehicles suitable to high MPG rating, approximately 62% are currently either BEV or hybrid sedans. There is currently no suitable ZEV that can meet CAL FIRE's mission standard. With ZEV becoming more mainstream, CAL FIRE will work to include more ZEVs into its program as they become more mission suitable.

Medium and Heavy-Duty Fleet Vehicles

CAL FIRE's fleet is dominated by heavy duty vehicles primarily used in fire suppression activities. Approximately 80% of the 2600 on-road vehicles are heavy duty vehicles that transport people and equipment. Heavy duty vehicles are vehicles with gross vehicle weight capacity greater than 8,500 pounds and include fire engines (20.3%), emergency crew transport/crew carrying vehicles (12.5%), large trucks for transporting equipment and trailers (17%), and ¾ ton pickup trucks (29.3%). Using the Federal Highway Administration (FHWA) vehicle classification, CAL FIRE's heavy-duty fleet is comprised of class 3 support vehicles and up to class 9 trailer-trailer assets.

Graph 2.3: Composition of Medium and Heavy-Duty Vehicle Fleet Subject to the ZEV First Purchasing Mandate

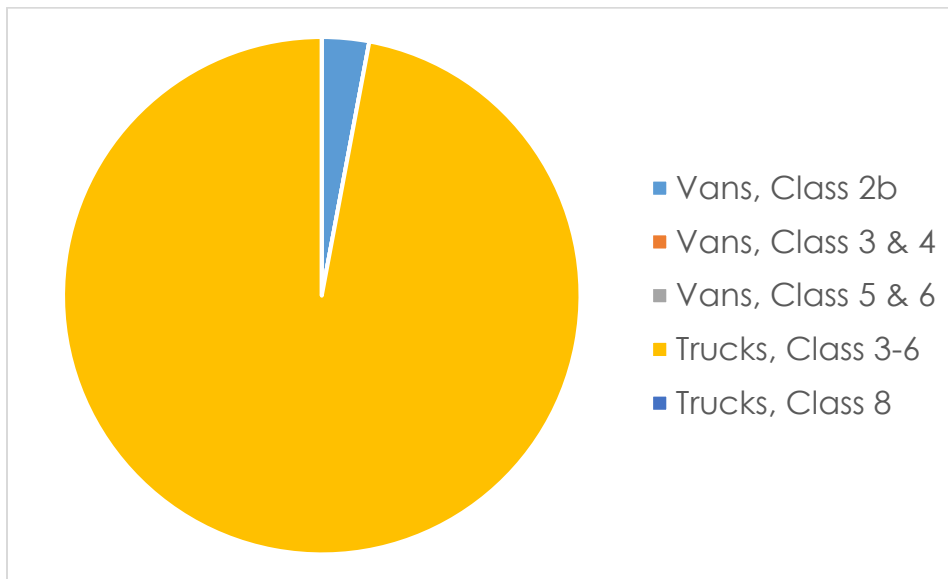


Table 2.1: Total Fuel Purchased in 2020

	Diesel	Gasoline	Renewable Diesel
Fuel Amount Gallons	1,615,269	1,860,510	172,717

The table above reports the fuel usage for on-road light duty and heavy-duty vehicles. Aviation fuel for airtankers, helicopters, and air tactical aircraft is not included in this table. Aircraft fuel is a large percentage of the total fuel consumed by CAL FIRE's vehicles.

CAL FIRE vehicles are mostly heavy duty, leading to high fuel amounts.

Incorporating ZEVs into the State Fleet

Pursuant to the Governor's Executive Order (EO) B-16-12, State departments are required to increase the number of zero emission vehicles (ZEV) within their fleets. As departments move towards this initiative, additional measures have been placed on the ZEV vehicle purchasing policy. Departments were advised, as of January 1, 2020, to purchase vehicles from authorized Original Equipment Manufacturers (OEMs) that have aligned with the California Air Resources Board (CARB).

Light-Duty ZEV Adoption

A widespread shift to ZEVs is essential for California to meet its Green House Gas (GHG) emission goals. State departments are now required to incorporate and prioritize a larger number of light-duty ZEVs in their vehicle fleets. Starting in FY 17/18 the percentage of new light duty vehicles that must be ZEVs began increasing by 5% each year, reaching 25% in FY 19/20 and 50% in FY 24/25.

Due to climate change, drought, the die-off of an enormous number of trees, and the latest tactics used to fight these immense fires, more personnel and firefighting gear are necessary, equating to a greater need for more payload. The Department has surpassed the expectations of EO B-16-12 mandated by FY 24/25, and we intend to replace more during our regular replacement cycle. Vehicles that meet specified mileage and age thresholds are eligible for replacement. Currently ZEVs are available on statewide commodity contracts in a range of light duty vehicle categories. While many vehicle classes currently lack a ZEV alternative to purchase due to the purchasing restrictions imposed in State Administrative Manual Section 4121.8, departments are encouraged to complete and review Table 2.2 as if all light duty vehicle classes have a ZEV alternative available for purchase.

Table 2.2: Light Duty Vehicles in Department Fleet Currently Eligible for Replacement

Table Header Name	Sedans	Minivans	Pickups	SUVs, 5 passengers	SUVs, 7 passengers	Total
# of vehicles eligible for replacement	9	4	18	47	0	78

Since CAL FIRE has begun to outgrow the use of light duty vehicles to achieve its overall mission, the Department is taking as much advantage as possible by incorporating them in our pool vehicle fleet, inspection fleet, courier fleet, day use fleet, travel, and training fleet. These vehicles would be driven by OSFM for building and facility inspection. The rest are commonly used by rank-and-file employees for various tasks, duties, assignments, training, courier, and emergency incident fire response, i.e., base camp operations and conducting support duties for incident command.

Vehicles over specified mileage and age thresholds are eligible for replacement. Currently ZEVs are available on statewide commodity contracts in the sub-compact, compact, mid-size sedan and mini-van vehicle classes. There are currently 2 vehicles in our fleet that are currently eligible for replacement in vehicle classes for which ZEVs are available on contract.

Table 2.3: Light Duty ZEV Additions to the Department Fleet

Table Header Format	21/22	22/23	23/24	24/25	25/26
Battery Electric Vehicle	1	1	1	1	1
Plug-in Hybrid Vehicle	29	29	29	29	29
Fuel Cell Vehicle	0	0	0	0	0
Percent of total purchases					
Required ZEV Percentage	35%	40%	45%	50%	50%
Total number of ZEVs in Fleet*	30	30	30	30	30

Medium- Heavy-Duty ZEV Adoption

Like the light-duty purchasing policy above, the adoption of MD/HD ZEVs is essential to meet greenhouse gas emission reduction goals. As of July 2020, SAM section 4121.9 requires State agencies to prioritize the purchasing of MD and HD ZEVs vehicles into their fleets. Additionally, beginning December 31, 2025, departments are required, per Assembly Bill (AB) 739, to have 15% of newly purchased vehicles with a gross weight rating of 19,000 pounds or more be ZEVs. This percentage will increase to 30% by December 31, 2030.

Replacing medium and heavy-duty trucks is more challenging because the ZEV technology is not yet reliable enough for the work CAL FIRE completes to meet its mission, leaving CAL FIRE with few options. Some manufactures have started to produce reliable ZEV mid-sized pick-up trucks that could replace some of our medium duty trucks. Many of our sites across the State are in remote and rural areas. The need for plug-in charging stations is vital to make this change. Currently, CAL FIRE is working to put many solar power charging stations at various facilities throughout the State, which would help make the transition to ZEV more obtainable. A mix of zero admission infrastructure, in the form of charging stations would need to be a Statewide facility plan. CAL FIRE's Capital Outlay program is currently pursuing these changes but is far from meeting necessary thresholds to support a ZEV fleet overhaul.

Additionally, many of our fleet vehicles are fire trucks and bulldozers, needed for emergency services. At this time there is no reliable ZEV, PHEV, or BEV that could replace our current fleet, and be as reliable as standard fire engines. This portion of our fleet is needed for days at a time in forest, and hard to reach places throughout the State. ZEV vehicles currently are not advanced enough to meet the requirements needed for wildfire response.

Table 2.4: MD/HD Vehicles in Department Fleet Currently Eligible for Replacement

	Vans, Class 2b	Vans, Class 3 & 4	Vans, Class 5 & 6	Trucks, Class 3-6	Truck, Class 8	Total
# of vehicles eligible for replacement	12	0	0	395	0	407

All of CAL FIRE applicable fleet vehicles have been converted to ZEVs. Therefore, there are no future ZEV purchases for CAL FIRE until the Department's existing ZEVs reach their usable lifespan.

Telematics Plan

In accordance with SAM section 4122, State departments are required to install telematics devices on all State fleet assets. Departments were required to install all telematics devices on light duty vehicles by August 1, 2021 and were required to install telematics on all remaining assets by February 1, 2022. Additionally, departments were required to develop and issue a telematics policy that is specific to their needs by March 31, 2021.

CAL FIRE is currently awaiting approval of the Department's Telematic Plan, as of November 2021.

Public Safety Exemption

CAL FIRE is an emergency response department much like the California Highway Patrol. Nearly all fleet assets fall under the provisions of SAM 4121.4, EO B-16-12, which specifies that only public safety vehicles with special performance requirements are exempted from a State agency's annual zero emission vehicle (ZEV) purchasing requirements. Governor Brown's 2016 ZEV Action Plan requires the Department of General Services (DGS) to evaluate and provide further guidance to agencies as to the appropriate circumstances under which the public safety exemption should be invoked so as to ensure that ZEVs are integrated into public safety mobile assets wherever feasible. ZEV technology has not provided an adequate solution for CAL FIRE to convert any further assets without sacrificing loss of property, natural resources, and human life.

There is no existing vehicle type that can out-perform the functions of a heavy-duty vehicle with the type of functionality required by the Department. The law enforcement units of CAL FIRE and OSFM would be severely restricted to utilize a ZEV for clandestine, undercover, or enforcement operations. Presently, CAL FIRE's law enforcement units and OSFM are selecting Dodge Chargers, Chevrolet Tahoe SUVs, and ¾ ton pickup trucks when replacing vehicles. Below are the justifications for selecting these vehicles:

Dodge Charger is a true enforcement vehicle that can be ordered with a police package that include ballistic panels, secure park feature, surveillance mode, and pursuit speed rated. Additional features included in a police package are a

high output electrical system, heavy duty cooling system, heavy duty braking system, spotlights, and prewiring to accommodate additional necessary electrical equipment. These vehicles come equipped with high speed "V" rated tires certified to 149 miles per hour (MPH).

Chevrolet Tahoe SUVs can be ordered with a police package with the similar law enforcement equipment as the Dodge Charger, including pursuit speed rating. The Tahoe has superior functional hauling capacity for law enforcement and investigating equipment. Large SUVs can negotiate rugged off-road terrain and poorly maintained roadways in unincorporated areas often during inclement weather that creates all types of driving conditions.

The heavy-duty three-quarter ton four-wheel-drive pickup truck has the cargo hauling capacity and is highly configurable to provide the required functionality of CAL FIRE's law enforcement and Office of the State Fire Marshal (OSFM) staff. The various available configurations are tonneau covers, camper shells, utility boxes, and bed slide-outs that provide functionality to staff.

The available BEVs available to purchase by the State would not provide the functionality required by CAL FIRE's law enforcement or OSFM staff to perform their duties, including OSFM investigators. BEVs lack the driving range, equipment hauling capacity, or pursuit rated speed. The available charging stations and the required charging time are additional factors that reduce BEVs' viability for the many remote areas of California.

PHEVs are a viable vehicle being purchased and assigned to OSFM investigators. The available mid-size PHEVs have the driving range and reasonable equipment carrying capacity for the investigators to perform their duties. They are solely used for investigation work and not used in any high-speed pursuit, nor do they have the law enforcement equipment found on the Dodge Charger or Chevrolet Tahoe SUV. They are also not suitable for rough off-road usage.

Department of Forestry and Fire Protection Parking Facilities

The most common CAL FIRE facility is a fire station that contains an apparatus building to house the fire engine(s) with supporting equipment and barrack/mess hall that provides sleeping quarters and dining for the fire fighters who are on duty 24 hours a day in the fire season. The outdoor parking facilities associated with the fire station are for the staff's personal vehicles. CAL FIRE's fire stations do not typically have customers coming to remote facilities. Visitor parking for fire stations is typically not available or required due to the remote

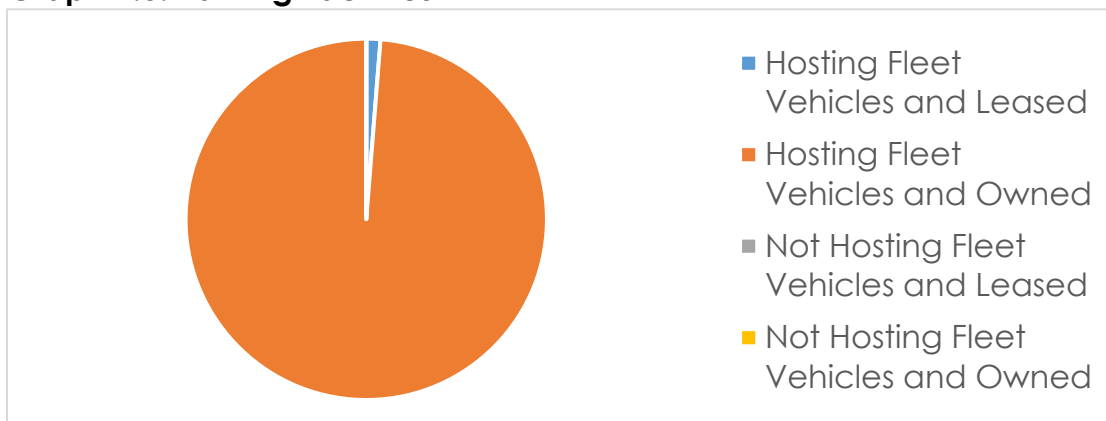
locations of most of these facilities. It is not practical for a visitor who is not conducting business at the fire station to use a L1 or L2 charger and wait hours to receive a usable charge. There would be no available onsite bathrooms for the visitor to use, nor would there be nearby public facilities to obtain food or bathroom services.

Besides fire stations, CAL FIRE has very diverse facility types that are distributed throughout the State. CAL FIRE owns approximately 70% of all our facilities and approximately 80% of our fire stations. All of CAL FIRE's facilities have fleet assets that typically are heavy-duty vehicles that could not use EV charging station. Fire stations typically have all heavy-duty vehicles, while the Unit Headquarters (UHQ) facilities have both light-duty and heavy-duty vehicles. UHQ facilities typically have a fire station as part of the facility. Providing EV charging stations to the visiting public is not practical and could interfere with CAL FIRE's public safety operation. CAL FIRE will not provide the EV charging stations to the visiting public or customers or staff personal vehicles. EV charging stations will be available to State vehicles only, where demand warrants the installation.

For the most common type of facilities, the remote fire station, CAL FIRE will evaluate the need for EVSE for State vehicles. Most fire stations are staffed by less than 10 fire fighters. Given the cost to install EVSE for all fire stations contrasted with the limited number (if any) of fleet vehicles requiring EVSE, CAL FIRE will prioritize charging equipment installation to larger facilities.

Large facilities will take priority for evaluation and installation of EVSE. These facilities have larger number of fleet and staff vehicles that more likely would have the need for charging equipment. As mentioned previously, CAL FIRE's light duty fleet vehicles are reducing in numbers with the conversion to the ¾ ton heavy duty.

Graph 2.3: Parking Facilities



The facilities with the most urgent need for EV charging are listed below. Please note, some of the facilities listed below are leased facilities. Many of the Department's leased facilities are in urban areas where large numbers of administrative staff report to work. EV charging would be more sensible at these facilities due to the larger workforce reporting to work.

Table 2.5: High Priority EVSE Projects

Facility Name	Total Parking Spaces	Existing L1 Charging Ports (2020)	Existing L2 Charging Ports (2020)	Existing L3 Charging Ports (2020)	Total Charging Ports (2020)	EV Charging Ports Needed by 2025
Business Services Office	488	5 dual (10)	3 dual, 3 single		14	0
Davis Mobile Equipment	80	10 dual	4 single		24	0
CSR Riverside HQ	137	5 dual	6 dual, 4 single		21	0
CSR Riverside HQ	191	5 dual	2 single		12	0
CNR Region HQ	50	3 dual	1 single		7	0
Total	1666	62	40		89	0

Given the limited number of ZEV vehicles we can purchase, there will not be as many new charging ports needed.

Outside Funding Sources for EV Infrastructure

CAL FIRE's Capital Outlay team will continue to investigate outside funding sources for EV infrastructure, including the DGS Office of Sustainability Transportation Unit, to determine if there is a cost savings. Currently, it is more cost effective to purchase and install EVSE without outside funding.

Hydrogen Fueling Infrastructure

CAL FIRE does not have any hydrogen fueled vehicles, and there are no plans to purchase these vehicles. Since there are no hydrogen vehicles in our fleet, there is no need to install hydrogen fueling stations. Due to the risk of being near an active wildfire, electric vehicles are more preferable to the Department.

Comprehensive Facility Site and Infrastructure Assessments

Site assessments are performed to establish the cost and feasibility of installing needed EV infrastructure. Due to the large number of CAL FIRE facilities Statewide, site assessments are completed on a case-by-case basis. As the CAL FIRE Sustainability program continues to grow, CAL FIRE staff will work to complete EV Charging site assessments at owned facilities.

EVSE Construction Plan

CAL FIRE has incorporated EVSE in the Department's Five-Year Infrastructure Improvement Plan during the 2019 to 2024 cycle. The five-year plan includes major and minor capital outlay projects with project cost and schedule. Where there is an immediate requirement to install EVSE for a State-owned vehicle, a minor capital outlay project will be programmed to construct.

The Department will perform or coordinate design work, bid, construction, and activation of the charging infrastructure. Each EVSE project will be evaluated to determine if the project will be designed in-house, by an outside firm, or the DGS Transportation Unit, based on the cost and timeline.

EVSE Operation

CAL FIRE will only provide EVSE for State vehicles and not to the visiting public or customers or staff personal vehicles at this time. There is no need to develop cost recovery policies. Due to the very limited number of State light-duty vehicles that are either BEV or PHEV, each facility with EVSE will develop a charging practice to accommodate its vehicles. The Mobile Equipment Management staff at the Davis facility will be responsible for collecting and reporting EVSE usage. Staff at each location with EVSE will be responsible for maintaining the equipment.



Chapter 3

Pictured - Fredoyner PV Powered
Communication Site

ENERGY

CHAPTER 3 - ENERGY

This Energy Report demonstrates to the Governor and the public the progress the Department has made toward meeting the Governor's sustainability goals related to energy. This report identifies successful accomplishments, ongoing efforts, and outstanding challenges.

Department Mission and Built Infrastructure

This Energy Report summarizes the progress CAL FIRE has made to meet the Governor's sustainability goals as it related to building energy usage. It will also identify for the Governor, the public, and CAL FIRE's executive staff CAL FIRE's accomplishments, challenges, and ongoing efforts.

CAL FIRE is an emergency response and resource protection department whose primary mission is to serve and safeguard the people and protect the property and resources of California. We integrate resource management, fire protection, and fire prevention missions on behalf of the State and local communities. We are committed to the safety and well-being of the public and our employees.

The Department has a diverse building infrastructure to support our mission that includes:

- 21 unit headquarters complexes (fire station, offices, emergency command centers, & training facilities)
- 237 State fire stations with supporting barracks and mess halls
- 575 local government fire stations shared with CAL FIRE staff and equipment
- 31 conservation camps shared with California Department of Corrections and Rehabilitation (CDCR) staff and inmates
- 13 air attack bases
- 10 helitack bases
- Lone Training Academy
- McClellan aviation repair facility
- Davis Equipment Center
- Davis Nursey

Each these facilities have various supporting buildings that consume energy.

A typical fire station will include an apparatus building to store the fire equipment, along with barracks and a mess hall to house the fire fighters' 24-hour operation. Vehicle gas and oil buildings are located at each station to keep the fire engines ready for emergency calls on a 24-hour basis. All fire stations have back-up electric generators to maintain operational readiness. Approximately half of the stations obtain water from wells that use electricity to pump water. Due to remote locations of many fire stations, propane fuel is used to provide hot water, building heating, and cooking.

CAL FIRE owns approximately 246 facilities with estimated 2,129,349 sq. ft. The energy usage reported in this chapter only includes CAL FIRE's owned buildings and not leased facilities, where obtaining energy usage from county/local governments, and the federal government (US Forest Service) has been challenging.

CAL FIRE's conservation camps energy usage is not included due to the challenge in determining the energy usage at our shared facilities. Typically, CDCR staff and inmates are housed at these fire camps, and CDCR pays most of the energy bills. Obtaining energy data for these camps has been an ongoing challenge for CAL FIRE, and we are working on creating a calculation to determine the amount of energy used by CAL FIRE personnel assigned to the camps. It is worth noting that the number of CAL FIRE employees at shared facilities is minimal compared with the inmate and guard populations.

Table 3.1 below shows total purchase energy quantities for the baseline year 2003 and the 2020 year. The table shows a 3% increase in total site kBtu for CAL FIRE owned facilities. Electric usage decreased by 3%, natural gas usage increased by 8% and propane delivered to the facilities increased by 12% for 2020 compared to the baseline year 2003. The total increase in site kBtu reflects the longer fire season that California has experienced in more recent years, and the additional staff increases to fight these large fires. Seasonal fire stations are being operated for additional months, increasing the total energy usage. EV charging station electric usage is not reported due to no separate meters to record usage at this time.

CAL FIRE's staffing fluctuates each year from base staffing, transitional staffing, and peak staffing as defined by CAL FIRE's Blue Book Fiscal Year 2019/2020. CAL FIRE's Human Resource (HR) office can only provide December's staffing number from 2012 to 2017. Starting in 2018, monthly staffing data is available. Using December staffing numbers from 2013 to 2020, there has been an approximate 66% increase in staffing.

Baseline 2003 purchased energy was estimated using available data from 2013 when staff was assigned to collect and report annual energy usage data to DGS.

Table 3.1: Total 2003 and 2020 Purchased Energy

Purchased Energy	2003 Baseline Quantity		2020 Quantity		% Qty. Change
Electricity	16,123,153	kWh	15,686,111	kWh	-3%
Less EV Charging	-	kWh	-	kWh	
Natural Gas	188,417	therms	203,021	therms	8%
Propane	250,440	gallons	281,350	gallons	12%
Fuel Oil	-	gallons	-	gallons	-
Steam	-	pounds	-	pounds	-
Chilled H2O	-	kBtu	-	kBtu	-
TOTALS	96,727,275	kBtu Site	99,519,686	kBtu Site	3%

Note: 2003 baseline electricity, natural gas and propane data is estimated using 2013 data.

Table 3.2 below lists the 10 highest energy consuming facilities owned by CAL FIRE. Eight of the facilities are large regional unit headquarter facilities that are operated year around. CAL FIRE's Aviation Management Unit (AMU) at McClellan Park is located in a facility constructed in the 1930s with very minimum energy standards. CAL FIRE's Training Center in Lone provides yearly training to our fire personnel; the Training Center completed the construction of a new 19,750 sq. ft. barracks in 2019, providing additional student housing and replacing the temporary modular trailers.

Listed below are facilities in Table 3.2 that will be replaced, relocated, or are slated to receive major improvements:

- CSR Riverside UH/ECC/FS – relocate facility on 5-year plan
- CNR BTU Magalia FTC – remodel to transition from camp to Fire Training Center
- CNR Howard Forest/Mendocino UH/ECC/HB/FS – 5-year plan to replace the helibase facility

- CNR-SKU Siskiyou UH/ECC/FS – 5-year plan to replace facility
- CNR-SCU Santa Clara UH/ECC/FS – 5-year plan to replace facility

The facilities listed above will be constructed to current building energy standards, providing the Department significant energy savings in the future.

Table 3.2: Properties with Largest Energy Consumption

Building Name	Floor Area (ft ²)	Site Energy (kBTU)	Source Energy (kBTU)	Source EUI (kBTU/ft ² -yr)
Aviation Management - McClellan	67,198	5,497,404	13,390,171	199
Training Center - Lone	70,855	5,475,650	12,787,315	180
CSR-RRU Riverside UH/ECC/FS	31,750	3,421,981	9,454,131	307
CNR-BTU Magalia FTC	59,799	3,292,487	5,459,575	100
CNR-SHU Redding UH/ECC/FS	33,854	2,321,598	5,519,716	179
CNR-MEU Howard Forest/Mendocino UH/ECC/HB/FS	29,248	1,993,711	4,594,549	161
CSR-BDU San Bernardino UH/ECC/COM/RMO/SFM/FS	34,447	1,324,872	4,131,100	120
CSR-TUU Tulare UH	31,387	1,636,790	3,711,528	130
CNR-SKU Siskiyou UH/ECC/FS	23,353	1,860,540	4,128,114	202
CNR-SCU Santa Clara UH/ECC/FS	29,259	1,771,554	3,792,041	133
Total for Buildings in This Table	411,150 ft ²	28,596,588 kBTU	66,968,239 kBTU	---
Total for All Department Buildings	2,087,254 ft ²	76,595,931 kBTU	222,371,234 kBTU	---
% of Totals	20%	37%	30%	---

A majority of CAL FIRE’s facilities were built more than 50 years ago and are operating well past their useful life. Older facilities use more energy than a modern constructed facility that meets today’s ZNE and Title 24 standards. CAL FIRE has been provided additional funds to replace more facilities in recent years, and additional Technical Services staff have been added to design replacement facilities to reduce the backlog of projects; DGS also continues to perform design and project management for CAL FIRE projects that are not handled internally.

CAL FIRE will be challenged to achieve ZNE for 50% of the square footage for existing State-owned building area by 2025. Many of our projects currently under design and in construction were initially funded/programmed before ZNE requirement due to long lead times. Installation of solar panels to improve ZNE goals at fire stations surrounded by tall trees or terrain with limited sun light will greatly reduce the effectiveness of renewable energy.

Solar panels with battery backup have been installed at three remote (off-grid) fire stations that were previously provided electricity by gas or diesel generators, considerably reducing their GHG emissions.

A large solar project has been installed at our Lone Training Center with a Power Purchase Agreement (PPA) that has provide approximately 860,000 kWh reduction in grid electricity.

In 2019-2020, 85 facilities were retrofitted with LEDs using On-Bill-Financing (OBF) in our PG&E service areas. An additional 65 facilities have been LED retrofitted in 2021 through the OBF program, completing all owned facilities in PG&E's service area. The total estimated savings for the 150 retrofit projects is \$563,000 and 2,414,000 kWh in electricity annually.

San Diego Gas & Electric (SDGE) and Southern California Edison (SCE) are in the process to offer OBF for LED retrofit programs, and CAL FIRE has submitted initial paperwork to apply for these programs. We expect these two programs will start up early in 2022.

CAL FIRE Five Year Infrastructure Plan

CAL FIRE controls and maintains over 2,550 structures comprising 530 State facilities Statewide, many of which are required to meet Title 24, Essential Services Act. An analysis of Statewide property inventory indicates that CAL FIRE ranks second in total number of structures among all General Fund State Agencies. Of these facilities, 63 percent were constructed prior to 1960, with 80 percent constructed prior to 1970. The average age of CAL FIRE's facilities exceeds 48 years.

As a result of aging infrastructure, increased use from extending fire season at fire protection facilities (due to the droughts and extreme weather), and multiple years of increased fire protection staff using these facilities (e.g., holding all two engine fire station personnel on duty due to predicted weather and fuel conditions), CAL FIRE is experiencing a higher rate of facility deterioration. The facilities were designed to have a maximum operational life of 50 years. Due to

these factors, CAL FIRE faces a rapidly increasing rate for facility repair and replacement funding.

The recession of 2008 resulted in a lack of logistical staff and funding to address facilities exceeding their operational readiness. The decrease in facility maintenance and repair, combined with increasing facility use, had accelerated infrastructure failures. This lack of attention resulted in both functional and structural damage to facilities, and in some cases added environmental and health investigations and cleanups. This is due to aging infrastructure that is exacerbated by either a lack of staff or a lack of funding to keep up on the maintenance and repair tasks, so the issues become larger due to the lack of attention.

The Covid-19 Pandemic affected CAL FIRE much like many other State Agencies and Departments. Amid the 2020 uncertainty, many new projects were withdrawn to preserve the State Budget in a time of turmoil. Many of these projects had a resurgence in the Department's 2021-22 Budget allocation.

Deferred Maintenance

In December 2019, CAL FIRE identified \$147.7 million in Deferred Maintenance projects and annually has had need for approximately \$100 million in necessary Special Repairs to maintain the current infrastructure. The Budget Act of 2016 included one-time Deferred Maintenance funding of \$8 million, \$2 million was included in the Budget Act of 2018, and \$3 million was included in the Budget Act of 2019. This funding has addressed only a portion of the repairs identified Statewide but continues to be utilized. In addition, it is difficult to implement a sudden influx of funds because artisans and maintenance staff need to be hired, plans generated and permitted, and work performed within the extended encumbrance/expenditure timeframes. This created challenges for CAL FIRE, and the Department has been working collaboratively with the Department of Finance to find solutions to these issues.

The long-term solution to the Deferred Maintenance backlog is for CAL FIRE to have sufficient Special Repairs funding and staff to complete necessary and required Special Repairs, avoiding them from becoming Deferred Maintenance.

The Budget Act of 2019 provided funding to increase the Special Repair budget from approximately \$1.7 million to \$14 million over three years, with additional positions and corresponding funding to support the delivery of annual Special

Repairs. This funding and positions address the annual special repair needs that will avoid a greater accumulation of Deferred Maintenance projects but does not address the existing Deferred Maintenance project backlog.

The Budget Act of 2021 provided \$50 million to address Deferred Maintenance projects that represent critical infrastructure deficiencies, and \$21.2 million to address projects at existing facilities to accommodate additional fire crews. Ongoing special repair funding will avoid a greater accumulation of Special Repairs; however, there will continue to be an increased need for capital outlay funding to permanently address the declining state of the current infrastructure and to ensure the Department's mission mandates and health and safety requirements are met.

Currently, CAL FIRE has 35 active Capital Outlay projects and asked to add 13 in the 2021 budget year, with an additional ask of 23 projects for the 2022 budget year. CAL FIRE's Capital Outlay program is the lead for eight projects each budget year, with DGS bearing responsibility for the remainder of the projects. The number of DGS managed projects is 17 for the 2022 budget year and increases to 25 for budget years 2023-2026. Both agencies manage projects Statewide.

Zero Net Energy (ZNE)

CAL FIRE's newly constructed San Mateo-Santa Cruz Unit and the Sonoma-Lake-Napa Unit Auto Shops were both designed as Zero Net Energy facilities. These projects have established a baseline for CAL FIRE ZNE facilities, and the Department is incorporating ZNE into future design and construction of facilities.

New Construction Exceeds Title 24 by 15%

All new State buildings and major renovations beginning design after July 1, 2012, must exceed the current California Code of Regulations (CCR) Title 24, energy requirements by 15% or more. CAL FIRE facilities designed after 2012 meet or exceed Title 24 energy reduction requirements.

Table 3.3: New Construction Exceeding Title 24 by 15%

Buildings Exceeding Title 24 by 15%	Number of Facilities	Floor Area (ft²)
Completed Since July 2012	12	178,367
Under Design or Construction	42	537,370

CAL FIRE designs and constructs new facilities according to LEED Silver standards, although certification is not sought. CAL FIRE projects, regardless of project management, work to ensure that new construction meets all statewide CCR requirements.

Reduce Grid-Based Energy Purchased by 20% by 2018

Executive Order B-18-12 requires State agencies to reduce grid-based energy purchased by 20% by 2018, compared with a 2003 baseline.

CAL FIRE has not historically collected data on facility energy usage outside of EnergyStar. In future iterations of the Sustainability Roadmap, CAL FIRE plans to begin collecting this data for reporting and energy efficiency purposes.

Table 3.4: Department-Wide Energy Trends

Year	Floor Area (ft²)	Total Source kBTU Consumption	Department Ave. Source EUI
2013	2,103,897	193,493,363	92
2014	2,103,897	194,974,295	93
2015	2,102,555	199,114,830	95
2016	2,102,235	225,247,385	107
2017	2,109,795	227,567,529	108
2018	2,216,203	223,749,965	101
2019	2,216,203	210,780,362	95
2020	2,129,349	234,488,136	110
% Change 2013-2020	1%	21%	20%

Table 3.4 above reports a 21% increase in total source kBTU consumption with only 1% increase in total floor area. CAL FIRE's average source EUI source has increased significantly from 2013 to current 2020, respectively 92 to 110. As previously mentioned, more of CAL FIRE facilities are operated longer throughout the year with the longer fire season. Staffing increase of approximately 66% since 2013 has also increased each facility energy usage. Seasonal firefighters are being kept longer than in previous years.

CAL FIRE has not made progress toward the Governor’s 20% reduction goal. Total source kBTU consumption has increased by 21% and the average source EUI has increased by 20% as shown in Table 3.5. This is largely due to an increase in fire activity and personnel.

The energy savings shown in Table 3.6 below are from LED retrofit projects using OBF in PG&E service area.

Table 3.5: Summary of Energy Projects Completed or In Progress

Year Funded	Estimated Energy Savings (kBTU/yr)	Floor Area Retrofit (sq.ft.)	Percent of Department Floor Area
2019	649,972	24,614	1.2%
2020	4,441,688	766,041	36.0%
2021	2,111,245	432,470	20.3%

CAL FIRE has not conducted any Level 1 or Level 2 surveys. With additional Technical Service staff added in late 2021, we will select high EUI sites to start the process. No sites from CAL FIRE Capital Funding Plan will be included.

Demand Response

Executive Order B-18-12 directed all State departments to participate in available demand response programs and to obtain financial incentives for reducing peak electrical loads when called upon, to the maximum extent cost-effective.

CAL FIRE has not participated in any of the major demand response programs available from PG&E, SCE, or SDGE. Technical Services staff will coordinate efforts with our field units to evaluate and enroll facilities into the demand response programs where energy or cost savings are demonstrated.

Renewable Energy

CAL FIRE has proposed several on-site power generation projects in the 2022 Budget. The Department plans to continue analyzing areas of the State where on-site power generation may be necessary.

Financing

CAL FIRE uses various financing sources available for energy saving projects, including capital improvement project budgets, on-bill-financing, and power purchase agreements.

CAL FIRE will resume LED retrofit projects in Southern California using the on-bill-financing in 2022. SDG&E and SCE are developing their OBF programs for which CAL FIRE has submitted initial applications. Once these projects are completed, we will have installed LEDs in the majority of our owned facilities.

CAL FIRE has one solar panel system power purchase agreement in place for the Training Center in Lone. This project was coordinated through DGS program. Installation was completed in 2020, generating over 860,000 kWh of energy. With the Training Center operational, other sites will be evaluated for additional projects starting in 2022.



Chapter 4

Pictured - CAL FIRE's new S70i Fire Hawk

**WATER EFFICIENCY AND
CONSERVATION**

CHAPTER 4 - WATER EFFICIENCY AND CONSERVATION

This Water Efficiency and Conservation report demonstrates to the Governor and the public the progress CAL FIRE has made toward meeting the Governor's goals. This report identifies successful accomplishments, ongoing efforts, and outstanding challenges.

California experiences the most extreme variability in yearly precipitation in the nation. In 2015, California had record low Statewide mountain snowpack of only 5 percent of average, and 2012-14 were the four driest consecutive years of Statewide precipitation in the historical record. Then, the 2017 water year (October 1, 2016-September 30, 2017) surpassed the wettest year on record (1982-83) in the Sacramento River and San Joaquin River watersheds and was close to becoming the wettest year in the Tulare Basin (set in 1968-69). These potential wide swings in precipitation from one year to the next show why California must be prepared for either flood or drought in any year.

Therefore, using water wisely is critical. The EOs and SAM sections listed in the previous chapter help demonstrate the connection between water and energy use (the water-energy nexus), water and climate change, and water and landscaping. Further, the impact of water use by State agencies goes beyond the scope of these EOs and SAM sections and DGS management memos, as these documents do not address such related issues as water runoff from landscaping and various work processes and the potential for water pollution or the benefits of water infiltration, soil health, and nutrient recycling. However, by using holistic water planning, a well-crafted water plan can not only meet all State requirements but add considerable value and benefits to the organization and surrounding communities.

CAL FIRE's Technical Services program is working to improve efficiency of key water systems through the construction of new facilities. Many of our new facilities are built to LEED Silver standards and include water efficient fixtures and plumbing controls, as well as commercial grade equipment at larger facilities. CAL FIRE also practices conservation through changes in operational practices, by turning off irrigation systems at facilities during drought conditions and using a "A Gallon Saved Here" campaign via our Communications Program to remind personnel to conserve water during drought years. CAL FIRE recently completed a water meter installation at Northern Region facilities to track water usage and trends and hopes to have the staff available to complete many water saving projects Statewide.

CAL FIRE will investigate additional opportunities for water savings; however, there are challenges that make project development complex. CAL FIRE has a backlog of critical maintenance projects to make our older facilities safe for personnel, as most of CAL FIRE's facilities have surpassed their useful lifespan.

Currently, CAL FIRE does not have a dedicated team to track and monitor data needed for completion of the water portion of the sustainability report. CAL FIRE utilizes a Retired Annuitant and two Capital Outlay finance analysts for the creation of this report. We are working to implement water saving strategies, like installing low water landscaping, low flow plumbing fixtures, and water meters in our newly constructed facilities.

Table 4.1: 2020 Total Purchased Water

Purchased Water	Quantity	Cost (\$/yr)
Potable	90,254,500	Data not available
Recycled Water	Data not available	Data not available
Total	90,254,500	Data not available

CAL FIRE does not currently track costs associated with the purchase of water, as not all facilities purchase water. Many of our facilities receive their water from wells.

Table 4.2: Owned Properties with Largest Water Use Per Capita

Building Name	Area (ft²)	# of Occu pants	Total 2020 Gallons	Total 2020 Irrigation in Gallons (Gallons per Capita
CNR-NEU Auburn (Nevada-Yuba-Placer) UH/ECC/FS	25,050	36	5,658,100	N/A	157,169
CSR-BEU Hollister FS	7,524	11	4,345,900	N/A	395,082
CSR-BDU San Bernardino UH/ECC/COM/RMO /SFM/FS	34,447	20	2,507,300	N/A	125,365
CNR-MEU Ukiah AAB	2,176	13	2,496,800	N/A	192,062
CDF Academy lone	70,855	28	2,363,800	N/A	84,421
Total for Buildings in This Table	140,052 ft ²	108	17,371,900	N/A	954,099
Total for All Department Buildings	2,129,349 ft ²	2716	90,254,500	N/A	33,230.67
% of Totals	7 %	4%	19%	N/A	2871%

The gallons reported in Table 4.2 are not representative of actual per capita water usage, and CAL FIRE does not currently have a system to track the landscape area of facilities. The large amount of water at the facilities shown in Table 4.2 is not related to the size of their landscape area, although it does account for some of the water usage. Water at CAL FIRE facilities is not simply for the operational needs of a standard 24-hour staffed facility, a large amount of water is used to fill fire engines, water tenders, aircraft, and mix fire retardant, depending on location and facility type. Firefighting equipment use significant amounts of water; a typical fire engine has a 500-gallon tank, water tenders have at least a 1,000-gallon tank, and fire-retardant mixing requires thousands of gallons of water for each batch mixed. Engines and tenders can be filled multiple times in a day, in addition to engines and tenders from other facilities and assisting agencies. Fire retardant is 88% water, and aircraft carry between 1,200 and 4,000 gallons of retardant and most fires have multiple aircraft performing multiple drops each day. Additionally, once the fire fight is over, staff

are required to thoroughly wash all vehicles, equipment, and firehose to prevent spreading contaminants. CAL FIRE is looking into a method of water metering that will allow us to only report facility use, rather than facility and equipment water usage. Due to lack of personnel and resources, there is not a current plan or timeline for these changes, but the Sustainability Team is looking into incorporating metering projects into our long term deferred maintenance plan for fiscal year 2025.

Following are CAL FIRE's challenges in meeting water efficiency and conservation goals:

- 24-hour facilities lead to more water usage than a typical 8-hour administrative employee (kitchen, bathroom, laundry, etc.)
- Unique, water intensive equipment used in firefighting (details discussed above)
- Aging infrastructure, a backlog of essential maintenance, and facility locations create challenges in implementing large scale, or rapid changes

Table 4.3: Department Wide Water Use Trends

Year	Total Occupancy /year	Total Amount Used (Gallons/year)	Per capita Gallons per person per day
Baseline Year 2010	2,484	81,444,700	90
2011	2,436	84,376,000	95
2012	2,394	87,181,000	100
2013	2,524	82,470,000	90
2014	3,453	79,281,000	63
2015	2,883	78,724,000	75
2016	2,956	79,375,000	74
2017	3,176	87,318,000	75
2018	3,960	90,242,000	62
2019	4,100	86,531,000	58
2020	4,194	90,255,000	59
2022 Goal (15% reduction from 2020)		76,716,750	

While CAL FIRE has increased water usage since the baseline year of 2010, we have also drastically increased our personnel. Our estimated overall gallons per capita, however, has decreased from 90 gallons in 2010 to 59 in 2020, giving us an estimated, 34% reduction in water usage. The data in Table 4.4 is an estimate of our occupancy in owned facilities. The available personnel data captures seasonal firefighters, employees working in leased facilities, and personnel in

conservation camps; to compensate for the difference in personnel, we are reporting 50% of our December staffing numbers.

It is difficult to determine overall water usage and reductions since CAL FIRE does not yet have an accurate way to track water throughout all our facilities. Additionally, most of the water usage for the Department is related to fire suppression activities. Due to the inconsistency in available data, Table 4.5 was not automatically populated within the workbook. However, CAL FIRE's water usage has not grown at the rate of our personnel and suppression efforts, indicating that the Department is making strides to reduce water usage.

Table 4.4: Total Water Reductions Achieved

Total 2020 Water Use Compared to 2010 Baseline	Total 2020 Amount Used (gallons per year)	Annual Gallons Per capita 2020
20% Reduction Achieved		
Less than 20% Reduction	90,254,500	33,230
25% Reduction Achieved		
Less than 25% Reduction		

The data reflected in Table 4.5 is not an accurate representation of water reductions or actual per capita usage; the water information collected includes water that is used for firefighting and is not limited to personal use at facilities. CAL FIRE does not currently have the data necessary for a thorough discussion of our water efficiency projects, boiler and cooling system projects, landscaping hardware, and living landscape projects, and their success in reducing water usage at facilities. CAL FIRE is working to track this data for future iterations of this report.

Water Shortage Contingency Plans and Critical Groundwater Basins

Urban water suppliers are required to maintain Water Shortage Contingency Plans that are customized to local conditions. These plans include a staged response to water shortages and droughts lasting up to three years. When implementing the stages of the Water Shortage Contingency Plan, the water supplier will require increasingly stringent reductions in water use.

EO 37-16 required DWR to strengthen the requirements for these plans, including, among other proposed changes, the creation of common standards for each stage in the plan and extending the drought planning from three to five years. For smaller water suppliers and rural communities not required to maintain a Water Shortage Contingency Plan, DWR works with counties to facilitate improved drought planning.

The Sustainable Groundwater Management Act (SGMA) established a new structure for managing California’s groundwater resources at a local level by local agencies. SGMA required, by June 30, 2017, the formation of locally controlled groundwater sustainability agencies (GSAs) in the State’s high- and medium-priority groundwater basins and subbasins (basins). A GSA is responsible for developing and implementing a groundwater sustainability plan (GSP) to meet the sustainability goal of the basin to ensure that it is operated within its sustainable yield, without causing undesirable results. For those facilities located in critical groundwater basins, State agencies are to work with the local GSA plan.

CAL FIRE does not currently have the data necessary for a thorough discussion of our water shortage contingency plans at our facilities, but we are working to track this data for future iterations of this report. CAL FIRE works with all local cooperating agencies providing water and groundwater management to ensure that we are adhering to directives which do not negatively impact our operational capabilities.

Table 4.5: Number of Buildings with Urban Water Shortage Contingency Plans and in Critical Groundwater Basins

Number of Buildings with urban water shortage contingency plans.	Number of facilities in critical groundwater basins	Total Amount of water used by buildings in critical groundwater basins (Gallons)
N/A	7	1,620,400

Building Inventories Summary

CAL FIRE is working to address water inefficiencies at our older facilities; however, due to the lack of personnel and conflicting priorities, there are still many areas for improvement. Table 4.11 reflects the known number of facility water fixtures that need to be replaced. Many of these facilities are not

accessible year-round and cannot be taken offline for repairs during fire season, leaving a limited time frame for improvements. CAL FIRE is working towards the goals established by DWR and Governor directives.

Table 4.6: Summary of Building Inventory Needs

Number of toilets to be replaced	Number of urinals to be replaced	Number of faucet aerators to be replaced	Number of showerheads to be replaced * Changing to 1.8 gallons in 2020	Number of clothes washers to be replaced	Number of garbage disposals to be replaced.	Number of pre-rinse valves to be replaced
1046	185	558	923	164	174	50

Heating and Cooling Systems Inventories Summary

CAL FIRE does not currently have the data necessary for a thorough discussion of our heating and cooling systems at our facilities, but we are working to track this data for future iterations of this report.

Irrigation Hardware Inventories Summary

CAL FIRE does not currently have the data necessary for a thorough discussion of our irrigation hardware inventory at our facilities, but we are working to track this data for future iterations of this report. CAL FIRE utilizes best management practices wherever and whenever possible at facilities requiring irrigation.

Living Landscape Inventory

Far from being just an aesthetic or ornamental feature, landscaping plays a critical role around public buildings and facilities. From providing safety and security, to reducing local heat islands, suppressing dust, reducing water runoff, maintaining soil health, aiding in water filtration and nutrient recycling, landscaping around public buildings is essential. Further, landscaping frequently surrounds historic places and public memorials and also provides pleasant public gathering spaces. The health and proper maintenance of these landscapes is vital to the physical wellbeing of California's people as well as to its social, cultural, political, and historical life.

Additionally, the many vital ecosystem functions carried out by living public landscaping are critical in helping California meet its goals for greenhouse gas

reduction, climate adaptation, and water and energy efficiency and water conservation.

Urban forests are vital to improve site conditions for occupants and visitors to buildings and the surrounding community. Large shade trees should be considered valuable infrastructure and given priority over other plants to maintain tree health. A voluntary urban forest plan is encouraged to assess individual trees and plan for additional tree plantings.

CAL FIRE does not currently have the data necessary for a thorough discussion of our living landscape inventory at our facilities, but we are working to track this data for future iterations of this report. CAL FIRE utilizes best management practices wherever and whenever possible at facilities requiring landscaping.

Large landscape Water Use

CAL FIRE does not currently have the data necessary for a thorough discussion of our large landscape water use at our facilities, but we are working to track this data for future iterations of this report. CAL FIRE utilizes best management practices wherever and whenever possible at facilities requiring landscaping.



Chapter 5

GREEN OPERATIONS

CHAPTER 5 - GREEN OPERATIONS

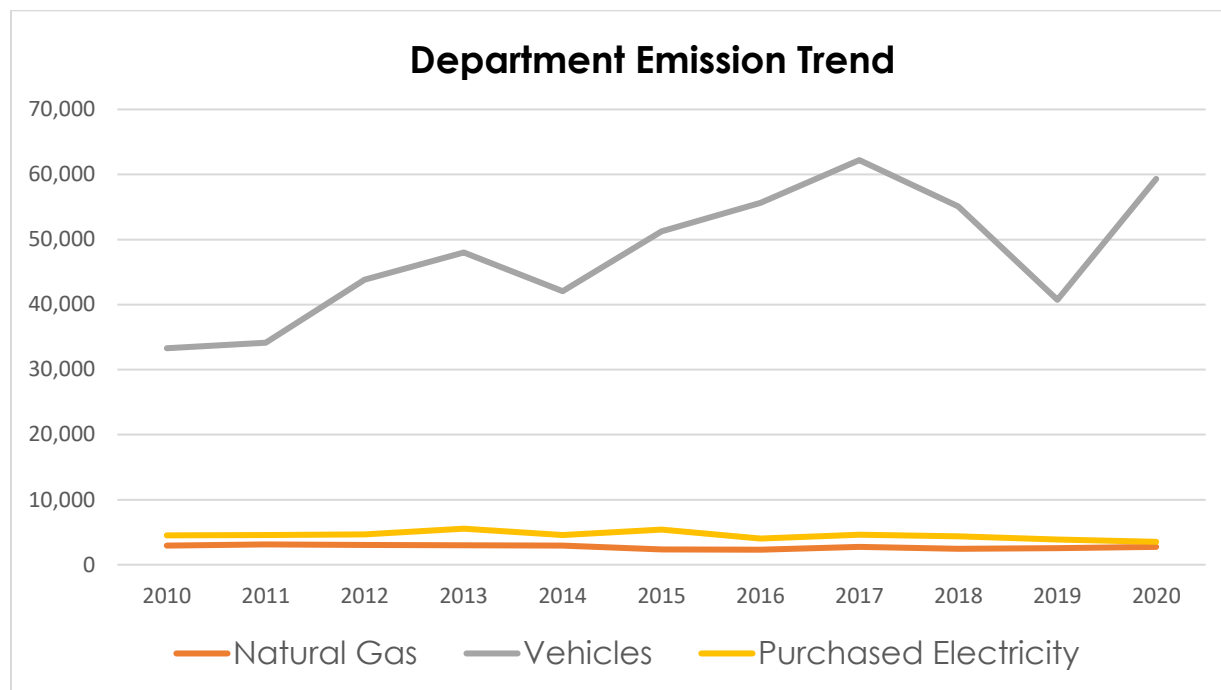
Greenhouse Gas (GHG) Emissions

Against the 2010 baseline, CAL FIRE has been able to reduce GHG emissions from electricity by 22%, and natural gas by 7%. CAL FIRE has been making improvements to facilities to lower emissions; for example, 150 facilities were retrofitted with LED light, providing over 2 million kilowatts of annual savings. Some of the upgrades have focused on solar power, one of the projects installed solar panels at the Lone Training Center and has reduced grid electricity by over 850,000 kilowatts.

Table 5.1: GHG Emissions since 2010

CAL FIRE	2010	2015	2016	2017	2018	2019	2020	Percentage Change
Natural Gas	2,953	2,356	2,310	2,727	2,468	2,563	2,747	-7%
Vehicles	33,284	51,249	55,632	62,213	55,070	40,704	59,335	78%
Purchased Electricity	4,507	5,413	4,031	4,610	4,345	3,881	3,517	-22%
Total	40,744	59,018	61,973	69,550	61,883	47,148	65,599	61%

Graph 5.1: GHG Emissions since 2010



As shown in Graph 5.1, a majority of the emissions are from vehicle usage, CAL FIRE uses aircrafts, fire trucks, and support vehicles to complete mission critical work. The viability of ZEV for firefighting (fire trucks and aircrafts), currently, is not a viable option for CAL FIRE's emergency response. As fire season increases in intensity and length, vehicle fuel usage will continue to increase. The best option for CAL FIRE, to help lower vehicle emissions, is replacing older firefighting equipment that have more efficient options and use renewable diesel whenever possible, although this will not lower emissions to acceptable levels.

State agencies were directed to take actions to reduce entity wide GHG emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline. Unfortunately, CAL FIRE's vehicles emissions have increased by 78% since 2010, resulting in the overall GHG emissions increase of 61%. Since the rise in emissions is due to mission critical operations, CAL FIRE will be challenged to meet reduction targets.

Building Design and Construction

Executive Order B-18-12 requires that all new buildings, major renovation projects and build-to-suit leases over 10,000 square feet shall obtain LEED Silver certification or higher. All new buildings under 10,000 square feet shall meet applicable CalGreen Tier 1 Measures. New buildings and major renovations

greater than 5,000 square feet are also required to be commissioned after construction.

Table 5.2: New Construction since July 1, 2012

Facility Name	LEED Certification Type & Level Achieved	Commissioning Performed (Y/N)
Bautista Conservation Camp	Silver	No
Nevada City Fire Station	Silver	No
Ione Academy (new dormitory)	Silver	No
CAL FIRE/CAL OES/USFS Southern Operational HQ Joint-Use	Gold	No

CAL FIRE implements mandatory measures and relevant and feasible voluntary measures of the California Green Building Standards Code (CALGreen), Part 11, related to indoor environmental quality (IEQ) that are in effect at the time of new construction or alteration and shall use adhesives, sealants, caulks, paints, coatings, and aerosol paints and coatings that meet the volatile organic chemical (VOC) content limits specified in CALGreen.

LEED for Existing Buildings Operations and Maintenance

All State buildings over 50,000 square feet were required to complete LEED-EBOM certification by December 31, 2015, and to meet an Energy Star rating of 75 to the maximum extent cost effective. CAL FIRE does not currently have the data necessary for a thorough discussion of our LEED for existing facilities, but we are working to track this data for future iterations of this report.

Table 5.3: LEED for Existing Buildings and Operations

Number of Buildings over 50,000 sq. ft. and eligible for LEED EBOM	Number of Building over 50,000 sq. ft. that have achieved LEED EBOM	Percentage of buildings over 50,000 sq. ft. required to achieve LEED EBOM that have achieved it
Data not Available		

Indoor Environmental Quality

CAL FIRE Headquarters within Sacramento consists of four (4) main locations within the regional area. These locations are leased to CAL FIRE by the Department of General Services (DGS) and private ownership. In the summer and fall of 2021, eight (8) CAL FIRE headquarters units relocated to the newly constructed P Street CA Natural Resources Building. This new building, owned and leased by DGS, houses Natural Resources departments with a focus on sustainability, Zero Net Energy, and has Leadership in Energy and Environmental Design (LEED) Platinum certification.

CAL FIRE utilizes multiple brands of sustainably sourced modular furniture systems and free-standing office furniture amongst its headquarters locations. CAL PIA, Knoll Morrison, and All Steel modular systems have been purchased or acquired for use within building leases. Knoll Morrison and All Steel manufactured brands of workstations are LEED and GREENGUARD Indoor Air Quality certified with focus on recycled fabric content, frame, and wood components. CAL PIA purchased modular furniture and freestanding furniture is compliant with the DGS Purchasing Standard and Specifications (Technical Environmental Bid Specification 1-09-71-52).

Cleaning Products

CAL FIRE headquarters locations and facilities utilize janitorial services provided by private building management or DGS Facilities Management Division. Any janitorial services contracted directly by CAL FIRE contains contract language that specifies that all cleaning products that are used onsite must meet Green Seal (GS) Standard GS-37. Any new janitorial contracts additionally include cleaning requirements to meet the Green Seal GS-42 standard.

HVAC Operation

CAL FIRE headquarters HVAC systems and maintenance are managed by each building's property management, as designated in each location lease, privately owned or DGS owned. The Business Services Office coordinates any HVAC requests for the Natural Resources Agency and West Sacramento headquarters locations with building management. CAL FIRE building leases stipulate that HVAC systems provide no less than the required minimum outdoor air requirements per California Code of Regulations, Title 8, Section 5142. HVAC systems are inspected at least annually. HVAC inspections will verify minimum outdoor airflows using hand-held airflow measuring instruments. Inspections will confirm that air filters are clean and replaced based on the manufacturer's specified interval and that new filters used have a MERV rating of no less than 11. Inspections will also verify that all outdoor dampers, actuators, and linkages operate properly. Ductwork will be inspected downstream of the cooling coils and will be properly maintained, with record of any chemical treatment. A computer-based preventative maintenance program is in place for all HVAC equipment for performance and efficiency. Buildings will be purged with outdoor air sufficient for three complete air changes or the minimum ventilation rate allowed in Section 120.1(c)2 of Title 24 for 1 hour before occupancy.

Waste and Recycling Programs

The California Integrated Waste Management Act (Assembly Bill 939, Sher, Chapter 1095, Statutes of 1989 as amended) established the solid waste management hierarchy. Source reduction is at the top of the State's waste management hierarchy; recycling and composting is next, followed by environmentally safe disposal. California's Department of Resources Recycling and Recovery (CalRecycle) administers the State's recycling and waste management programs. State agencies must report their waste and recycling efforts by May 1 of each year covering activities conducted during the prior calendar year.

CAL FIRE's recycling program promotes the State of California's sustainability, recycling, and waste management goals. The CAL FIRE recycling program provides personnel with language for recycling and waste management contracts, development of procurement training material, access to recycling and waste management guides, and online resources that help prioritize the usage and procurement of SABRC/EPP compliant goods while focusing on waste diversion for over 600 CAL FIRE headquarters, stations, and facilities Statewide. CAL FIRE's 4,600 purchasers are required to use Statewide contracts when purchasing goods and services (when feasible) and are encouraged to

record SABRC reportable purchases in Fi\$Cal to track the Department's progress.

Pursuant to [Assembly Bill-75, Chapter 18.5 State Agency Integrated Waste Management Plan](#), at least one solid waste reduction and recycling coordinator shall be designated by each State agency. The CAL FIRE Recycling Coordinator updates the Department's current integrated waste management plan by developing and authoring new Department wide standards, policies, procedures, and submitting mandated annual waste and recycled content purchasing reports. This program also involves the cooperation of State and Federal agencies to account for fire and emergency incident waste management. Policy and procedures are being developed to support and promote Department sustainability goals and will address all current and impending legislation related to recycling and waste management. The CAL FIRE Recycling Coordinator works closely with CalRecycle administrators and collaborates with other State agency recycling coordinators.

The CAL FIRE Recycling Coordinator conducts outreach efforts with all CAL FIRE primary facility contacts, which includes all CAL FIRE facilities Statewide. The Recycling Coordinator maintains waste diversion reporting for over 600 different CAL FIRE facilities. This is accomplished by establishing goals for responsible waste diversion by implementing common recycling (plastics, paper, etc.), hazardous waste (batteries, fluorescents, toner/ink cartridges), and commercial organic waste (compost and food waste) programs via service contracts, procurement of recycling receptacles, and or collaboration with facility property management. To successfully meet Department targeted waste goals and plans, the CAL FIRE Recycling Coordinator collaborates with local representatives from CalRecycle that include multiple State, county, and city jurisdictions.

The CAL FIRE Recycling Coordinator is an ambassador to the Greening Fire Team (GFT). The Greening Fire Team is a group of field experts from the US Forest Service (and other federal partners) whose mission is to integrate sustainability best management practices into incident operations, with a long-term vision of achieving net zero environmental impact on all large incidents and within the fire community by 2030. By becoming an ambassador for the GFT, the Recycling Coordinator hopes to further develop the existing Incident Recycling Program for CAL FIRE with the shared knowledge and experience from partner agencies that will focus on:

- Energy Conservation and Renewable Energy Implementation

- Water Conservation
- Fleet and Fuel Efficiency
- Sustainable Procurement
- Waste Reduction and Recycling
- Triple Bottom Line Returns
- Sustainability Leadership, Education, and Outreach

Table 5.4: State Agency Reporting Center (SARC) Report on Total Waste per Capita

Per Capita Baseline	2019	2020	Total Waste 2019	Total Waste 2020	% Change from 2019/2020
3.9	1.69	1.69	1573.38 Tons	1847.53 Tons	0.85%

CAL FIRE total tonnages were determined by utilizing a correlative factor per facility type. The tonnage can be estimated by multiplying the number of staff at a specific CAL FIRE facility type by a predictive factor which will calculate the annual waste tonnage per year for that facility. These facilities' (Agency HQ + 600 facilities) tonnage totals are added together to calculate the CAL FIRE total annual waste amount disposed. For example, a CAL FIRE Headquarters facility with 100 full-time employees in an Administrative Office Building multiplied by the correlative factor, 0.20, would indicate that 20 (all numbers are rounded up to the nearest whole number) tons of waste is generated annually. This method and its accompanying listing of the types of facilities and corresponding predictive factors are found on the CalRecycle website, in the publication "Solid Waste Generation, Disposal, and Diversion Measurement Guide." Per CalRecycle SARC Help Guide, it is recommended that the disposal method be calculated in the same consistent manner each year.

CAL FIRE is currently meeting the annual target disposal rate and goal to meet 50 percent waste diversion. CAL FIRE accomplished this with a Per Capita Disposal Rate of 1.69 pounds per person per day for the year of 2020. This Disposal Rate is the same as the previous year, 2019. Due to an increase in employee totals, there was small increase in waste tonnage recorded; however,

the diversion percentage remained the same for the reporting year. Successes in meeting and exceeding the target diversion goals are attributed to training and education, waste separation and bin signage, as well as reutilization of materials before adding to the waste stream.

Recycling

Recycling is the practice of collecting and diverting materials from the waste stream for remanufacturing into new products, such as recycled-content paper. Stewardship programs help collect and recycle carpet, paint, pharmaceutical and sharps, and mattresses. [AB 341](#), Mandatory Commercial Recycling (Chesbro, Chapter 476, Statutes of 2011) requires businesses and public entities that generate four cubic yards or more of commercial solid waste per week to arrange for recycling services under the goal of source reducing, recycling, or composting 75% of solid waste generated statewide.

CAL FIRE occupies and maintains over 600 facilities statewide. A large amount of these locations are smaller fire and lookout stations that do not produce enough Commercial Solid Waste (CSW) (four cubic yards) to require the arrangement of recycling services. This is determined by personnel staffing reports based on employee facility and seasonal assignments. While some CAL FIRE locations do not generate over four cubic yards of waste, many of them do adhere to recycling practices per their available regional services and jurisdiction waste mandates. The CAL FIRE Recycling Coordinator determined that ten CAL FIRE facilities produce an estimate four or more yards of CSW per week. These facilities have arranged recycling services via a CAL FIRE Services Contract or through building lease agreements that requires building management to provide on-site recycling services.

Organics Recycling

State agencies must implement [AB 1826](#) ([Chesbro, Chapter 727, Statutes of 2014](#)). State agencies that generate 2 cubic yards or more of commercial solid waste (total trash, recyclables, and organics) per week shall arrange for organic waste recycling services. CalRecycle has extended the current [AB 1826 rural exemption](#) until December 31, 2026.

Effective January 1, 2022, State agencies must implement [SB 1383](#) ([Lara, Chapter 395, Statutes of 2016](#)). State agencies are currently required to maintain mandatory commercial recycling and organic recycling programs, including

ensuring that properly labeled recycling containers are available to collect bottles, cans, paper, cardboard, food waste, and other recyclable materials. SB 1383 builds upon these efforts by identifying non-local entities and expanding the definition of organic waste to include food scraps, landscape and pruning waste, organic textiles and carpets, lumber, wood, manure, biosolids, digestate, and sludges.

CAL FIRE currently has 44 facilities that produce an estimate of two or more yards of CSW per week (based on CalRecycle's waste per employee calculator). In accordance with AB1826, these facilities are required to implement and arrange for organics recycling services. Of these 44 facilities, 16 locations fall in the rural jurisdiction exemption list for commercial organics or are shared facilities between CAL FIRE and other government jurisdictions. These 16 facilities will not be required to arrange for organics recycling services and instead will be given information on preventing food waste.

The CAL FIRE Recycling Coordinator is working to bring the remaining facilities into compliance by establishing service contracts for organics recycling. This undertaking is a large collaboration between the Recycling Coordinator, building and property management at each facility, waste haulers, and CAL FIRE staff.

Current challenges that CAL FIRE faces with implementing organics recycling programs are:

- Evaluating actual staffing levels of administration buildings due to new teleworking conditions. Not all employees assigned to a facility are present in the building 100% of the work week. This requires consideration for actual waste generated versus a general staff count within a facility.
- Implementing service contracts for jurisdictions that do not have as many options for organics recycling vendors
- Shared facilities that house other government entities, not employed by CAL FIRE

CAL FIRE Facilities Generating 2 Cubic Yards or More of Solid Waste		
Location	Organics Program	Comments

1416 9 th Street HQ – Sacramento	Yes	Serviced by DGS with bins on each floor and accompanying signage, serviced daily. Staff moving to new HQ building in 2021.
710 Riverpoint HQ – West Sacramento	No	Target date for organics services 2022
2251 Harvard St. OSFM – Sacramento	No	More than half of program staff relocating to new HQ building in 2021. No contract needed at this time.
Northern Region HQ – Santa Rosa	No	Target date for organics services 2022
Southern Region HQ – Fresno	No	Target date for organics services 2022
Aviation Management Unit – McClellan	No	Target date for organics services 2022
Training Center – Lone	No	Target date for organics services 2022
Southern Region Operations – Riverside	No	Target date for organics services 2022
Mobile Equipment Management – Davis	No	Target date for organics services 2022
Amador El Dorado Unit HQ – Camino	No	TBD
San Bernardino HQ – San Bernardino	No	TBD
San Benito Monterey Unit HQ – Monterey	No	TBD
Pebble Beach Station 22 – BEU	No	Schedule A Station
Butte Unit HQ – Oroville	No	TBD
San Mateo Santa Cruz Unit HQ – Felton	No	TBD
Belmont Station #17 – CZU	No	Schedule B Station
Fresno Kings Unit HQ – Sanger	No	TBD
Del Rey Station #82 – FKU	No	Schedule A Station
Humboldt Del Norte Unit HQ –Fortuna	No	TBD
Sonoma Lake Napa Unit HQ – St. Helena	No	TBD

Mendocino Unit HQ – Willits	No	TBD
Howard Forest Station – MEU	No	Schedule B Station
Madera Mariposa Merced Unit HQ – Mariposa	No	TBD
San Diego Unit HQ – El Cajon	No	TBD
McCain Valley Conservation Camp – MVU	No	Re-evaluate in 2021 due to transition to Fire Center
Nevada Yuba Placer Unit HQ – Auburn	No	TBD
Sunset Station #77 – NEU	No	Schedule A Station
Auburn Station #10 – NEU	No	Schedule B Station
Riverside Unit HQ – Perris	No	TBD
Ryan Air Attack/Helitack Base – RRU	No	TBD
Coachella Station #79 – RRU	No	Schedule A Station
Indio Station #86 – RRU	No	Schedule A Station
Menifee Lakes Station #76 – RRU	No	Schedule A Station
Palm Desert Station #33 – RRU	No	Schedule A Station
Parkview Station #84 – RRU	No	Schedule A Station
Rancho California Station #73 – RRU	No	Schedule A Station
Rosetta Canyon Station #97 – RRU	No	Schedule A Station
Santa Clara Unit HQ – Morgan Hill	No	TBD
Shasta Trinity Unit HQ – Redding	No	TBD
San Luis Obispo Unit HQ – San Luis Obispo	No	TBD
Ventura Conservation Camp – SLU	No	TBD
Tuolumne Calaveras Unit HQ – San Andreas	No	TBD
Tehama Glenn Unit HQ – Red Bluff	No	TBD

602 E. Huntington St. OSFM Monrovia	No	TBD
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Hazardous Waste Materials

Universal waste is handled and disposed of in accordance with local, State, and federal laws. The CAL FIRE Safety program provides field staff information on how to handle and dispose of hazardous waste materials not common to the office environment. The Recycling Coordinator provides information and resources on how to handle and dispose of hazardous waste common in an office environment (such as batteries and fluorescent light bulbs). The CAL FIRE Electronic Waste Information Technology Coordinator provides the department with guidelines on how to handle and dispose of hazardous information technology waste materials.

Material Exchange

CAL FIRE promotes and engages in programs that encourage the exchange and reuse of unwanted or surplus materials and equipment. The exchange of surplus materials reduces the cost of materials/products for the receiving agency and results in the conservation of energy, raw resources, landfill space, and the reduction of greenhouse gas emissions, purchasing costs, and disposal costs. CAL FIRE currently practices the following methods/types of material exchange:

- Nonprofit/School Donations
- Internal Property Reutilization
- State Surplus Program (accepted by DGS)
- Federal Excess Property Programs
- Used Book Exchange/Buy Back
- Textile Material Exchange
- Employee Supplies Exchange
- Incident Food Donations to Food Banks

Waste Prevention/Reuse

Programs in this section support (a) waste prevention: actions or choices that reduce waste and prevent the generation of waste in the first place; and (b) reuse: using an object or material again, either for its original purpose or for a similar purpose, without significantly altering the physical form of the object or material.

CAL FIRE prevents waste and encourages reuse through the following actions:

- Paper forms reduction - online forms
- Bulletin boards
- Remanufactured toner cartridges
- Washable/Reusable cups, service ware, towels
- Reusable boxes
- Reusable pallets
- Reusable slip sheets
- Electronic document storage
- Intranet
- Reuse of office furniture, equipment & supplies
- Reuse of packing materials
- Double-sided copies
- Email vs. paper memos
- Remanufactured equipment
- Reuse of construction/remodeling materials
- Electric air hand-dryers
- Food Donations
- Rags made from waste cloth or reusable rags
- Other Textiles

Training and Education

Pursuant to AB 2812 (Gordon, Chapter 530, Statutes of 2016), each State agency is required to provide adequate receptacles, signage, education, and staffing, and arrange for recycling services consistent with existing recycling requirements for each office building of the State agency or large State facility. The bill requires, at least once per year, each covered State agency and large State facility to review the adequacy and condition of receptacles for recyclable material and of associated signage, education, and staffing. Additionally, the bill requires each State agency to include in its existing Report to CalRecycle a summary of the State agency's compliance with the act.

The CAL FIRE Recycling Coordinator has developed training material that the Department uses in Statewide CAL FIRE Procurement trainings. This material highlights the importance of Environmentally Preferred Purchases (EPP) and

includes resources and information for buying green products. The Recycling Coordinator has created signage, posters, recycling guides, and has authored several recycling focused memos and newsletter articles that are disseminated to Department staff and can be found on the CAL FIRE intranet. Outreach to Federal and State partners has been conducted by the Recycling Coordinator and webinars focused on sustainable practices are attended regularly.

The CAL FIRE Recycling Coordinator reviews the efficacy of procurement trainings and the dissemination of recycling resources and education by reviewing the data results from the annual SARC and SABRC reports. Generally, a decrease or no change in compliance within the reports are interpreted as there being a need for more Department wide staff training and resources.

Foodservice Items

[SB 1335 \(Allen, Chapter 610, Statutes of 2018\)](#) requires food service facilities located in a State-owned facility, operating on, or acting as a concessionaire on State-owned property, or under contract to provide food service to a State agency to dispense prepared food using food service packaging that are reusable, recyclable, or compostable. CalRecycle approved proposed regulations December 31, 2020, to establish the process and criteria to determine what types of food service packaging are reusable, recyclable, or compostable. CalRecycle must also publish a list of food service packaging that meets these criteria within 90 days of the regulation going into effect. Food service facilities will only be allowed to purchase food service packaging from the approved list, which will be updated at least once every five years.

CAL FIRE operates one cafeteria at the Department's training center. Meals at the Department operated facility are served on ceramic plates and plastic trays. Beverages are dispensed in plastic reusable cups. All dishware and silverware items are reusable (except for disposable hot beverage cups) and returned to the kitchen to be washed and used again. CAL FIRE also contracts food service vendors to provide subsistence to fire personnel at incident base camps. These vendors are required to provide eco-friendly packaging that is compostable or reusable when washed.

Environmentally Preferable Purchasing

State agencies are required to purchase and use environmentally preferable products (EPP) that have a reduced effect on human health and the environment when compared with competing goods that serve the same purpose.

Additionally, the State Agency Buy Recycled Campaign (SABRC) is a joint effort between CalRecycle and DGS to implement State laws requiring State agencies and the Legislature to purchase recycled-content products (RCP) and track those purchases. State agency and its contractors must be track purchases that fall under eleven product categories.

Reducing Impacts

The environmental impact of the goods we buy is often larger than the impact of our own Department operations. CAL FIRE is committed to reducing the environmental impact of the goods and services we purchase.

CAL FIRE continues to reduce environmental impacts such as energy, water, and natural resource conservation when making purchasing decisions. CAL FIRE will work to implement policy that prioritizes the procurement of products and goods that will reduce environmental impacts. Additionally, training material and information will be developed to highlight the importance of environmentally preferable purchasing. CAL FIRE contractors are required to conform to general terms and conditions to "certify in writing under penalty of perjury, the minimum, if not exact, percentage of post-consumer material as defined in the [Public Contract Code Section 12200](#), in products, materials, goods, or supplies offered or sold to the State regardless of whether the product meets the requirements of Public Contract Code 12209.

CAL FIRE continues to further develop and update policy, procedures, and training material to ensure that the goods and services we purchase meet the current DGS purchasing standards and specifications. CAL FIRE relies on purchasers to use State mandated contracts to meet DGS purchasing standards. Below are a few examples of measures CAL FIRE has taken to comply with DGS purchasing standards.

- CAL FIRE encourages purchasers to purchase compliant paint manufacturers and brands listed on CalRecycle's [paint stewardship program page](#).
- CAL FIRE is compliant with all requirements, where feasible, for energy saving equipment when purchasing information technology goods and other office equipment.
- CAL FIRE uses State mandated contracts, when feasible, to purchase janitorial supplies and cleaners that are EcoLogo, Greenseal certified cleaners, to comply with DGS 47131800 Purchasing Standard.

- CAL FIRE uses State mandated contracts, when feasible, to purchase janitorial supplies and paper products that comply with DGS 141117A Purchasing Standard.
- In future procurement training classes, CAL FIRE will stress the importance of purchasing EPP lighting fixtures, which meet DGS 391115-A purchasing standard compliance requirements.
- CAL FIRE's Information Technology Procurement ensures that Office equipment are EPEAT compliant, and EnergyStar rated printers, copiers.
- CAL FIRE uses State mandated contracts, when feasible, to purchase paper products that comply with DGS 441200-A Purchasing Standard.
- CAL FIRE encourages purchasers to order remanufactured toner cartridges using contract ID 1-15-75-61.

CAL FIRE ensures that the goods and services procured meet the current DGS purchasing standards and specifications available from the [DGS Buying Green website](#) For each product category below these are the steps that have already been taken to ensure purchases are EPP.

- Paint (i.e., master painter's institute certified paint and recycled paint)
- Information technology goods (energy star rated: computers, monitors, and televisions DGS-52161505 Purchasing Standard or meet current specifications of Statewide contracts)
- Janitorial supplies and cleaners (EcoLogo, Greenseal certified cleaners, DGS_471318A Purchasing Standard compliant)
- Janitorial supplies, paper products (i.e., SABRC compliant and DGS_141117A Purchasing Standard Compliant)
- Desk Lamps (DGS-391115-A Purchasing Standard compliant)
- Office equipment (i.e., EPEAT compliant and EnergyStar rated printers, copiers and DGS_432121A Purchasing Standard compliant for high-end multifunctional devices)
- Paper products (i.e., Forest Stewardship Council certified, SABRC compliant copy paper, DGS-441200-A Purchasing Standard compliant)
- Remanufactured toner cartridges (available from PIA and Statewide contract ID/Number: 1-15-75-61)

Measure and Report Progress

The CAL FIRE Procurement section is tasked to inform all CAL FIRE certified purchasers about the importance of EPP. The CAL FIRE Recycling Coordinator has worked with the Procurement section to create training material, memos,

and procurement broadcasts that stress the importance of EPP. Plans to increase EPP spending will include the following:

- Increase EPP spend include identifying top five percent of spend with largest opportunity to “green”
- Measure percent EPP spend in comparison to non-EPP spend
- Incorporate EPP criteria in the goods and services the State buys
- Embed sustainability roles and responsibilities into purchasing procedures
- Train buyers in the benefits of buying EPP products, how to apply EPP best practices, the importance of accuracy in recording buys within Fi\$Cal and reporting labor separate from goods in service contracts, and listing EPP goods by line item
- Engage and educate suppliers to offer EPP products when selling to the State

To increase EPP spending, CAL FIRE will need to describe measure, monitor, report, and oversee progress of EPP spending.

- CAL FIRE will continue to train and encourage purchasers to purchase SABRC/EPP compliant products when available.
- CAL FIRE will also train and encourage purchasers to report all SABRC/EPP dollars spent in SCPRS and Fi\$Cal to monitor and measure progress.
- The CAL FIRE Recycling Coordinator will present tracked SABRC/EPP spending to the Procurement section and will suggest policy and procedural changes to increase SABRC/EPP spending.

Table 5.5: State Agency Buy Recycled Campaign FY 19/20 Performance

Product Category	SABRC Reportable Dollars	SABRC Compliant Dollars	% SABRC Compliant
Antifreeze	\$0.00	\$0.00	N/A
Compost and Mulch	\$0.00	\$0.00	N/A
Glass Products	\$0.00	\$0.00	N/A
Lubricating Oils	\$0.00	\$0.00	N/A
Paint	\$4,039	\$3,943	97.6%
Paper Products	\$40,139	\$33,697	83.9%
Plastic Products	\$373,501	\$335,276	89.8%

Printing and Writing Paper	\$49,941	\$47,880	95.9%
Metal Products	\$793,412	\$652,249	82.2%
Tire Derived Products	\$0.00	\$0.00	N/A
Tires	\$0.00	\$0.00	N/A

The CAL FIRE Recycling Coordinator has presented procurement dollar information for SABRC compliant categories to the Chief of the Business Services Office and has suggested methods to increase compliance. The methods include:

- Increase outreach and education of SABRC related topics to CAL FIRE certified purchasers via official memos, procurement broadcasts, newsletter articles, and increase SABRC information in CAL FIRE's procurement training material.
- Require purchasers to report all SABRC compliant dollars.
- Teach purchasers how to properly report SABRC reportable purchases.
- SABRC Compliant Dollar percentages increased in all reported categories to meet minimum required percentage of 75%. Five product categories were reported, all increased in compliancy percentage over the previous fiscal year to show improvement in data reporting and responsible CAL FIRE purchasing of EPP products.

Table 5.6: Commodities categories with the greatest Potential to Green

Commodity	19/20 Total Spend (\$)	19/20 Percent EPP Spend (%) 75% Meets Minimum Compliance	EPP Target (%)
Paper Products	\$40,139	83.9%	Goal of 2 % Increase Next FY
Plastic Products	\$373,501	89.8%	Goal of 2 % Increase Next FY
Printing and Writing Paper	\$49,941	95.9%	Goal of 2 % Increase Next FY
Metal	\$793,412	82.2%	Goal of 2 % Increase Next FY

Commodity	20/21 Total Spend (\$)	20/21 Percent EPP Spend (%) 75% Meets Minimum Compliance	EPP Target (%)
Paper Products	\$73,058	81.9%	TBD – 20/21 report submitted 11/1/2021, evaluating next FY goals
Plastic Products	\$1,960,475	88.6%	TBD – 20/21 report submitted 11/1/2021, evaluating next FY goals
Printing and Writing Paper	\$108,083	91.2%	TBD – 20/21 report submitted 11/1/2021, evaluating next FY goals
Metal	\$961,778	87.7%	TBD – 20/21 report submitted 11/1/2021, evaluating next FY goals

**Comparison:
19/20 Goals vs. Next Reporting FY 20/21 Totals Spent**

Commodity	19/20 EPP Target %	20/21 Percent EPP Totals Spend (%)	EPP Target Met Y/N Comments
Paper Products	85.9%	81.9%	No – Maintained compliance over 75% but did not meet our internal goal and increase. Reported \$32,919 more spent in product category for 20/21 than previous year, thus affecting EPP Spend %.
Plastic Products	91.8%	88.6 %	No – Maintained compliance over 75% but did not meet our internal goal and increase. Reported \$1,586,973 more spent in product category for 20/21 than previous year, thus affecting EPP Spend %.

Commodity	19/20 EPP Target %	20/21 Percent EPP Totals Spend (%)	EPP Target Met Y/N Comments
Printing & Writing Paper	97.9%	91.2%	No – Maintained compliance over 75% but did not meet our internal goal and increase. Reported \$58,141 more spent in product category for 20/21 than previous year, thus affecting EPP Spend %.
Metal	84.2%	87.7%	Yes - Increased compliance by 5.47% meeting internal goal of increase by 2%. Reported \$8,818,365 more spent in product category for 20/21 than previous year, thus affecting EPP Spend %.

Sustainability Development and Education

Total Number of Employees Assigned as Buyers: **5004**. CAL FIRE does not have a central tracking mechanism to track this specific training. All CAL FIRE purchasers go through a CAL FIRE Basic Purchasing course and a Refresher Course lead by CAL FIRE, not CALPCA.

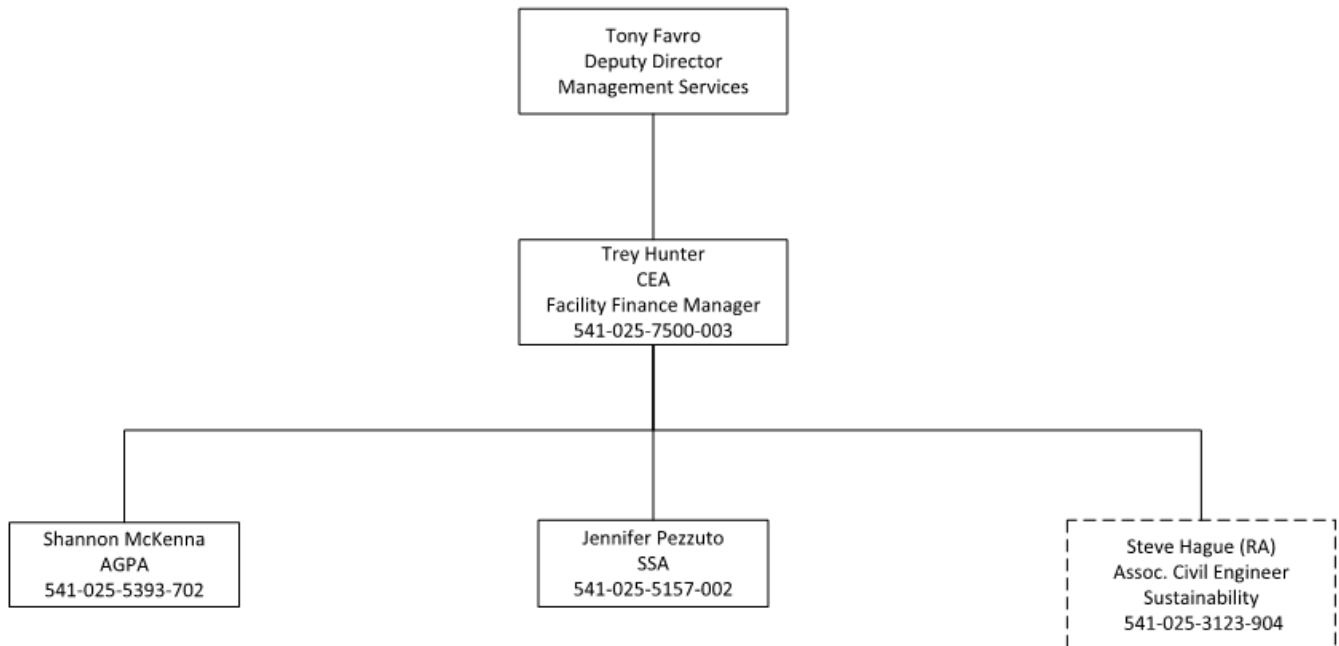
Location Efficiency

Location efficiency refers to the effect of a facility's location on travel behavior and the environmental, health, and community impacts of that travel behavior, including emissions from vehicles. Locating Department facilities in location efficient areas reduces air emissions from State employees and users of the facilities contribute to the revitalization of California's downtowns and town centers; helps the Department compete for a future workforce that prefers walkable, bikeable, and transit-accessible worksites; and aligns Department operations with California's planning priorities.

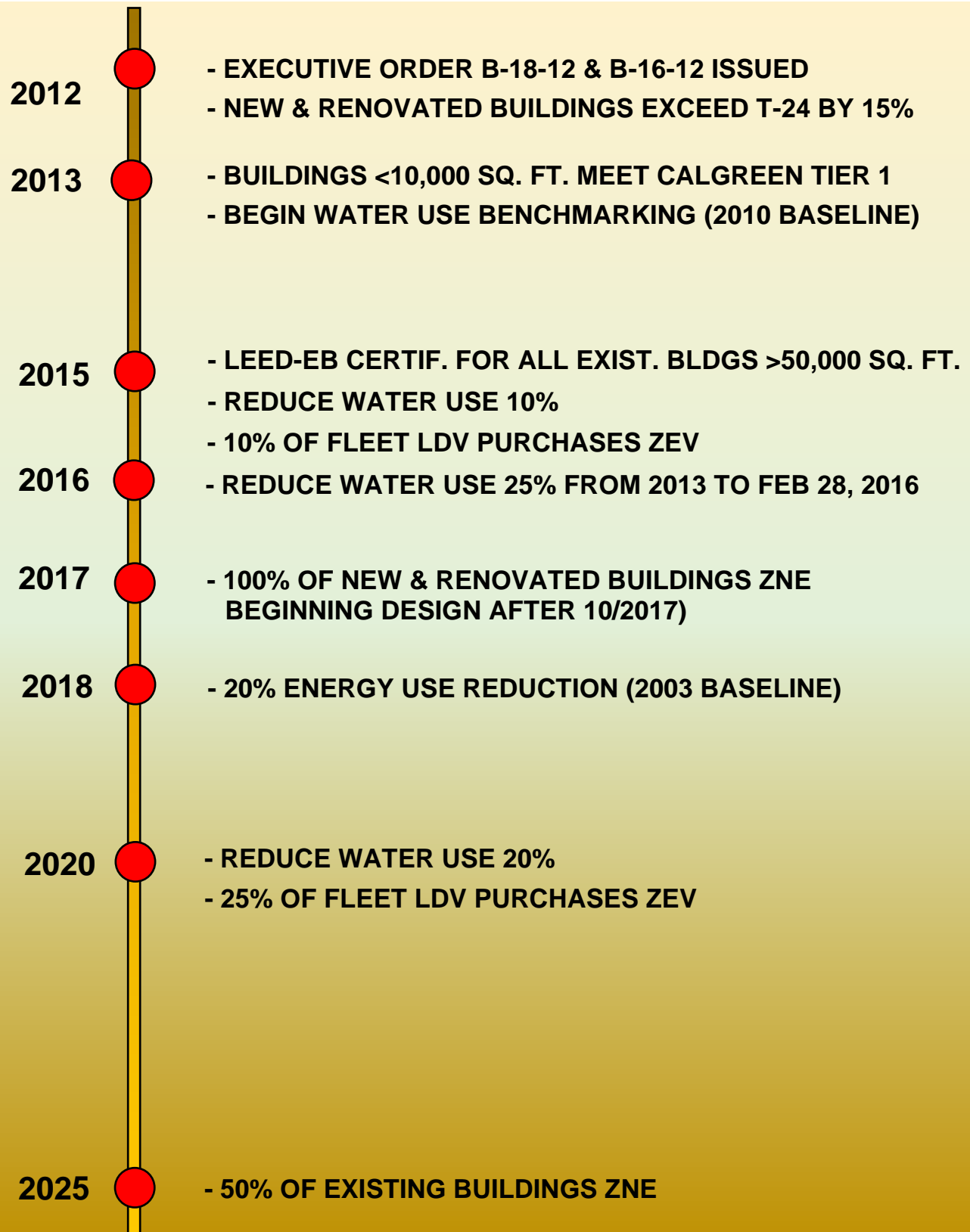
CAL FIRE's goal is that the average location efficiency score for all new leases be 10% higher than our average on January 1, 2017.

Appendix A – Sustainability Leadership

CAL FIRE Sustainability Org Chart



Appendix B - Sustainability Milestones & Timeline



Appendix C – Roadmap Checklists

1 - Climate Adaptation Roadmap Checklist

Policy References: Executive Order B-30-15

Executive Summary:

- Summary of status and actions underway to meet sustainability objectives related to climate adaptation.
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document.)

Past Performance:

- Describe how screening process will integrate facility operations and planning processes
- Describe approach and steps taken to integrate climate considerations in planning and investment, and how this will address changes
- Use Cal-Adapt to collect data and characterize anticipated climate change
- Report Top 5 facilities most affected by changing temperature in Table 1.2a
- Discuss how temperature and extreme heat events affect your facilities and operations, and what facilities and regions are most affected
- Describe strategies to reduce impacts of changing temperatures
- Describe ways you could employ natural infrastructure to reduce risks of climate change
- Report facilities located in disadvantaged communities in Table 1.5 and discuss how these facilities can interact with the community or serve as a resource
- Report facilities located in urban heat islands in Table 1.4

- Describe whether these facilities have large parking lots or impervious surface
- Describe actions that can be or are being taken to reduce urban heat island affect at these facilities

Future Planning:

- Report five facilities that will experience the largest increase in extreme heat events in Table 1.1
- List facilities most impacted by projected changes in precipitation in Table 1.5, and describe strategies to reduce these impacts
- Identify facilities at risk from rising sea levels in Table 1.6
- Discuss actions that can be taken to minimize risks of sea level rise
- List facility climate risks in Table 1.10
- Identify new facilities anticipating future extreme heat events in Table 1.10
- Discuss how new facilities siting, design, construction, and operation are accounting for these changing conditions
- Report new facilities and disadvantaged communities and urban heat islands in Table 1.11
- Describe how climate change will affect useful life of each planned facility
- Verify the integration of a Climate Change Plan into department planning in Table 1.12
- Verify the engagement and planning processes in Table 1.13
- Report if climate change is integrated into funding programs in Table 1.14
- Describe what climate impacts are of most concern to your facilities and plans, and how department will track how they are changing
- Describe which office or branch will develop a policy to integrate climate change into infrastructure, how it will prioritize, and when the policy will be completed

2 - Zero-Emission Vehicle Roadmap Checklist

Policy References: [EO B-18-12](#), [EO B-16-12](#), [2016 ZEV Action Plan](#)

Executive Summary:

- Summary of status and actions underway to meet sustainability objectives related to fleet operations and Zero Emission Vehicles.
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document, signed by the department executive director.)

Department Fleet Status:

- Describe fleet composition and uses
- Edit Graph 2.1 to reflect Department fleet vehicle composition
- Edit Graph 2.2 to reflect Department light duty vehicle fleet composition
- Edit Graph 2.3 to reflect Department medium and heavy-duty vehicle fleet composition

Past Performance:

- Report all prior year Total Purchased Fuel in Table 2.1
- Describe any successes or challenges encountered by your department as it seeks to incorporate ZEVs into its portfolio
- Report on department light duty fleet eligible for replacement in Table 2.2
- Report recent and planned light duty ZEV fleet additions in Table 2.3
- Report on facilities with parking and whether hosting fleet vehicles & modify Graph 2.2 to reflect this

Future Planning:

- Identify facilities with the most urgent need for EV charging in Table 2.4

- Describe department's engagement with utility and other funding programs for EVSE's and infrastructure
- List any hydrogen fueling stations that could serve as any primary refueling stations for fleet vehicles, and any plans to install hydrogen refueling infrastructure at department facilities
- List site and infrastructure assessment results for ZEV parking in Table 2.5
- Describe plan to design, bid, construct, and activate EVSE infrastructure
- Describe department's operation plan for EVSE infrastructure and how it will collect and report EVSE use data and maintain equipment
- Identify department stakeholders for ZEVs and EVSE efforts in Appendix

3 - Energy Efficiency Roadmap Checklist

Policy References: [EO B-18-12](#), [MM 14-07](#), [MM 14-09](#), [MM 15-04](#), [MM 15-06](#), [MM 17-04](#)

Executive Summary:

- Summary of status and actions underway to meet sustainability objectives related to energy use and efficiency.
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document, signed by the department executive director.)

Department Energy Status:

- Describe mission of your department
- Describe built infrastructure supporting department mission that consumes energy (electricity, natural gas, propane, etc.). Include number and total square footage of department facilities.
- Complete summary of actions and timeframes to meet requirements (can be bullet points)

Past Performance:

- Report 2020 Total Purchased Energy in Table 3.1
- List department properties with largest energy consumption in Table 3.2
- Describe any successes or challenges encountered by your department and solutions as it seeks to achieve energy efficiency
- Identify specific challenges to achieving ZNE, T-24+15%, reducing grid-based energy, demand response, renewable energy, or monitoring-based commissioning
- Describe department's 5-year capital improvement program
- List department zero net energy buildings in Table 3.3 and department's plans to achieve ZNE at 50% of building portfolio area

- Report department wide energy trends in Table 3.5
- Report yearly energy surveys in Table 3.7
- Discuss energy survey status and efforts over past 5 years

Future Planning:

- Describe efforts to reduce plug loads and comply with energy standard operating procedures
- List status of new buildings exceeding Title 24 by 15% in Table 3.4, and describe strategy for ensuring this minimum level of efficiency in future
- Identify department energy projects in Table 3.6
- Identify department demand response in Table 3.8
- Describe demand response programs available, and positive or negative experiences or lessons learned, and department benefits for participation
- Discuss steps department is taking to implement DR in more buildings
- Identify department on-site renewable energy in Table 3.9
- Discuss proposed increases in on-site renewable energy
- Report department planned Monitoring-Based Commissioning (MBCx) projects in Table 3.10
- Summarize department's MBCx experience, challenges, successes, and whether MBCx is incorporated as required, or plans to implement
- Discuss how energy efficiency Best Management Practices have been implemented, how they were institutionalized, and quantify repairs and replacements with estimated energy savings, if possible.
- Describe department steps to finance energy goals and requirements, and what programs it is using

4 - Water Efficiency and Conservation Roadmap Checklist

Policy References: [Executive Order B-37-16](#)

Executive Summary:

- Summary of status and actions underway to meet sustainability objectives related to water efficiency and conservation.
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document.)

Past Performance:

- Describe built infrastructure supporting department mission that consumes purchased water. Include number and total square footage of department facilities.
- Report all 2020 Total Purchased Water in Table 4.1
- List department properties with largest water use per capita in Table 4.2
- List facilities with largest landscape areas in Table 4.3
- Describe any successes or challenges encountered by your department, and solutions as it seeks to achieve water efficiency and conservation
- Report department wide water use trends in Table 4.4
- Report total water reductions achieved in Table 4.5
- Describe major water efficiency project over past five years or underway
- Identify indoor water efficiency projects in Table 4.6
- Identify boilers and cooling systems projects in Table 4.7
- Identify landscaping hardware water efficiency projects in Table 4.8

- Identify living landscaping water efficiency projects in Table 4.9

Future Planning:

- Report the number of buildings with urban water shortage contingency plans and in critical groundwater basins in Table 4.10, and discuss steps to reduce water use in those facilities
- Identify building inventory interior fixture needs in Table 4.11
- Summarize water using boilers and cooling systems inventory in Table 4.12
- Identify irrigation hardware inventory in Table 4.13 and discuss how replacements will occur
- Identify living landscape inventory in Table 4.14 and discuss results
- Identify large landscape inventory and water budget, as well as certified staff in Table 4.15
- Discuss how water conservation Best Management Practices have been implemented, how they were institutionalized, and quantify repairs and replacements with estimated water savings, if possible.

5 - Green Operations Roadmap Checklist

Policy References: [Executive Order B-18-12](#)

Executive Summary:

- Summary of status and actions underway to meet sustainability objectives related to green operations
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document.)

Past Performance:

- Report GHG Emissions since 2010 in Table 5.1 and update Graph 5.1 to reflect department emissions trend
- Describe any successes or challenges encountered by your department as it seeks to achieve GHG Emission reductions, and how various strategies contribute
- Explain which actions your department has taken that had the largest impact on GHGe
- Identify newly constructed buildings since July 1, 2012, and LEED level achievement in Table 5.2 and list number of buildings eligible as well as have achieved LEED for Existing Buildings and Operations in Table 5.3.
- Report state agency buy recycled campaign 2016 performance in Table 5.5 and describe your department's efforts to increase green commodities
- Report the lowest smart location score leases in Table 5.9 and describe the department's measures to improve location efficiency scores

Future Commitment:

- Discuss how your department implements efficiency measures to meet Energy Star targets and to achieve LEED EBOM for buildings >50,000 sw. ft. Describe steps to achieve these and goal dates.

- D**iscuss the steps taken to ensure new construction incorporates the IEQ provisions of CalGreen, and ensures IEQ is considered and incorporated into products, cleaning, and HVAC operation
- Identify pest control contracts in Table 5.4 and discuss the steps taken to incorporate IPM into all contracts and practices
- Describe department efforts to reduce waste and recycle
- Describe department efforts to reduce environmental impacts through purchases of goods and services
- Identify commodities categories with the greatest potential to green in Table 5.6 and describe your department's efforts to increase green commodities
- List buyers who have completed EPP Training in Table 5.7 and discuss available training and certifications buyers may have beyond the basic training courses
- List new leases and their smart location scores in Table 5.8 and describe the department's measures to improve location efficiency scores
- Describe how you will achieve greener operations and how many GHGe reductions your department will need to achieve its goal

Appendix D – Acronyms

Customize to include organizations and acronyms within your specific department

AB	Assembly Bill
ADR	Automated Demand Response
AMB	Asset Management Branch (at DGS)
BMP	Best management practices
CA	California
CALGREEN	California Green Building Code (Title 24, Part 11)
CEC	California Energy Commission
COM	Radio Communication Systems
DGS	Department of General Services
DWR	Department of Water Resources
ECC	Emergency Command Center
EHT	Extreme heat threshold
EMS	Energy management system (aka EMCS)
EMCS	Energy management control system (aka EMS)
EO	Executive Order

EPP	Environmentally preferable purchasing
ESCO	Energy service company
ESPM	Energy Star Portfolio Manager
ETS	Enterprise Technology Solutions (a division at DGS)
EUI	Energy use intensity (source kBTU/sq. ft.)
EVSE	Electric vehicle supply equipment (charging equipment)
FMD	Facilities Management Division (a division at DGS)
FS	Fire Station
GCM	Global circulation model
GHG	Greenhouse gas
GHGe	Greenhouse gas emissions
GSP	Groundwater Sustainability Plan
IEQ	Indoor environmental quality
kBTU	Thousand British thermal units (unit of energy)
LCM	The Landscape Coefficient Method
LEED	Leadership in Energy and Environmental Design
MAWA	Maximum applied water allowance
MM	Management Memo

MWELO	Model Water Efficient Landscape Ordinance
OBAS	Office of Business and Acquisition Services (at DGS)
OBF	On-bill financing
OFAM	Office of Fleet and Asset Management (at DGS)
OS	Office of Sustainability (at DGS)
PMDB	Project Management and Development Branch (at DGS)
PPA	Power purchase agreement
PUE	Power usage effectiveness
RCP	Representative Concentration Pathway
SABRC	State Agency Buy Recycled Campaign
SAM	State Administrative Manual
SB	Senate Bill
SCM	State Contracting Manual
SGA	Sustainable groundwater agency
SGMA	Sustainable Groundwater Management Act
WMC	Water management coordinator
WUCOLS	Water Use Classifications of Landscape Species
ZEV	Zero-emission vehicle

ZNE

Zero net energy

Appendix E - Glossary

Backflow - is the undesirable reversal of the flow of water or mixtures of water and other undesirable substances from any source (such as used water, industrial fluids, gasses, or any substance other than the intended potable water) into the distribution pipes of the potable water system.

Back flow prevention device – a device that prevents contaminants from entering the potable water system in the event of back pressure or back siphonage.

Blowdown - is the periodic or continuous removal of water from a boiler to remove accumulated dissolved solids and/or sludge. Proper control of blowdown is critical to boiler operation. Insufficient blowdown may lead to deposits or carryover. Excessive blowdown wastes water, energy, and chemicals.

Compost – Compost is the product resulting from the controlled biological decomposition of organic material from a feedstock into a stable, humus-like product that has many environmental benefits. Composting is a natural process that is managed to optimize the conditions for decomposing microbes to thrive. This generally involves providing air and moisture, and achieving sufficient temperatures to ensure weed seeds, invasive pests, and pathogens are destroyed. A wide range of material (feedstock) may be composted, such as yard trimmings, wood chips, vegetable scraps, paper products, manures and biosolids. Compost may be applied to the top of the soil or incorporated into the soil (tilling).

Critical overdraft - a condition in which significantly more water has been taken out of a groundwater basin than has been put in, either by natural recharge or by recharging basins. Critical overdraft leads to various undesirable conditions such as ground subsidence and saltwater intrusion.

Ecosystem services - are the direct and indirect contributions of ecosystems to human well-being. They support directly or indirectly our survival and quality of life. Ecosystem services can be categorized in four main types:

- Provisioning services are the products obtained from ecosystems such as food, fresh water, wood, fiber, genetic resources, and medicines.

- Regulating services are the benefits obtained from the regulation of ecosystem processes such as climate regulation, natural hazard regulation, water purification and waste management, pollination, or pest control.
- Habitat services provide living places for all species and maintain the viability of gene-pools.
- Cultural services include non-material benefits such as spiritual enrichment, intellectual development, recreation, and aesthetic values.

Grass cycling -refers to an aerobic (requires air) method of handling grass clippings by leaving them on the lawn when mowing. Because grass consists largely of water (80% or more), contains little lignin, and has high nitrogen content, grass clippings easily break down during an aerobic process. Grass cycling returns the decomposed clippings to the soil within one to two weeks acting primarily as a fertilizer supplement and, to a much smaller degree, mulch. Grass cycling can provide 15 to 20% or more of a lawn's yearly nitrogen requirements

Hydrozone – is a portion of a landscaped area having plants with similar water needs that are served by one irrigation valve or set of valves with the same schedule.

Landscape Coefficient Method (LCM) describes a method of estimating irrigation needs of landscape plantings in California. It is intended as a guide for landscape professionals.

Landscape water budget - is the calculated irrigation requirement of a landscape based on landscape area, local climate factors, specific plant requirements and the irrigation system performance.

Model Water Efficient Landscape Ordinance (MWELO) - The Water Conservation in Landscaping Act was signed into law on September 29, 1990. The premise was that landscape design, installation, and maintenance can and should be water efficient. Some of the provisions specified in the statute included plant selection and groupings of plants based on water needs and climatic, geological, or topographical conditions, efficient irrigation systems, practices that foster long term water conservation and routine repair and maintenance of irrigation systems. DWR adopted the Model Ordinance in June of 1992. One element of the Model Ordinance

was a landscape water budget. In the water budget approach, a Maximum Applied Water Allowance (MAWA) was established based on the landscape area and the climate where the landscape is located. The latest update to MWELo was in 2015. MWELo applies to all state agencies' landscaping.

Mulch – Mulch is a layer of material applied on top of soil. Examples of material that can be used as mulch include wood chips, grass clippings, leaves, straw, cardboard, newspaper, rocks, and even shredded tires. Benefits of applying mulch include reducing erosion and weeds and increasing water retention and soil vitality. Whenever possible, look for mulch that has been through a sanitization process to kill weed seeds and pests.

Trickle flow – A device that allows users to reduce flow to a trickle while using soap and shampoo. When the device is switched off, the flow is reinstated with the temperature and pressure resumes to previous settings.

Sprinkler system backflow prevention devices – are devices to prevent contaminants from entering water supplies. These devices connect to the sprinkler system and are an important safety feature. They are required by the California Plumbing Code.

Submeter- a metering device installed to measure water use in a specific area or for a specific purpose. Also known as dedicated meters, landscape submeters are effective for separating landscape water use from interior water use, evaluating the landscape water budget and for leak detection within the irrigation system.

Water Budget - A landscape water budget is the calculated irrigation requirement of a landscape based on landscape area, local climate factors, specific plant requirements and the irrigation system performance.

Water-energy nexus - Water and energy are often managed separately despite the important links between the two. 12 percent of California's energy use is related to water use with nearly 10 percent being used at the end water use. Water is used in the production of nearly every major energy source. Likewise, energy is used in multiple ways and at multiple steps in water delivery and treatment systems as well as wastewater collection and treatment.

Water Shortage Contingency Plans - each urban water purveyor serving more than 3,000 connections or 3,000 acre-feet of water annually must have an Urban Water Shortage Contingency Plan (Water Shortage Plan) which details how a community would react to a reduction in water supply of up to 50% for droughts lasting up to three years.

Appendix F – Department Stakeholders

List individuals, offices, and divisions responsible for leading efforts related to each initiative identified in this report. Include their respective titles, roles, responsibilities.

Climate Change Adaptation

Understanding Climate Risk at Existing Facilities	
Resource Management	Climate & Energy Unit

Understanding Climate Risk at Planned Facilities	
Resource Management	Climate & Energy Unit

Integrating Climate Change into Department Planning and Funding Programs	
Resource Management	Climate & Energy Unit

Measuring and Tracking Progress	
Resource Management	Climate & Energy Unit

Zero Emission Vehicles

Incorporating ZEVs Into the Department Fleet	
Fire Protection	Mobile Equipment Unit

Telematics	
Fire Protection	Mobile Equipment Unit

Public Safety Exemption	
Fire Protection	Mobile Equipment Unit

Outside Funding Sources for ZEV Infrastructure

Fire Protection	Mobile Equipment Unit
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Hydrogen Fueling Infrastructure

Fire Protection	Mobile Equipment Unit
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Comprehensive Facility Site and Infrastructure Assessments

Fire Protection	Mobile Equipment Unit
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EVSE Construction Plan

Fire Protection	Mobile Equipment Unit
-----------------	-----------------------

EVSE Operation

Fire Protection	Mobile Equipment Unit
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Energy

Zero Net Energy (ZNE)

Technical Services	Capital Finance & Sustainability Unit
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New Construction Exceeds Title 24 by 15%

Technical Services	Capital Finance & Sustainability Unit
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Reduce Grid-Based Energy Purchased by 20% by 2018	
Technical Services	Capital Finance & Sustainability Unit

Server Room Energy Use	
Technology	Information Technology Unit

Demand Response	
Technical Services	Capital Finance & Sustainability Unit

Renewable Energy	
Technical Services	Capital Finance & Sustainability Unit

Monitoring Based Commissioning (MBCx)	
Technical Services	Capital Finance & Sustainability Unit

Financing	
Technical Services	Capital Finance & Sustainability Unit

Water Efficiency and Conservation

Indoor Water Efficiency Projects In Progress First initiative	
Technical Services	Capital Finance & Sustainability Unit

Boilers and Cooling Systems Projects In Progress	
Technical Services	Capital Finance & Sustainability Unit

Landscaping Hardware Water Efficiency Projects In Progress	
Technical Services	Capital Finance & Sustainability Unit

Living Landscaping Water Efficiency Projects In Progress	
Technical Services	Capital Finance & Sustainability Unit

Buildings with Urban Water Shortage Contingency Plans In Progress	
Technical Services	Capital Finance & Sustainability Unit

Green Operations

Greenhouse Gas Emissions	
Technical Services	Capital Finance & Sustainability Unit

Building Design and Construction	
Technical Services	Capital Finance & Sustainability Unit

LEED for Existing Buildings Operations and Maintenance	
Technical Services	Capital Finance & Sustainability Unit

Indoor Environmental Quality	
Management Services	Property & Local Services Unit

Integrated Pest Management	
Management Services	Property & Local Services Unit

Waste Management and Recycling	
Management Services	Property & Local Services Unit

Environmentally Preferable Purchasing	
Management Services	Procurement & Contracting Unit

Location Efficiency	
Technical Services	Capital Finance & Sustainability Unit

Appendix G – Sustainability Requirements & Goals

Governor Edmund G. Brown Jr. directed California state agencies to demonstrate sustainable operations and to lead the way by implementing sustainability policies set by the state. Additionally, enacted legislation includes sustainability-related requirements of state facilities and operations. Specific references and background on executive orders, legislation, management memos and other requirements or actions are included in five general chapters within this roadmap, as follows:

- Climate change adaptation
- Zero-emission vehicles
- Energy
- Water efficiency and conservation
- Green operations

These general sustainability initiatives include the following:

- GHG emissions reductions
- Climate change adaptation
- Building energy efficiency and conservation
- Indoor environmental quality (IEQ)
- Water efficiency and conservation
- Monitoring-based Building Commissioning (MBCx)
- Environmentally preferable purchasing (EPP)
- Financing for sustainability
- Zero-emission vehicle (ZEV) fleet purchases
- Electric vehicle charging infrastructure
- Monitoring and executive oversight
- Zero Net Energy (ZNE)

Appendix H – Sustainability Background

References

The following executive orders, Management Memos, legislative actions, resources, and guidance documents provide the sustainability criteria, requirements, and targets tracked and reported herein.

Executive Orders

The governor issued the following executive order relevant to chapters of this roadmap:

- [Executive Order B-16-12](#)

EO B-16-12 directs state agencies to integrate zero-emission vehicles (ZEVs) into the state vehicle fleet. It also directs state agencies to develop the infrastructure to support increased public and private sector use of ZEVs. Specifically, it directs state agencies replacing fleet vehicles to replace at least 10 percent with ZEVs, and by 2020 to ensure at least 25 percent of replacement fleet vehicles are ZEVs.

- [Executive Order B-18-12](#)

EO B-18-12 and the companion *Green Building Action Plan* require state agencies to reduce the environmental impacts of state operations by reducing greenhouse gas emissions, managing energy and water use, improving indoor air quality, generating on-site renewable energy when feasible, implementing environmentally preferable purchasing, and developing the infrastructure for electric vehicle charging stations at state facilities. The Green Building Action Plan also established two oversight groups – the staff-level Sustainability Working Group and the executive-level Sustainability Task Force – to ensure these measures are met. Agencies annually report current energy and water use into the Energy Star Portfolio Manager (ESPM).

- [Executive Order B-29-15](#)

EO B-29-15 directs state agencies to take actions in response to the ongoing drought and to the state of emergency due to severe drought conditions proclaimed on January 17, 2014. Governor Brown directed numerous state agencies to develop new programs and regulations to mitigate the effects of the drought and required increased enforcement of water waste statewide. Agencies were instructed to reduce potable urban water use by 25 percent between 2013 and February 28, 2016.

- [Executive Order B-30-15](#)

In 2015, the governor issued EO B-30-15, which declared climate change to be a “threat to the well-being, public health, natural resources, economy and environment of California.” It established a new interim statewide GHG emission reduction target of 40 percent below 1990 levels by 2030 and reaffirms California’s intent to reduce GHG emissions to 80 percent below 1990 levels by 2050. To support these goals, this order requires numerous state agencies to develop plans and programs to reduce emissions. It also directs state agencies to take climate change into account in their planning and investment decisions and employ life-cycle cost accounting to evaluate and compare infrastructure investments and alternatives. State agencies are directed to prioritize investments that both build climate preparedness and reduce GHG emissions; prioritize natural infrastructure; and protect the state’s most vulnerable populations.

- [**Executive Order B-37-16**](#)

EO B-37-16 builds on what were formerly temporary statewide emergency water restrictions in order to establish longer-term water conservation measures, including permanent monthly water use reporting; new permanent water use standards in California communities; and bans on clearly wasteful practices such as hosing off sidewalks, driveways, and other hardscapes. The EO focuses on using water more wisely and eliminating water waste by taking actions to minimize water system leaks. The California Department of Water Resources (DWR) estimates that leaks in water district distribution systems siphon away more than 700,000 acre-feet of water a year in California – enough to supply 1.4 million homes for a year.

The EO further strengthens local drought resilience and looks to improve agricultural water use efficiency and drought planning. State agencies are to cooperate with urban water management plans, which include plans for droughts lasting for at least five years by assuring that the water efficiency and conservation plan has drought contingency actions.

State Administrative Manual & Management Memos

The following section of the State Administrative Manual (SAM), and associated Management Memos (MMs) currently impose sustainability requirements on the department under the governor’s executive authority:

- [**SAM Chapter 1800**](#): Energy and Sustainability
- [**MM 14-02**](#): Water Efficiency and Conservation

- [MM 14-05](#): Indoor Environmental Quality: New, Renovated, And Existing Buildings
- [MM 14-07](#): Standard Operating Procedures for Energy Management in State Buildings
- [MM 14-09](#): Energy Efficiency in Data Centers and Server Rooms
- [MM 15-03](#): Minimum Fuel Economy Standards Policy
- [MM 15-04](#): Energy Use Reduction for New, Existing, and Leased Buildings
- [MM 15-06](#): State Buildings and Grounds Maintenance and Operation
- [MM 15-07](#): Diesel, Biodiesel, and Renewable Hydrocarbon Diesel Bulk Fuel Purchases
- [MM 16-07](#): Zero-Emission Vehicle Purchasing and EVSE Infrastructure Requirements
- [MM 17-04](#): Zero Net Energy for New and Existing State Buildings

Legislative Actions

Several pieces of legislation were signed in 2015-16 that codified several elements of the executive orders, or provided further requirements included in the policies. These include the following:

- [Assembly Bill \(AB\) 1482 \(Gordon, 2015\)](#): Requires that the California Natural Resources Agency (CNRA) update the state's adaptation strategy safeguarding California every three years. Directs state agencies to promote climate adaptation in planning decisions and ensure that state investments consider climate change impacts, as well as the use of natural systems and natural infrastructure. (Public Resources Code Section 71153)
- [Senate Bill \(SB\) 246 \(Wieckowski, 2015\)](#): Established the Integrated Climate Adaptation and Resiliency Program within the Governor's Office of Planning and Research to coordinate regional and local efforts with state climate adaptation strategies to adapt to the impacts of climate change. (Public Resources Code Section 71354)
- [AB 2800 \(Quirk, 2016\)](#): Requires state agencies to take the current and future impacts of climate change into planning, designing, building, operating, maintaining, and investing in state infrastructure. CNRA will establish a Climate-Safe Infrastructure Working Group to determine how to integrate climate change impacts into state infrastructure engineering. (Public Resources Code Section 71155)
- **Assembly Bill (AB) 4**: Passed in 1989. The State Agency Buy Recycled Campaign (SABRC) statutes are in Public Contract Code Section [12153-12217](#). The intent of SABRC is to stimulate markets for materials diverted by California local government and agencies. It requires state agencies to purchase enough recycled-content products to meet annual targets, report on purchases of recycled and nonrecycled products, and submit plans for meeting the annual goals for purchasing recycled-content products.
- [AB 32 Scoping Plan](#): The scoping plan assumes widespread electrification of the transportation sector as a critical component of every scenario that leads to the mandated 40 percent reduction in GHG by 2030 and 80 percent reduction by 2015.
- [AB 2583 \(Blumenfield 2012\)](#) **Public Resources Code §25722.8**: Statute requires reducing consumption of petroleum products by the state fleet compared to a 2003 baseline. Mandates a 10 percent reduction or

displacement by Jan. 1, 2012, and a 20 percent reduction or displacement by Jan. 1, 2020.

- [AB 75](#) – Implement an integrated waste management program and achieve 50 percent disposal reduction target. State Agencies report annually on waste management program
- [SB 1106](#) – Have at least one designated waste management coordinator. Report annually on how your designated waste and recycling coordinator meets the requirement.
- [AB 2812](#) - Provide adequate receptacles, signage, education, staffing, and arrange for recycling services. Report annually on how each of these is being implemented
- [AB 341](#) – Implement mandatory commercial recycling program (if meet threshold). Report annually on recycling program
- [AB 1826](#) – Implement mandatory commercial organics recycling program (if meet threshold). Report annually on organics recycling program
- [SB 1383](#) - 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020, a 75 percent reduction by 2025, and 20 percent of currently disposed edible food is recovered for human consumption by 2025.
 - Agencies already in compliance with AB 1826 may need to further expand their organic waste recycling service to comply with the new requirements
 - Jan. 1, 2024, Tier 2 Commercial Edible food Generators will be required to donate edible food to a recovery organization.
- [SB 1335](#) - requires food service facilities located in a state-owned facility, a concessionaire on state-owned property, or under contract to dispense prepared food using reusable, recyclable, or compostable. food service packaging

Action Plan

- [2016 Zero-Emission Vehicle Action Plan](#)

The plan establishes a goal to provide electric vehicle charging to 5 percent of state-owned parking spaces by 2022. It also advances the ZEV procurement target to 50 percent of light-duty vehicles by 2025.

State Resources and Guidance Documents

California has invested significant resources in understanding the risks of climate change, water efficiency, strategic growth, and state actions available to respond to and reduce these risks. These include the following:

- **[Safeguarding California](#)**: The state's climate adaptation strategy organized by sector. Each sector identifies risks from climate change and actions to reduce those risks.
- **[Safeguarding California Implementation Action Plans](#)**: Directed under EO B-30-15, the Implementation Action Plans outline the steps that will be taken in each sector to reduce risks from climate change.
- **[Planning and Investing for a Resilient California](#)**: Prepared under direction of EO B-30-15, this document provides a framework for state agencies to integrate climate change into planning and investment, including guidance on data selection and analytical approach.
- **[California's Climate Change Assessments](#)**: California has completed three comprehensive assessments of climate change impacts on California. Each assessment has included development of projections of climate impacts on a scale that is relevant to state planning (i.e., downscaled climate projections). These data are available through [Cal-Adapt](#), an online data visualization and access tool.
- **[Water Use Reduction Guidelines and Criteria](#)**: Issued by the California Department of Water Resources February 28, 2013, pursuant to Executive Order B-18-12. Each applicable agency was required to take actions to reduce water use in facilities and landscapes that are operated by the state, including owned, funded, or leased facilities. State-operated facilities are defined as facilities where the agency has direct control of the buildings' function, maintenance, and repair. For leased facilities, the Green Building Action Plan directed at that time that new and renegotiated leases include provisions for water conservation, reporting water use, and installation of sub-meters to the extent possible and economically feasible.
- **[Strategic Growth Council \(SGC\) Resolution on Location Efficiency](#)**: Location efficiency refers to the greenhouse gas emissions arising from the transportation choices of employees and visitors to a building as determined by the Smart Location Calculator. Adopted on December 6, 2016, the resolution directs members of the SGC to achieve a 10 percent improvement in the Smart Location Score of new leases compared to the average score of leased facilities in 2016.

Table G-1: Background References and Applicable Roadmap Chapters

	Climate Adaptation	ZEV	Energy	Water	Green Operation
Executive Orders:					
EO B-16-12		X			X
EO B-18-12		X	X	X	X
EO B-29-15				X	
EO B-30-15	X	X	X		X
EO B-37-16				X	
Management Memos					
MM 14-02				X	
MM 14-05			X		X
MM 14-07			X		X
MM 14-09			X		
MM 15-03		X	X		
MM 15-04			X		X
MM 15-06			X	X	X
MM 15-07		X			
MM 16-07		X			
MM 17-04			X		
Legislative Actions					
SB 246	X				

SB 2800	X				
SB 1106					X
SB 1383					X
AB 4					X
AB 32		X			X
AB 75					X
AB 341					X
AB 1826					X
AB 2812					X
AB 1482	X				
Action Plans					
2016 ZEV Action Plan		X			
State Resources and Guidance Documents					
Cal-Adapt	X				
California's Climate Change Assessments	X				
Public Resources Code §25722.8		X			
Planning and Investing for a Resilient California	X				
Safeguarding California	X				
Safeguarding CA Implementation Action Plan	X				

Sustainable Groundwater Management Act of 2014				X	
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