Sustainability Roadmap 2020-2021

California Air Resources Board

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

for California State Agencies

California Air Resources Board

Gavin Newsom, Governor

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California Air Resources Board Roadmap

Sustainability Road Map 2020-2021

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Table of Contents

Executive Summary

In accordance with the Governor's Executive Order B-18-12 and the Green Building Action Plan, all State agencies are to reduce energy and water consumption, and greenhouse gas emissions. Additionally, agencies are to follow specific guidelines as it relates to new construction, renovation of existing facilities, implementation of electric vehicle charging stations, purchasing products that are environmentally preferable, and achieving Leadership in Energy and Environmental Design (LEED) certification and Zero Net Energy (ZNE) goals. The following report provides information on the Air Resources Board's (ARB) progress in responding to the goals set forth by the Governor's Office.

The California Air Resources Board (CARB) serves as the State's primary agency to promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the State. CARB has over 1,700 employees within multiple divisions.

CARB occupies approximately 56 sites; one is State-owned, one was under construction during 2020; and 55 are leased throughout the State. Of the leased sites, 36 support air-monitoring stations and 19 support an array of vehicle testing, warehouses, research, planning, enforcement, chemical laboratories, support services, and administrative needs.

The Haagen-Smit Laboratory (HSL), CARB's State-owned site, has presented the most significant challenge due to the aged infrastructure coupled with the energy intensive demands of testing and research operations. Originally built in 1971, HSL was designed to support 40 staff. Today HSL is currently being decommissioned and all personnel and operations are being relocated to CARB's new Southern California Headquarters (SCHQ) located in Riverside, CA. The new facility is designed to house all testing, laboratory and staff that once housed multiple leased locations in El Monte, CA. The new SCHQ facility is approximately 420,000 square feet and is designed to perform and operate in an energy-efficient manner and support CARB's goal of being LEED-Platinum and ZNE certified.

In support of CARB's mission to address climate change and keep the State on a path towards a low-carbon future, CARB is seizing this opportunity to showcase how a laboratory and testing facility can incorporate sustainable building practices. CARB's goal is to not only achieve the Governor's energy and environmental goals, but to surpass them.

Climate Change Adaptation

In a changing climate, CARB employs climate adaptation strategies for its facilities to help reduce climate risks. In regard to new construction, leases, and landscape/facility projects, CARB will consider the following:

- Temperature changes (including extreme heat events).
- Urban heat island effect, drought, and wildfires.
- Precipitation changes (including extreme precipitation events).
- Sea level rise (e.g. flood risk).

CARB's current facility (Haagen Smit Laboratory) is located at 9528 Telstar Ave. in El Monte, CA. This Facility is slated to close operations in December 2022. CARB will be working directly with DGS Real Estate to prepare the building for sale.

Zero Emission Vehicles (ZEV)

CARB encompasses a very diverse fleet. Vehicles are utilized differently depending on the Program/Division. CARB's fleet is comprised primarily of sport utility vehicles (SUV)that are used as pool vehicles or by CARB employees who conduct work in the field. Many of the other vehicles are used to assist with conducting tests, carrying equipment and tools, and assisting staff with navigating through unique terrain. ZEVs currently on the state contract include Battery Electric Vehicles (BEV) and Fuel Cell Electric Vehicles (FCEV).

Most BEVs available historically are sedans, which have limited cargo space and lack the off-road capability required by CARB divisions and staff that work in the field. Thus, most CARB BEVs serve as pool vehicles that most staff can access when needed for passenger trips to meetings and the like. The main challenge in incorporating more BEVs into CARBs fleet in the past is models that lack specific vehicle attributes and that are available from CARB aligned OEMs, but as more BEV options with these features are made available CARB will continue to add more.

FCEVs were not widely considered by CARB due to the limited fueling infrastructure in most regions. As more fueling stations become available in Sacramento, the vehicles may become a considerable option for CARB. Currently, the Toyota Mirai is available on the state contract. This vehicle could serve as an adequate pool vehicle for many programs and divisions should the

infrastructure be expanded. CARB will continue to research and review where FCEVs can be incorporated into the fleet.

CARB is committed to incorporating MD and HD ZEVS whenever feasibly possible. Most CARB MD and HD vehicles are used for towing and transporting large items. Programs and divisions drive these vehicles throughout California, often in rough terrain that requires 4-wheel drive. The challenge with incorporating MD and HD BEV would come down to availability of BEV vehicles from CARB aligned OEMs that meet the 4-wheel drive and towing requirements. Historically, there have not been any models that meet CARBs unique needs. .

Plug-in hybrid vehicles (PHEVs) have been easier to incorporate due to having models that meet the off-road capability, or cargo space requirements that CARB requires to reach remote areas that house equipment such as air monitoring stations, or to transport equipment and tools. CARB continues to monitor the vehicles that are available on state contracts that are manufactured by CARB aligned OEMs. CARB prioritizes BEV models that meet CARBs needs. If BEV models are not available, CARB will look for PHEV models before selecting models powered solely by fossil fuels as a last resort.

Energy

CARB operates the Haagen Smit Laboratory (HSL) located in El Monte, California. This facility was the main operations for vehicle emissions testing during the 2020 calendar year.

CARB has faced many challenges due to the age of the HSL facility. It was not cost effective to retrofit the facility to meet ZNE goals. CARB determined a long-range plan and funding were required to build a new facility to meet the long-term sustainability goals set by the governor.

Water

CARB has determined it was not cost effective to replace any of the boilers or cooling systems described in the table below as HSL will be decommissioned and sold in December 2023. CARB has constructed a new ZNE facility in Riverside, CA.

Green Operations

All services contracted for at HSL include a requirement to use environmentally friendly methods whenever possible including battery or hand powered

landscaping equipment, low VOC construction materials, high efficiency methods with limited chemical usage in both cleaning and pest management and continued Environmental Preferable Purchasing (EPP) education and State Agency Buy Recycled Campaign (SABRC) awareness.

The HSL Facility was built in 1971. CARB determined it was not cost effective to retrofit the building in order to meet LEED standards. HSL will be decommissioned and sold in December 2022.

Steven S. Cliff, Ph.D., Executive Officer

CHAPTER 1 - CLIMATE CHANGE ADAPTATION

Executive Order B-30-15 directs 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., sea level rise 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).

CARBS current facility (Haagen Smit Laboratory) is located at 9528 Telstar Ave. in El Monte, CA. This Facility is slated to close operations in December 2022. CARB will be working directly with DGS Real Estate to prepare the building for sale.

The new CARB Southern California Headquarters Building (SCHQ) located at 4001 Iowa Ave in Riverside, CA. This campus is currently under construction with a completion date of August 2022. This facility has incorporated into the design and performance criteria the analysis of the impact of climate change in relation to the requirements of the California Building Code (CBC), LEED and other executive orders. The types of screening criteria are part of the scoping of a project and are integrated into the project design parameters.

In preparation of the project, the project team along with the Department of General Services, the design build team, architect, and consultants have outlined the project scope criteria to include the use of a ZNE screening process

to identify the building design's energy usage intensity and how the design will then achieve the ZNE status.

Understanding Climate Risk to Existing Facilities

Background on Climate Projections

Global Circulation Models (GCMs) are used to project future climate conditions. Models project future climate conditions under different future emission scenarios that are called Representative Concentration Pathways (RCPs). Different RCPs essentially represent different rates and magnitudes of global greenhouse gas (GHG) emission reduction.

Of the 32 internationally recognized course-resolution GCMs, the State of California has chosen four models to utilize in its climate studies for the Fourth Assessment.[1] The following four models were selected to capture a range of different climate futures:

- Model 1: HadGEM2-ES characterizes a warm and dry future (warm/dry)
- Model 2: CNRM-CM5 characterizes a cool and dry future (cool/wet)
- Model 3: CanESM2 characterizes an average future condition (average)
- Model 4: MIROC5 provides a complement to the above models, and covers a range of outputs

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 being experienced, and they are likely to be experienced sooner than changes in average temperatures.

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1 Pierce, D.W., D.R. Cayan, L. Dehann. June 2016. Creating Climate projections to support the 4th California Climate Assessment.

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)
HSL	101.77	4.44	19.69	15.25	42.47	38.02	N/A	N/A

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)
HSL	79.47	84.6	5.125	88.25	8.9775

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)
HSL	54.37	59.367	4.99	63.34	8.9775

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 that 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, 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). It will also result in decreased snowpack.

Table 1.3: 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)
HSL	16.813	18.0028	7%	19.741	17%	6.1266	6.457	7.83

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. The California Ocean Protection Council (OPC) has issued the State of California Sea-Level Rise Guidance (Guidance) for State agencies on what level of sea level rise projections to consider in planning.

The Guidance provides estimates of sea level rise for the California Coast for all active tide gauges based on a range of emission trajectories, which are based on the report, Rising Seas in California: An Update on Sea-Level Rise Science. These data provide projections for use in low, medium-high, and extreme risk aversion decisions. Current guidance from the CA Coastal Commission suggests using the medium-high risk aversion or extreme risk when assessing the vulnerability of critical infrastructure.

Table 1.4 : 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)
HSL	N/A	N/A	N/A	N/A	N/A

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 extreme 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. Five of California's six largest fires all occurred in 2020[2]. 2017 and 2018 previously set records as the most destructive fire seasons in California's history[3]. 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 year[4]. To start to understand how wildfire could affect facilities, complete the following tables for all facilities. The first table is meant to give an indication of current risk, based on CALFIRE data for Fire Hazard Severity Zones. This is presented as low, medium, high, or very high. For future risk, the table uses data from CalAdapt to project acres burned in your facilities' area.

In identifying facilities most at risk, considerations should include location, fire risk in surrounding areas, required operations, impacts of current fire events, the impact of disruption, access to facility during disruptions/wildfires in surrounding areas, and criticality of the facility and/or its operations.

Table 1.5: Top 5-10 Facilities Most at risk to current wildfire threats

Facility Name	Fire Hazard Severity Zone (low, medium, high, very high)
HSL	N/A

2 https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

3 https://www.fire.ca.gov/incidents/2017/ ; https://www.fire.ca.gov/incidents/2018/

4 https://calmatters.org/projects/california-school-closures-wildfire-middletown-paradise-disaster-days/?

Table 1.6: 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)
HSL	N/A	N/A	N/A

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 1.7: 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)
HSL	1082/1782	442/3204	216/4168

The above tables reference HSL which is due to close operations in December of 2022.

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)).

Understanding the Potential Impacts of Facilities on Communities

Vulnerable Populations

Climate change disproportionately impacts vulnerable communities, with certain populations experiencing heightened risk and increased sensitivity to climate change and have 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 a number of social and economic factors, and 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; incarnated populations; linguistically or socially isolated individuals; communities with less access to healthcare or educational resources; or communities that have suffered historic exclusion or neglect.

While there is no single tool to identify vulnerable populations in an adaptation context, there are a number of state-wide, publicly available tools that when overlaid with climate projection data can help identify communities most at risk to a changing climate. Some of these tools, including a definition for vulnerable communities, are available in a resource guide developed by the Integrated Climate Adaptation and Resiliency Program in the Office of Planning and Research.

Disadvantaged Communities

California is required to invest certain funding streams in disadvantaged communities (DACs). Many state programs that have DAC funding requirements

use CalEnviroScreen, a tool that ranks census tracts based on a combination social, economic, and environmental factors, to identify DACs. While it does not capture all aspects of climate vulnerability, it is one tool that is available, and 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
HSL	4.0	Yes

Urban Heat Islands

Urban heat islands are areas with localized spikes in temperature, which impact human health, increase pollution, and increase 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 measures, cool roofs (e.g., lighter roofing materials that reflect light), cooler pavements, and other measures.

Using the State's Urban Heat Island interactive maps, complete the following table for **all** facilities.

Table 1.9: Facilities Located in Urban Heat Islands

Facility Name	Located in an urban heat island (yes/no)
HSL	Yes

The HSL facility is located within an Urban Heat Island location. The facility is surrounded by several parking lots for fleet and employee use. In the year 2020 these lots were minimally used due to teleworking and decommissioning of the building.

Understanding Climate Risk to Planned Facilities

The new Southern California Headquarters campus has been designed to LEED Platinum standards in addition to meeting Title 24 energy reduction requirements

and meeting the energy usage index that will operate at zero net energy use with renewable power purchase agreements.

It is important to the state to assist and serve disadvantaged communities in California. By doing so, this project was placed in a prime location to the nearby University of Riverside Campus as well as local schools to facilitate a partnership in the community to support collaboration and fostering future job opportunities for local students. Additionally, bringing in staff will support local businesses to thrive that reside in the area.

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. 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)).

CARB's planning of the new SCHQ has included reducing the urban heat island effect by installation of cool roofs, PV canopies throughout the facility and parking areas, and native tree and vegetation landscaping for the surrounding campus path, inner courtyard, and visitor entry.

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

The facility location was chosen to be accessible to the future national and global community, by proximity to the Ontario International Airport. Another benefit to its location is being centrally located close to the downtown Riverside community and the hub of businesses which CARB works hand and hand with.

Table 1.10 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)
SCHQ	77.96	83.582	5.6225	86.92	8.96

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)
SCHQ	49.56	54.432	4.872	58.2	8.64

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)
SCHQ	9.627	9.932	3.022	3.227

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
SCHQ	103.59	4.448	27.232	22.784

d.

Facility Name	Area (California Coast, San Francisco Bay, Delta)	Sea Level Rise 0.0 m	Sea Level Rise 0.5 m	Sea Level Rise 1.0 m	Sea Level Rise 1.41 m
SCHQ	N/A	N/A	N/A	N/A	N/A

e.

Facility Name	Current Fire Hazard Severity Zone (low, medium, high, very high)
SCHQ	N/A

f.

Facility Name	Acres Burned (1961-1990)	Acres Burned (2031-2060)
SCHQ	4.357	.816

g.

Facility Name	Heating/Cooling Degree Days (1961-1990) (HDD/CDD)	Heating/Cooling Degree Days (2031-2060) (HDD/CDD)
SCHQ	1830/1377	972/2628

Table 1.11: New Facilities and Disadvantaged Communities and Urban Heat Islands

Facility Name	Located in a Disadvantaged Community (yes/no)	Located in an urban heat island (yes/no)
SCHQ	Yes	Yes

Integrating Climate Change into Department Planning and Funding Programs

Table 1.12: 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?
Achieve zero net carbon emissions from facility operations.	Yes	N/A	Installation of 3.7 KWH onsite renewable energy at the SCHQ.
Implementation of the Green Power Purchase	Yes	N/A	Signed and executed Agreement with Riverside Public Utilities.

Agreement for SCHQ.			
VMT reduction goal through local GHG mitigation plan.	Yes	N/A	Innovative transportation technologies, CARB is planning to implement a transportation demand management (TDM) program to achieve both future year GHG obligations and the VMT reduction target.
Implementation of the Transportation Demand Program.	Yes	N/A	CARB's TDM program is focused on four key measures: active transportation, bike share, vanpool, and trip reduction outreach.

Table 1.13: 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?
Mitigation Plan	Yes	Yes	Yes

Table 1.14: 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?
N/A	N/A	N/A	N/A	N/A

Measuring and Tracking Progress

Changing climate conditions necessitate an adaptive management approach. An adaptive management approach is informed by tracking changing climate conditions and the performance of a plan or project. Building check points into

a project or plan timeline can help to create a system for regular review and, if needed, adjustments.

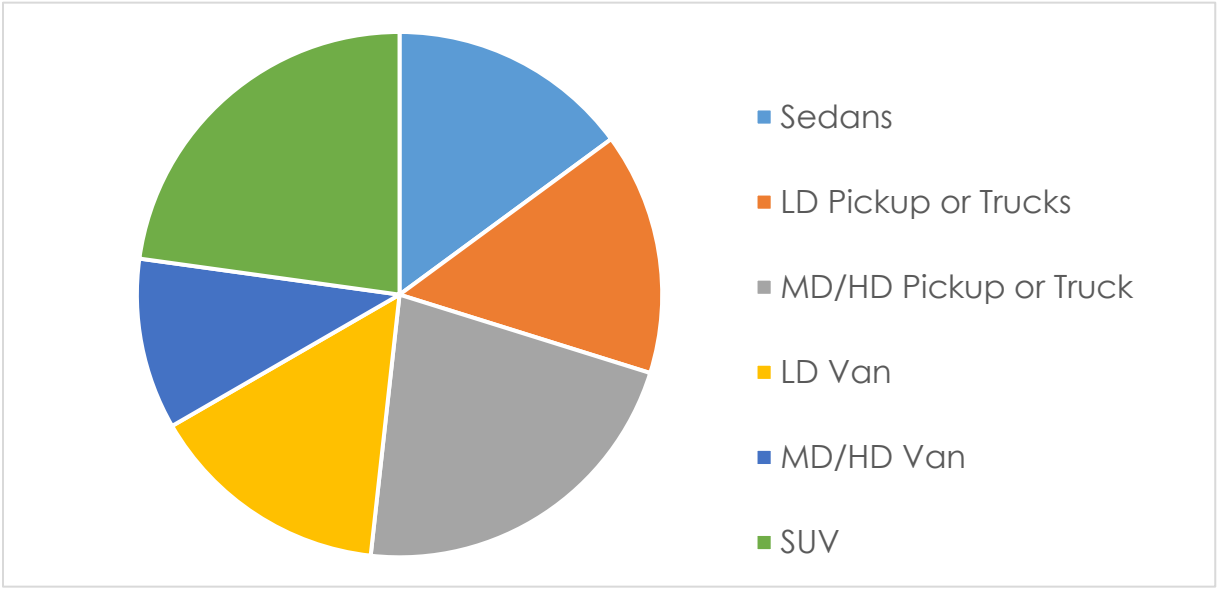
CHAPTER 2 – ZERO-EMISSION VEHICLES

Department Mission and Fleet

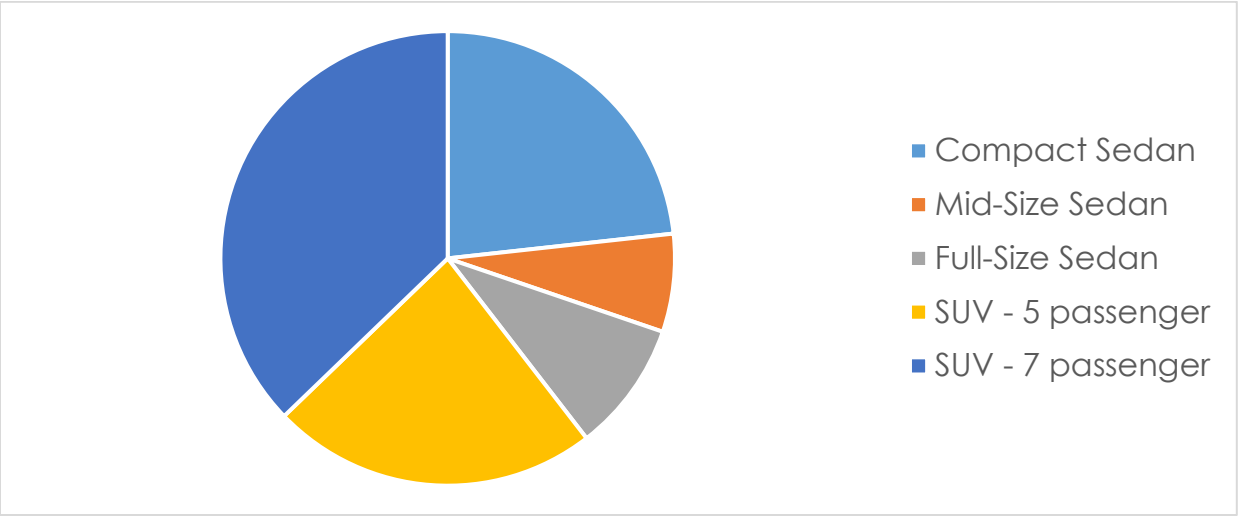
This ZEV Report and Plan demonstrates to the Governor and the public the progress the Department has made toward meeting the Governor's sustainability goals related to Zero Emission Vehicles. This report identifies successful accomplishments, ongoing efforts, outstanding challenges, and future efforts.

CARB encompasses a very diverse fleet. Vehicles are utilized differently depending on the Program/Division. CARB's fleet is comprised primarily of sport utility vehicles (SUV)that are used as pool vehicles or by CARB employees who conduct work in the field. Many of the other vehicles are used to assist with conducting tests, carrying equipment and tools, and assisting staff with navigating through unique terrain. Graph 2.1 below illustrates the composition of CARB fleet vehicles as of December 2020.

Graph 2.1: 2020 Composition of Vehicle Fleet



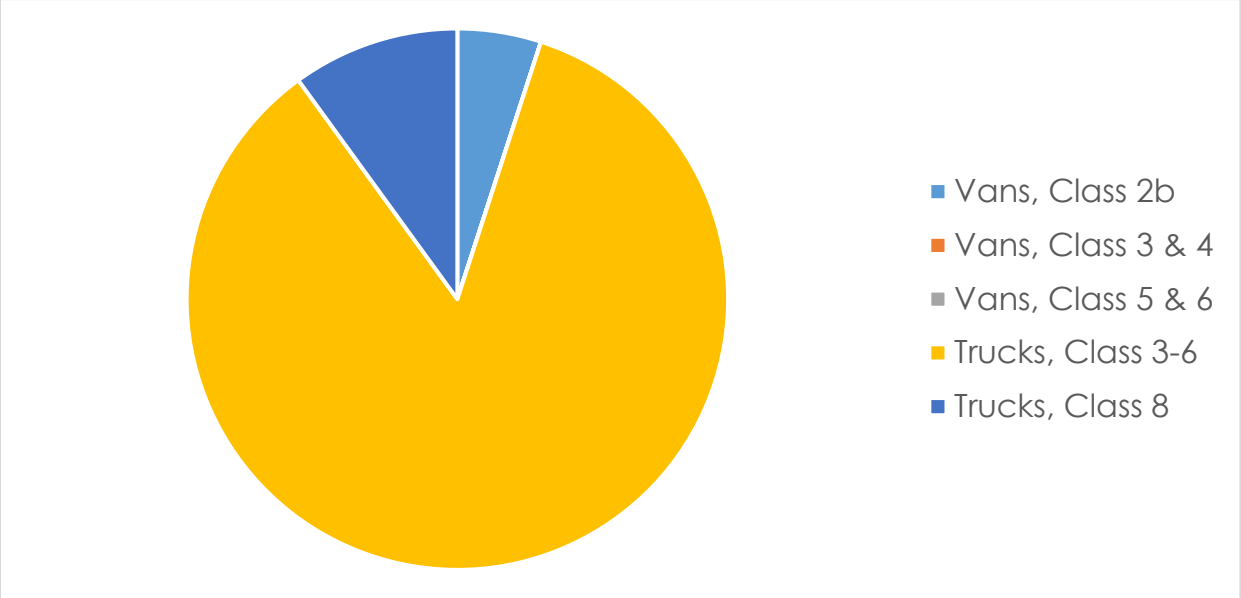
Graph 2.2: Composition of Light Duty Vehicle Fleet



Light Duty Fleet Vehicles

CARB light duty fleet is comprised of 50 vehicles. CARB light duty fleet vehicles are used by various divisions and programs for many duties and functions, including but not limited to transportation and towing of equipment; investigations; surveillance; various enforcement activities; and inspections. The vehicles are driven statewide in cities and rural areas, on paved roads, highways as well as rough and rugged terrain. Most of the employees that utilize these vehicles are staff that conduct work in the field. CARB has engineers and specialists that sometimes make long trips while others work in a city environment requiring multiple shorter trips during the day and throughout the week. Many of the divisions and programs are located in satellite offices around the city and utilize light duty fleet vehicles as pool vehicles to make trips to headquarters or other CARB sites.

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



Medium and Heavy-Duty Fleet Vehicles

CARB's medium and heavy-duty vehicles are made up of mostly trucks and pickups. Most programs and divisions utilize these larger vehicles because it allows them to transport more staff, includes larger cargo space, and features towing capabilities. These vehicles are also used all over the state and are driven in various conditions. They operate on highways, paved and unpaved roads, rough terrain, and in conditions that require 4-wheel drive. Most of the staff that drive these vehicles use them daily for both long and short trips depending on the need for that day.

Table 2.1: Total Fuel Purchased in 2020

	Diesel	Gasoline	Renewable Diesel
Fuel Amount Gallons	4267	33076	0

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 state fleet. As departments move towards this initiative, additional measures have been placed on the ZEV vehicle purchasing policy. Departments are advised, as of January 1, 2020, to purchase vehicles from authorized OEMs that have aligned with the California Air Resources Board (CARB). In addition, the state anticipates significant economic impacts from the COVID-19 pandemic which will result in a decrease in state revenues for fleet purchasing.

With these policies in place, departments should consider the most effective ways to incorporate ZEVs into their fleet.

In fiscal year 2021-22, CARB requested nineteen (19) replacements, which included seven (7) ZEV credits to meet the 35 percent for fiscal year 2021-22 requirements.

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.

The utilization of ZEVs by CARB would be utilized for standard fleet and travel available vehicles. Most BEVs available historically are sedans which have limited cargo space and lack off-road capability required by CARB divisions and staff that work in the field OEMs. Most CARB BEVs serve as pool vehicles that staff can access when needed for passenger trips to meetings and the like. The 2019 Chevrolet Bolt was incorporated into CARB's fleet a few years ago, and it has served as a reliable alternative to fossil fuel powered vehicles. The main challenge in incorporating more BEVs into the CARB fleet in the past is models that lack specific vehicle attributes that are available from CARB aligned OEMs, but as more BEV options with these features are made available CARB will continue to add more.

PHEVs have been easier to incorporate due to having models that meet the off-road capability, or cargo space requirements that CARB requires to reach

remote areas that house equipment such as air monitoring stations, or to transport equipment and tools. Recently, CARB procured a few PHEV Chrysler Pacifica vans that have allowed our programs and divisions who travel through California a sustainable option with additional cargo space. PHEVs will continue to play an important role in CARB's fleet as we await more BEV options that meet CARB's operational requirements . CARB continues to monitor the vehicles that are available on state contracts that are manufactured by CARB aligned OEMs. CARB prioritizes BEV models that meet CARB's needs. If BEV models are not available, CARB will look for PHEV models before selecting models powered solely by fossil fuels as a last resort.

FCEVs were not widely considered by CARB due to the limited fueling infrastructure in most regions. As more fueling stations become available in Sacramento, the vehicles may become a considerable option for CARB. Currently, the Toyota Mirai is available on the state contract. This vehicle could serve as an adequate pool vehicle for many programs and divisions should the infrastructure be expanded. CARB will continue to research and review where FCEVs can be incorporated into the fleet.

Vehicles that meet specified mileage and age thresholds are eligible for replacement. Currently ZEVs are available on a statewide commodity contract in a range of light duty vehicle categories.

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	**8**	**6**	**8**	**8**	**0**	**30**

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	5	6	7	8	8
Plug-in Hybrid Vehicle	4	4	2	2	2
Fuel Cell Vehicle	0	0	1	1	1
Percent of total purchases	37%	40%	45%	50%	50%
Required ZEV Percentage	35%	40%	45%	50%	50%

Total number of ZEVs in Fleet*	15	20	26	33	41

*This table shows the estimated number of ZEVs that have been or are anticipated to be added to the department fleet in coming years.

Medium- Heavy-Duty ZEV Adoption

Similar to 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.

Vehicles over meet specified mileage and age thresholds are eligible for replacement. Currently, ZEVs are available on statewide commodity contracts are the Class 2B, Class, 3, Class 4, Class 5, Class 6, and Class 8.

CARB is committed to incorporating MD and HD ZEVs whenever feasibly possible. Most CARB MD and HD vehicles are used for towing and transporting large items. Programs and divisions drive these vehicles throughout California, often in rough terrain that requires 4-wheel drive. The challenge with incorporating MD and HD ZEV would come down to availability of ZEV vehicles from CARB aligned OEMs that meet the 4-wheel drive and towing requirements. Historically, there have not been any models that meet CARB's unique needs.

As with LD vehicles, CARB continues to monitor the MD/HD vehicles that are available on state contracts that are manufactured by CARB aligned OEMs. CARB prioritizes BEV models that meet CARB's needs. If BEV models are not available, CARB will look for PHEV models before selecting models powered solely by fossil fuels as a last resort.

With more hydrogen fueling stations available in the Sacramento area, FCEVs are more considerable than they have been in the past. The challenge that would arise is availability for fueling for the vehicles that travel throughout California.

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	1	0	0	17	2	20

The table below shows the estimated number of MD/HD ZEVs that have been or are anticipated to be added to the department fleet in coming years.

Table 2.5: ZEV Additions to the Department Fleet

Table Header Format	21/22	22/23	23/24	24/25	25/26
Battery Electric Vehicle	0	3	3	4	4
Plug-in Hybrid Vehicle	0	0	1	2	2
Fuel Cell Vehicle	0	0	0	0	0
Percent of total purchases	0%	30%	40%	60%	60%
Total number of ZEVs in Fleet	0	3	7	13	19

ZEV Take-home Vehicles

Vehicles that are authorized for home storage, per SAM Section 4109, are subject to all applicable ZEV purchasing policies.

Currently, CARB does not have any ZEV vehicles authorized for home storage. In the future, PHEVs would be the most feasible way to allow staff who require a home storage permits (HSP) to be able to charge when able, but not be limited if that is not an option. CARB will work with staff to find the charging opportunities available for staff with HSPs, this will be key in finding the correct ZEV that will be utilized. In addition, telematics will assist with providing data on charging and the vehicle use.

Telematics Plan

In accordance with SAM section 4122, state departments are required to install telematics devices on all state fleet assets. Departments are required to install all telematics devices on light duty vehicles August 1, 2021 and are required to

install telematics on all remaining assets by February 1, 2022. Additionally, departments shall develop and issue a telematics policy that is specific to their needs by March 31, 2021.

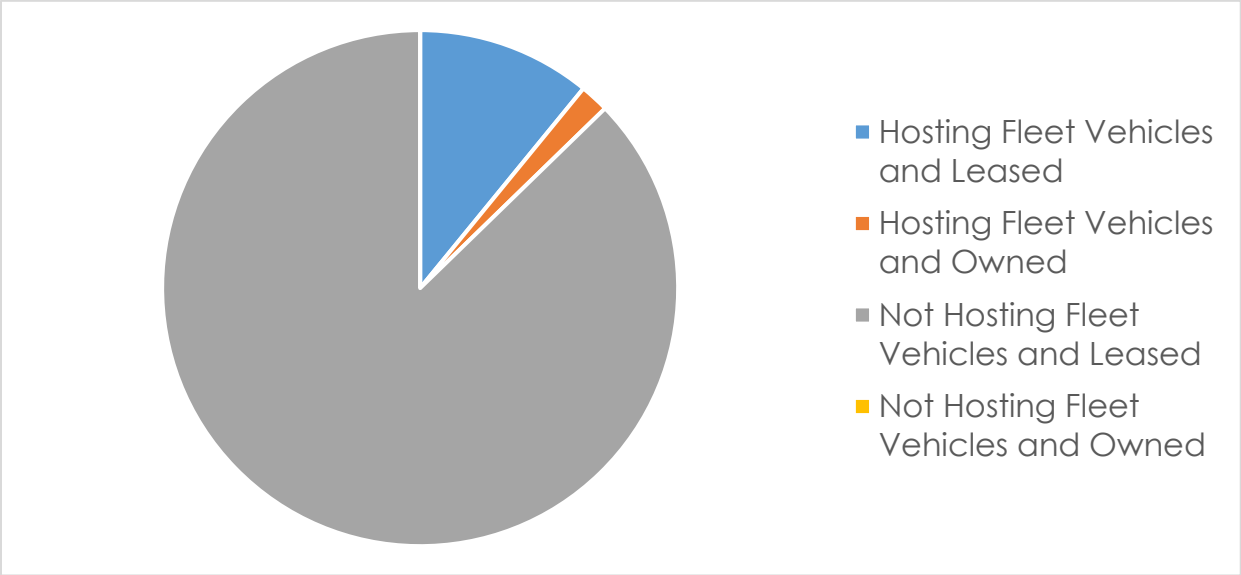
CARB placed its telematics policy into effect in 2021. Telematics will provide data that will allow more efficiency in fleet utilization and procurement. With more data, CARB can ensure the correct vehicles are being purchased for divisions and programs. It will also add accountability for utilizing charging opportunities when they are available.

California Air Resource Board Parking Facilities

CARB main operates environmental laboratories, field air monitoring stations (AMS), and a few office locations throughout the state. For sites that have a parking lot, the parking is mainly utilized by employees and fleet vehicles. Fleet, employee, and visitor parking lots are physically separated at CARB's locations and all field AMS locations provide a parking spot for the field tech only on a weekly basis. CARB only owns the HSL facility located in El Monte, California.

Currently, 2% of CARB's facilities are state owned and 11% are leased that host fleet vehicles.

Graph 2.4: Parking Facilities



Given the nature of the department's fleet operations, the length of stay for visitors and employees CARB has determined that L1 chargers should make up approximately 53% of chargers in employee parking areas and 17% of chargers in fleet parking areas, with the remainder being L2. DGS recommends *at least* 25% of chargers for employees be L2 and that 75% of fleet chargers be L2.

Based on estimates of future ZEV fleet purchases and a count of visitor and workplace parking spaces it has been determined that CARB will need fifty-two (52) L1 and forty-four (44) L2 chargers to adequately serve fleet vehicles and achieve the goals established in the ZEV Action Plan by 2035.

The facilities with the most urgent need for EV charging are listed below.

Table 2.6: 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
Southern California Headquarters	506	52	44	2	98	0

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
Total	506	52	44	2	98	0

Outside Funding Sources for EV Infrastructure

CARB is researching various funding sources for electric vehicle supply equipment (EVSE) installation, including but not limited to internal funds, budget change proposals (BCP), utility incentives, EVgo (privately run charging stations), Volkswagen settlement funds, and California Energy Commission grants. In addition, we intend to work with the DGS Office of Sustainability's (OS) Transportation Unit that can fund and project manage EV charging projects at state-owned facilities. At state-leased facilities OS Transportation Unit can purchase and install chargers.

Hydrogen Fueling Infrastructure

City	Address
Sacramento	3510 Fair Oaks Boulevard Sacramento, CA 95864
West Sacramento - S. River Rd.	515 S. River Road West Sacramento, CA 95691
Citrus Heights	6141 Greenback Lane Citrus Heights, CA 95621
Riverside	3044 St. Lawrence Street Riverside, CA 92504

The stations listed in the table above are closest to CARB's two largest facilities' that house most of our staff. These stations could be utilized to fuel any hydrogen vehicles purchased in the future. CARB currently does not have plans to install any hydrogen infrastructure.

Comprehensive Facility Site and Infrastructure Assessments

Site Assessments are performed to establish the cost and feasibility of installing needed EV infrastructure. The table below lists the facilities that have been evaluated with Site Assessments. At this time, CARB does not have any assessments on file and will be perusing this in the near future.

Table 2.7: Results of Site Assessments

Facility Name	L1 Chargers with Current Electrical System	L2 Chargers with Current Electrical System	Total cost for Project using Current Electrical System	L1 Chargers with Electrical System Upgrades	L2 Chargers with Electrical System Upgrades
N/A	N/A	N/A	N/A	N/A	N/A
Total					

EVSE Construction Plan

CARB is working on additions to the EV charging infrastructure by incorporating these units at the Southern California Headquarters as a part of the built to suit. There are a total of ninety-eight (98) EV charging ports that will be available for staff, fleet, and visitor parking with the ability for future expansion of 149 additional ports.

EVSE Operation

CARB has a contract with BTC Power to provide, operate and collect EV costs associated with the EV units located at the visitor lot in the SCHQ campus. BTC Power will also be responsible for collecting data and providing access to run usage reports.

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

- CARB's mission is to promote and protect public health, welfare, and ecological resources through effective reduction of air pollutants while recognizing and considering effects on the economy. CARB is the lead agency for climate change programs and oversees all air pollution control efforts in California to attain and maintain health-based air quality standards.
- CARB operates the Haagen Smit Laboratory (HSL) located in El Monte, California. This facility was the main operations for vehicle emissions testing during the 2020 calendar year.
- HSL is approximately 54,000 square feet in total space.

Table 3.1: Total Purchased Energy 2020

Purchased Energy	2003 Baseline Quantity		2020 Quantity		% Qty. Change
Electricity	1,862,162	kWh	1,503,997	kWh	NA
Less EV Charging	-	kWh		kWh	
Natural Gas	32,427	therms	22,436	therms	NA
Propane	-	gallons	-	gallons	#DIV/0!
Fuel Oil	-	gallons	-	gallons	#DIV/0!
Steam		pounds		pounds	
Chilled H2O		kBtu	-	kBtu	
TOTALS	**9,574,997**	**kBtu Site**	**7,375,237**	**kBtu Site**	**-23%**

*Total purchased HSL energy quantities for 2020, compared with the 2003 baseline year.

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)
HSL – Haagen Smit Laboratory	54,000	8,300,288	23,139,750	429
Total for Buildings in This Table	54,000	8,300,288	23,139,750	---
Total for All Department Buildings	361,119	21,813,161	23,139,750	---
% of Totals	15%	38%	100%	---

*Lists the energy-consumption for CARB's owned facility.

CARB has faced many challenges due to the age of the HSL facility. It was not cost effective to retrofit the facility to meet ZNE goals. CARB determined a long-range plan and funding were required to build a new facility to meet the long-term sustainability goals set by the governor.

Zero Net Energy (ZNE)

State policies set forth the following milestones for state zero net energy buildings:

- 2017 – 100% of new construction, major renovations and build-to-suit leases beginning design after 10/23/2017 to be ZNE
- 2025 – 50% of total existing building area will be ZNE

CARB is in the construction stage of a new facility (SCHQ) by a design build contractor located in Riverside, CA. This facility is approximately 402,000 square feet on a 19-acre campus.

- Construction of the building met the DGS Management Memo (MM17-04) which requires all new projects beginning design after October 2017 to be ZNE.
- This campus will provide 50% of CARBS ZNE portfolio requirement which is needed by 2025.

Table 3.3: Zero Net Energy Buildings

Status of ZNE Buildings	Number of Buildings	Floor Area (ft^2)	% of Building Area
Buildings Completed and Verified	0	0	0
Building in Design or Under Construction	1	402,604	100%
Building Proposed for Before 2025 (but not yet in design)	0	0	0
Addtl. Exist. Bldg. Area within 15% w/ EE projects	0	0	0
Totals for ZNE Buildings by 2025	1	402,604	100%
Totals for All Department Buildings by 2025	1	402,604	100%
% ZNE by 2025	100%	100%	100%

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.

CARB is currently in the construction phase of the SCHQ campus. The 402,000 square foot (sf) building will exceed the CCR Title 24.6 energy requirement once completed.

The HSL facility does not meet the CCR Title 24 requirements. This building is scheduled to be sold in December 2022 therefore no retrofits were initiated.

Table 3.4: New Construction Exceeding Title 24 by 15%

Buildings Exceeding Title 24 by 15%	Number of Buildings	Floor Area (ft^2)
Completed Since July 2012	0	0
Under Design or Construction	1	402,604
Proposed Before 2025	0	0

CARB is currently in the construction phase of the SCHQ campus. The 402,000 sf building will exceed the CCR Title 24 energy requirement once completed. The SCHQ campus will be built to meet Zero Net Energy and Leadership in Energy and Environmental Design 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.

There are numerous Management Memos and sections of the State Administrative Manual (SAM) that provide specific directions and support for this goal, including, but not limited to, the following (note embedded links below to the referenced documents). HSL currently does not have an Energy Management System. There is no reporting currently. CARB is exploring incorporating Energy Management Systems in their new SCHQ facility.

CARB Energy Trends

Table 3.5: Department-Wide Energy Trends (if available)

Year	Floor Area (ft^2)	Total kBTU Consumption	Department Average EUI
Baseline Year 2003	54,000	26,809,991	521
2013	54,000	0	0
2014	54,000	7,654,095	142
2015	54,000	19,837,814	367
2016	54,000	21,813,161	404
2017	54,000	20,104,815	372
2018	54,000	23,139,750	429
2019	54,000	23,131,830	428
2020	54,000	18,610,179	345
% Change 2003-2020	0%	-31%	-34%

CARB has seen a trend in reduction in 2020 at HSL due to the pandemic. Teleworking contributed to the grand reduction in energy consumption. CARB has not implemented or completed any energy projects other than focusing efforts on the SCHQ ZNE construction project.

Table 3.6: 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
2015	N/A	N/A	N/A
2016	N/A	N/A	N/A
2017	N/A	N/A	N/A
2018	N/A	N/A	N/A
2019	N/A	N/A	N/A
2020	N/A	N/A	N/A
2021	N/A	N/A	N/A

CARB did not conduct any energy projects for the HSL facility due to its age and future plans to decommission and sell the building. SCHQ project in progress.

Table 3.7: Energy Surveys

Year	Total Department Floor Area (sq.ft.)	Energy Surveys Under Way (sq.ft.) Level 1	Energy Surveys Under Way (sq.ft.) Level 2	Percent of Department Floor Area Level 1	Percent of Department Floor Area Level 2
2014	54,000	N/A	N/A	N/A	N/A
2015	54,000	N/A	N/A	N/A	N/A
2016	54,000	N/A	N/A	N/A	N/A
2017	54,000	N/A	N/A	N/A	N/A
2018	54,000	N/A	N/A	N/A	N/A
2019	54,000	N/A	N/A	N/A	N/A
2020	54,000	N/A	N/A	N/A	N/A

CARB did not conduct any energy surveys for the HSL facility due to its age and future plans to decommission and sell the building.

Demand Response

Executive Order B-18-12 directed all state Departments are 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.

CARB worked with Southern California Edison to inquire on available demand response programs. Unfortunately, no demand response programs were available to CARB in 2020/2021.

Table 3.8: Demand Response

Demand Response Participation	Number of Buildings	Estimated Available Energy Reduction (kW)
Number of Buildings Participating in 2020	0	0
Number of Buildings That Will Participate in 2021	0	0
All Department Buildings (Totals)	0	0
All Department Buildings (Percent)	0%	0%

Renewable Energy

New or major renovated state buildings over 10,000 square feet must use clean, on-site power generation, and clean back-up power supplies, if economically feasible. Facilities with available open land must consider large scale distributed generation through various financing methods, including, but not limited to, third party power purchase agreements (PPAs).

Although there are no specific kW goals for renewable energy, renewable energy does count towards meeting: (1) Zero Net Energy goal for 2025 and (2) 20% grid-based energy use reduction by 2018.

HSL does not have onsite renewable energy due to the age of the facility. The Riverside SCHQ campus that is under construction will have an onsite PV system that is estimated to generate a total of 3.7 MW with available space for expansion to a maximum of 5 MW.

Table 3.9: On-Site Renewable Energy

Status	Number of Sites	Capacity (kW)	Estimated Annual Power Generation (kWh)	Percent of Total Annual Department Power Use
Current On-Site Renewables in Operation or Construction	1	3,750	5,913,750	0.0%
On-Site Renewables Proposed	0	0	0	0.0%
On-Site Renewables Operational or Proposed Totals	1	3,750	5,913,750	0.0%
Total Department-Wide ZNE-Targeted Facilities & Energy Current & Proposed On-Site Totals	0	0	0	0.0%
Off-Site Renewable Current Totals	0	0	0	0.0%
Off-Site Renewables Planned	0	0	0	0.0%
Off-Site Renewables Combined Current & Planned	0	0	0	0.0%
Current Combined On-Site and Off-Site Renewable Energy	**1**	**3,750**	**5,913,750**	0.0%
Additional Planned On-Site and Off-Site Renewable	0	0	**0**	0.0%

Monitoring Based Commissioning (MBCx)

New and existing state buildings must incorporate Monitoring Based Commissioning (MBCx) to support cost effective and energy efficient building operations, using an Energy Management Control System (EMCS). State agencies managing state-owned buildings must pursue MBCx for all facilities over 5,000 square feet with EUIs exceeding thresholds described in Management Memo 15-04.

No data is available for Table 3.10 as CARB does not have any planned MBCx Projects for the HSL facility.

An MBCx is to be implemented into the SCHQ project once construction is completed.

Table 3.10: Planned MBCx Projects

Facility	Building Name	Location	Floor Area (sq. ft.)	EMS Make, Model, Installation/Upgrade	EMS Year	MBCx Capable, Difficult, or No EMS	MBCx Projected To Start	MBCx Projected Cost ($)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Financing

State agencies are required to pursue all available financing and project delivery mechanisms to achieve these goals including, but not limited to state revolving loan funds, utility On-Bill Financing (OBF), Power Purchase Agreements (PPAs), GS $Mart, Energy Service Contractors (ESCOs), or other available programs

Once the SCHQ campus is constructed, CARB will be participating in a Green Power Purchase Agreement with Riverside Public Utilities.

CHAPTER 4 - WATER EFFICIENCY AND CONSERVATION

This Water Efficiency and Conservation report demonstrates to the Governor and the public the progress the Department 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 while 2012-14 were the 4 driest consecutive years of statewide precipitation in the historical record. The 2017 water year (October 1, 2016-September 30, 2017) surpassed the wettest year of record (1982-83) in the Sacramento River and San Joaquin River watersheds and 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 E.O.s and SAM sections listed in the previous section 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 uses by state agencies goes beyond the scope of these E.O.s 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.

The water plan component of the Governor's Sustainability Roadmap will help all agencies and departments maximize water efficiency and conservation while improving their energy savings. Further, the plan helps agencies to gain additional benefits regarding climate adaptation and other ecosystem services. The water efficiency and conservation plan sets priorities, defines tasks, timelines and budgets and designates responsible personnel for each step of the plan.

This water plan has two major components. The first component consists of a quantitative inventory of indoor water use by fixtures, boilers and cooling

systems and appliances in state buildings and facilities. The second component focuses on outdoor water use and landscaping and includes a measurement of landscape areas and types as well as an assessment of irrigation equipment. Each water plan component includes a mandatory set of BMPs for ongoing water use efficiency in both buildings and landscapes. Additionally, there are further requirements for large landscape water use tracking, if an agency has a total landscape area greater than 20,000 square feet at a facility. Both components of water use include monitoring, reporting, oversight, and compliance. State agencies shall complete all of the applicable Building and Landscape Inventories and Best Practices assessments found in the workbook sections and report their results in the following tables and sections.

DWR suggests that state agencies contact their water supplier for advice and assistance regarding local water conditions. Water suppliers are a source of expertise and can assist with water conservation and water efficiency efforts in a number of ways including rebates and other incentives, free water audits for both buildings and landscapes, irrigation scheduling assistance, water shortage contingency plans and informational brochures.

Best Management Practices

Building Best Management Practices (BMPs) are ongoing actions that establish and maintain building water use efficiency. State agencies are required by DGS Management Memo 14-02 to implement the building BMPs outlined below.

BMPs can be continuously updated based on need and tailored to fit the facility depending on occupancy and specific operations.

One of the critical practices in effective water management is to designate a water management coordinator to conduct the building walk-through inventory, implement the building BMP's and monitor and report water use. In the beginning of implementation, these BMPs require that staff be able to have enough time and resources to perform the actions required. A certain level of expertise may also be required. It is possible that various skills are needed which may not be found in just one person but require a team approach. Additionally, many of the BMPs are location specific, and it may be that BMP responsibilities are best assigned on that basis.

considering effects on the economy. CARB is the lead agency for climate change programs and oversees all air pollution control efforts in California to attain and maintain health-based air quality standards.

Currently CARB only consumes purchased water at the HSL facility.

Heating and Cooling Systems Inventories Summary

CARB has determined it was not cost effective to replace any of the boilers or cooling systems described in the table below as HSL will be decommissioned and sold in December 2023. CARB has constructed a new ZNE facility in Riverside, CA.

Table 4.1: 2020 Total Purchased Water

Purchased Water	Quantity	Cost ($/yr)
Potable	194,300	$2,967
Recycled Water	0	$0
	194,300	$2966.68

Table 4.2: Properties with Largest Water Use Per Capita

Building Name	Area (ft^2)	# of Building Occupants	Total 2020 Gallons	Total 2020 Irrigation in Gallons (if known)	Gallons per Capita
HSL - Haagen Smit Laboratory	54,000	144	194,300	N/A	1,349
Total for Buildings in This Table	54,000	144	194,300	-	1,349
Total for All Department Buildings	54,000	144	194,300		1349.305556
% of Totals	100%	100%	100%		100%

Table 4.3: Properties with Largest Landscape Area

Building Name	Landscape Area (ft^2)
HSL	12,282
Total Landscaping area for Buildings in This Table	12,282
Total Landscaping for All Department Buildings	12,282
% of Totals that is large landscape	100%

HSL's landscape area has not created any significant challenges due to its small size and the pending closure and sale of the building.

Table 4.4: Department Wide Water Use Trends

Year	Total Occupancy /year	Total Amount Used (Gallons/year)	Per capita Gallons per person per day
Baseline Year 2010	65	474,232	7,295.88
2020	144	194300	1,349
2020 Goal	144	379385	2,634

CARB was able to exceed the 20% reduction goal from the 2010 baseline required by EO B 18-12 and the 25% reduction from the required EO B 29-15 by following water conservation recommendations and guidelines. In 2020 COVID played a big factor in CARB's reduction of water usage as well as the phased operations in preparation for the shutdown of HSL.

Table 4.5: Total Water Reductions Achieved

Total Water Use Compared to Baseline	Total Amount Used (gallons per year)	Annual Gallons Per capita
20% Reduction Achieved	194,300	4
Less than 20% Reduction		
Totals	194,300	4
Department-Wide Reduction		

CARB has faced many challenges due to the age of the HSL facility. It was not cost effective to retrofit or implement water efficiency projects. CARB determined a long-range plan and funding were required to build a new

facility to meet the long-term water conservation goals set by the governor. HSL will be decommissioned and sold in December 2023. CARB has constructed a new ZNE facility in Riverside, CA.

Table 4.6: Summary of Indoor Water Efficiency Projects Completed 2014-2020 or In Progress

Year Completed	Water Saved (Gallons/yr.)	Number of Indoor Water Efficiency Projects Completed	Cost Savings per Year
2014	0	N/A	0
2015	0	N/A	0
2016	0	N/A	0
2017	0	N/A	0
2018	0	N/A	0
2019	0	N/A	0
2020	0	N/A	0

CARB has faced many challenges due to the age of the HSL facility. It was not cost effective to retrofit or implement water efficiency projects. CARB determined a long-range plan and funding were required to build a new facility to meet the long-term water conservation goals set by the governor. HSL will be decommissioned and sold in December 2023. CARB has constructed a new ZNE facility in Riverside, CA.

Table 4.7: Summary of Boilers and Cooling Systems Projects Completed or In Progress

Year Completed	Water Saved (Gallons/yr.)	Number of Systems with Water Efficiency Projects
2014	0	0
2015	0	0
2016	0	0
2017	0	0
2018	0	0
2019	0	0
2020	0	0

Table 4.8: Summary of Landscaping Hardware Water Efficiency Projects Completed or In Progress

Year Funded	Water Saved (Gallons/yr.)	Estimated Annual Cost Savings	Total Number of Projects per Year
2014	0	$ -	0
2015	0	$ -	0
2016	0	$ -	0
2017	0	$ -	0
2018	0	$ -	0
2019	0	$ -	0
2020	0	$ -	0

Table 4.9: Summary of Living Landscaping Water Efficiency Projects Completed or In Progress

Year Funded	Water Saved (Gallons/yr.)	Landscape Area MWELO (ft2)	Climate Appropriate Landscape Area (ft2)
2014	0	0	0
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0
2019	0	0	0
2020	0	0	0

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.

DWR has finalized these requirements in a Primer that can be found at:

Making Conservation a CA-Way-of-Life-Primer.

State agencies are to be aware of their water suppliers' Water Shortage Contingency Plan and the potential impact each stage may have on their water use. State agencies are to have their own contingency plans in place for their building and landscaping water use in order to respond to any stage implemented by the water supplier.

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.

Table 4.10: 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 buildings in critical groundwater basins	Total Amount of water used by buildings in critical groundwater basins (Gallons)
1	0	N/A

Building Inventories Summary

CARB has determined it was not cost effective to replace any of the building inventory needs described in the table below as HSL will be decommissioned and sold in December 2023.

Table 4.11: 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
NA	NA	NA	NA	NA	NA	NA

Table 4.12: Summary of Boilers and Cooling Systems Inventory

Amount of Water Used for make-up (Gallons)	Number of flash tanks to purchase and install	Number of meters to purchase and install	Amount currently reused? (Gallons)	Remaining additional water suitable for other purposes (Gallons)
NA	NA	NA	NA	NA

Irrigation Hardware Inventories Summary

Landscaping typically uses 50 percent or more of an agency's total water use. While landscaping serves critical functions, the accompanying irrigation hardware, if not properly installed and maintained, can contribute to water waste. By reviewing and inventorying all irrigation hardware, it is possible to achieve significant water savings.

As stated previously, CARB has determined it was not cost effective to replace any of the irrigation hardware inventory described in the table below as HSL will be decommissioned and sold in December 2023.

Table 4.13: Summary of Irrigation Hardware Inventory

Number of separate meters or sub-meters needed	Number of irrigation controllers required with weather or soil moisture adjustment and flow sensing capabilities needed.	Number of backflow prevention devices needed.	Number of flow sensors to be purchased and installed	Number of automatic rain shut-off devices needed	Number of new pressure regulators needed.	Number of new hydrozones needed.	Number of new valves needed.	Number of filter assemblies needed.	Amount of drip irrigation needed (area covered)	Number of booster pumps needed	Number of rotary nozzles or other high efficiency nozzles needed
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

As stated previously, CARB has determined it was not cost effective to perform landscaping improvements as escribed in the table below as HSL will be decommissioned and sold in December 2023.

Table 4.14: Summary of Living Landscape Inventory

Landscape >500Sq. ft.)	Turf (Sq. ft.)	Number of historical sites or memorials	MWELO landscape area (Sq. Ft.)	Climate appropriate landscape area (Sq. Ft.)
12,282	**12,000**	**0**	**0**	**0**

HSL's current landscape consists of approximately 12,000 SF of turf and the remaining is soil, trees, and foliage. Due to the planned decommissioning and sale of the building in December 2023 CARB has not invested in landscape improvements and at this time does not maintain a landscape budget or a separate facility water budget.

Table 4.15: Summary of Large Landscape Inventory and Water Budget

Number of Facility Sites/Locations with > 20,000 sq. ft. of Landscaping	Total Landscape Area all Facilities	Total Water Budget all Facilities	Total EPA WaterSense or Irrigation Association Certified Staff
N/A	N/A	N/A	N/A

This table does not apply as CARB did not implement any water efficiency projects in the 2020 year as HSL is due to sell in December 2023.

Table 4.16: Summary of Completed Living Landscaping Water Efficiency Projects

Total of all Facilities	Est Annual Water Savings (Gallons)	Est Annual Cost ($) Savings	Sum of MWELO Landscape installed (Sq. Ft.)	Sum of Climate Appropriate Landscape Installed (Sq. Ft.)
N/A	N/A	N/A	N/A	N/A

CHAPTER 5 - GREEN OPERATIONS

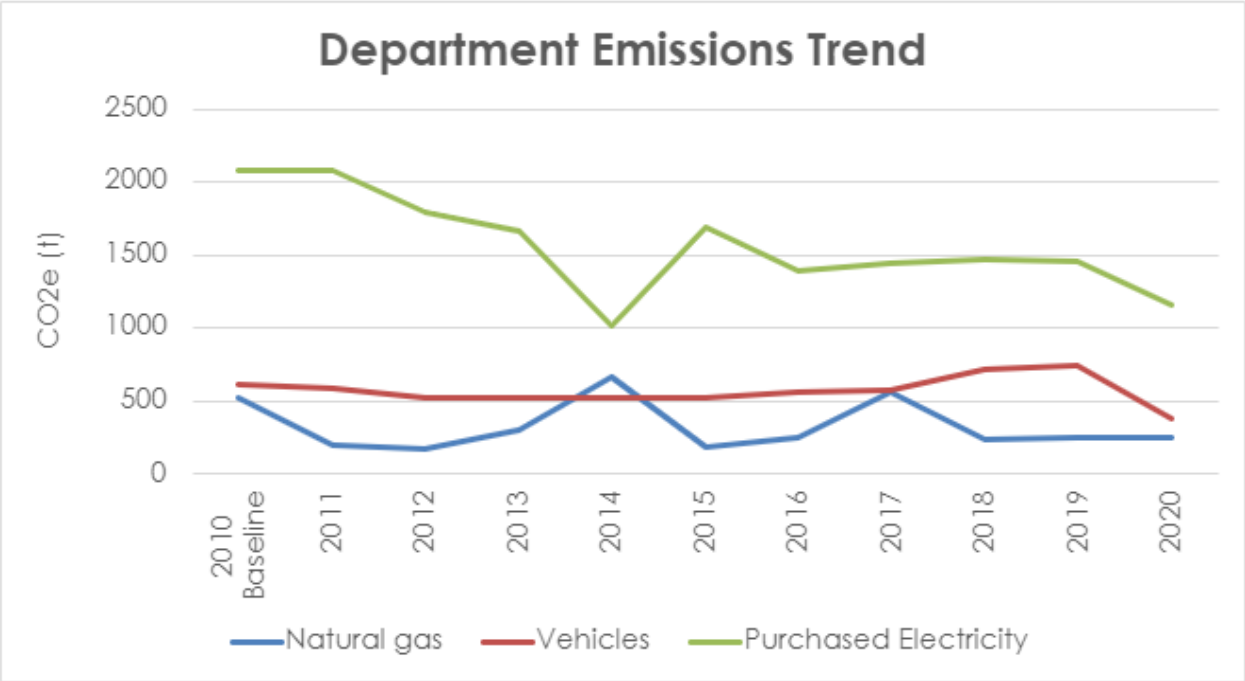
Greenhouse Gas (GHG) Emissions

State agencies are directed take actions to reduce entity-wide greenhouse gas emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline.

Table 5.1: GHG Emissions since 2010

Emissions Source	Natural gas	Vehicles	Purchased Electricity	Total
2010 Baseline	526	607	2,075	3,208
2011	199	581	2,075	2,855
2012	167	526	1,794	2,487
2013	304	523	1,665	2,492
2014	661	525	1,009	2,195
2015	186	524	1,692	2,402
2016	245	561	1,391	2,197
2017	561	568	1,447	2,576
2018	234	712	1,467	2,413
2019	247	747	1,459	2,453
2020	249	375	1,154	1,778
Percent Change since Baseline	**-53%**	**-38%**	**-44%**	**-45%**

Graph 5.1: GHG Emissions since 2010



Low Emitting Landscaping Equipment

State agencies are to use manual landscape and hardscape maintenance as much as possible to reduce air pollution, dust, and noise. These measures are addressed in SAM Section 1821.6.

CARB contracts all landscaping services for the HSL facility and ensures within the scope of the contract that these services are performed with manual equipment whenever possible. These manual tools include the use of the following equipment:

- Hand pruners
- Leaf rakes
- Push brooms
- Weed hoes
- Shovels

For tasks that require power equipment, electric or battery powered equipment should be used whenever possible. Equipment in this category includes, but is not limited to:

- Lawn mowers
- Leaf blowers
- String trimmers
- Hedge trimmers

Chainsaws 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.

The HSL Facility was built in 1971. CARB determined it was not cost effective to retrofit the building in order to meet LEED standards. HSL will be decommissioned and sold in December 2022.

CARB is focusing their LEED efforts on the new SCHQ campus which is anticipated to be completed in December 2021. Once commissioned, it is anticipated that CARB will receive LEED Platinum certification for this building.

Table 5. 2: New Construction since July 1, 2012

Facility Name	LEED Certification Type & Level Achieved	Commissioning Performed (Y/N)
NA	NA	NA

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 meet an Energy Star rating of 75 to the maximum extent cost effective.

While HSL is over 50,0000 square feet in size CARB determined it was not cost effective to retrofit the building to meet LEED EBOM standards. HSL will be decommissioned and sold in December 2022.

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
N/A	N/A	N/A

Indoor Environmental Quality

When accomplishing Alterations, Modifications, and Maintenance Repairs and when relevant and feasible, state agencies shall implement the mandatory and voluntary measures of the California Green Building Standards Code (CALGreen), Part 11, related to indoor environmental quality.

Indoor Environmental Quality must also be maintained through the use of low emitting furnishings, cleaning products and cleaning procedures.

New Construction and Renovation

CARB has incorporated voluntary measures from CALGreen related to IEQ in the SCHQ project through its adherence to the governor's order that this project will incorporate LEED certification requirements into the scope of the work.

- CARB will utilize a construction IAQ Management Plan that complies with multiple construction activities, including but not limited to:
    - The use of low VOC products as listed by the specifications that are being utilized.
    - Protect stored onsite or installed absorptive materials from moisture damage, by means of dunnage, storage containers, and protective coverings.
    - Waste materials, which can release odor or dust being covered/ closed when not in use for installation.

For the SCHQ project, CARB includes the following measures into our building process:

- Commissioning to ensure proper operation of all building systems, including delivering the required amount of outside air.

CARB maximizes daylighting (providing natural daylight to workspaces) in new construction by:

- Where possible, providing a direct line of sight to the outdoors via vision glazing for occupied office and lab areas.
- Incorporating photo sensor controls to provide artificial lighting only to areas of need in lieu of uniformly applying artificial lighting regardless of need.

Furnishings

CARB ensures that all furniture and seating purchased by the department complies with either:

- The DGS Purchasing Standard and Specifications (Technical Environmental Bid Specification 1-09-71-52, Section 4.7) or
- Where CALPIA is unable to meet the furniture needs, CARB utilizes project specifications that include DGS' Purchasing Standard and Specifications (Technical Environmental Bid Specification 1-09-71-52) requirements.

Cleaning Products

CARB has a contract with a janitorial service, Kwik Kleen, to service the HSL facility. The contractor only uses cleaning products used meet the Green Seal Standard GS-37.

Cleaning Procedures

- All vacuum cleaners are LEED compliant, meeting the Carpet and Rug Institute requirement for efficiency.
- When feasible the minimum use of chemicals is used when cleaning entry way floor surfaces.

- All cleaning procedures performed by the contractor meet the Green Seal GS-42 Standard and Title 8 Section 3362.

HVAC Operation

- HVAC systems provide no less than the required minimum outdoor air requirements.
    - All HVAC systems in operation at the HSL facility operate at 15% minimum outdoor air airflow except the units that provide air to office areas which operate at a 45% outdoor airflow. Additionally, one HVAC unit, the S-2, operates at 100% outdoor airflow.

HVAC systems are inspected at least annually and that all HVAC inspections and maintenance are documented in writing. These inspections must include:

- All HVAC units located in HSL are inspected and maintained every six months. Reports of inspections and maintenance performed are provided by the contractor.
- Verification of minimum outdoor airflows using hand-held airflow measuring instruments. CARB has not conducted these measurements due to the decommissioning and pending sale of the HSL facility.
- Confirmation that air filters are clean and replaced based on manufacturer's specified interval. All HVAC air filters are replaced on a monthly or bi-annual basis per the manufacturer's specifications.
- Air filters used have a MERV rating of no less than 11. All filters utilized at HSL are MERV 11 rated.
- Verification that all outdoor dampers, actuators, and linkages operate properly. Inspections are conducted monthly or bi-annually per the operational requirements of the unit.
- Checking condition of all accessible heat exchanger surfaces for fouling and microbial growth, with action taken when fouling is found. We cannot confirm that this has been previously performed.
- Checking the first 20 feet of ductwork downstream of cooling coils for microbial growth, take action if growth is found. The ductwork in HVAC units S-2 and S-3 have been cleaned and inspected within the past five years.

- Ensuring that cooling towers are properly maintained and that records of chemical treatment are kept. Retrofit to prevent cooling tower plumes closer than 25 feet to any building air intake. There are no cooling towers located in HSL.
- A computer-based preventative maintenance program is in place for all HVAC equipment. Yes. CARB uses the Tridium software program with Envision Alerton at the HSL facility.
- Buildings are 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. All units are programmed to turn on one hour prior to occupancy.

Integrated Pest Management

Department staff and contracted pest management companies will follow an integrated pest management (IPM) strategy that focuses on long-term prevention of pest problems through monitoring for pest presence, improving sanitation, and using physical barriers and other nonchemical practices. If nonchemical practices are ineffective, Tier 3 pesticides may be used, progressing to Tier 2 and then Tier 1 if necessary.

Currently CARB sends informational bulletins to HSL personnel informing them of the use of IPM practices within the facility and to not disturb any of the listed IPM items. These items include integrated pest management (IPM) strategies that focus on long-term prevention of pest problems through monitoring for pest presence, improving sanitation, and using physical barriers and other nonchemical practices.

CARB currently has incorporated IPM strategies into their executed contract listed in table 5.4 for the effective pest management of the HSL facility until the building is sold.

Table 5.4: Pest control contracts

Pest Control Contractor	IPM Specified (Y/N)
Abba Termite and Pest Control	Y
Contractor 2	
Contractor 3	

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 last 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.

Pursuant to SB 1106 each state agency shall have at least one designated waste and recycle coordinator. The coordinator shall perform the duties imposed pursuant to this chapter using existing resources. The coordinator shall be responsible for implementing the integrated waste management plan and shall serve as a liaison to other state agencies and coordinators. In addition, each state agency is required to provide adequate receptacles, signage, and education and outreach to staff.

CARB has a dedicated recycling coordinator for all CARB locations and all required communication regarding the waste management plan. Employees are aware of the recycling programs at the agency and have successfully reduced waste as compared to prior year. The recycling coordinator has made sure contracts are in place for waste and recycling services and that the recycling receptacles and signage are adequately displayed. Training and education are ongoing for staff. The recycling coordinator reports annual tonnage for each facility annually by obtaining the information from the contracted waste and recycling vendors.

Table 5.5: 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
.50	.20	.06	67.74 Tons	20.65 tons	30%

The total amount disposed was calculated by taking the total number of employees 1746, multiplying by the average amount of waste disposed of by person per year in the CalEPA Headquarters Building (30 pounds), and dividing

by 2,000 to get the tonnage. The data from the CalEPA Headquarters building was applied to all CARB locations as data is not available at all other CARB locations.

Due to Covid-19 and the subsequent predominant practice of staff working from home during most of 2020, these figures were both calculated based on the 2019 building occupancy rates which were significantly higher than the actual building occupancy for the last 9-1/2 months of 2020.

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.

Items that are commonly still thrown away include plastic containers, organic waste, paper, food-soiled paper goods, complex or specially treated packaging or containers, broken non-electrical office supplies, film plastics.

CARB is continuing its efforts to educate staff on the different disposal types that exist throughout our agency and are promoting reuse, recycle, and composting throughout our agency.

Organics Recycling

State agencies must implement AB 1826 (Chesbro, Chapter 727, Statues 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.

Organic waste includes:

- Food waste
- Green waste
- Landscape and pruning waste
- Nonhazardous wood waste
- Food-soiled paper

The exemption under 42649.82 (e)(3)(E) related to businesses that generate one cubic yard or less of organic waste is no longer in effect. Furthermore, 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.

Under SB 1383, non-local entities include:

- Special districts
- Federal facilities
- Prisons
- State park facilities
- Public universities and community colleges
- County fairgrounds
- State agencies

SB 1383 organics collection requirements are effective January 1, 2022.
You can view the SB 1383 statewide webinar to learn more by clicking here.

CARB participated in food, scraps and food portion right sizing for organic waste and reuse programs. Currently we work with Building management located in the CalEPA building to ensure that organic waste receptacles are placed in the proper areas, such as breakrooms and small kitchenettes throughout the building. The Building Management mitigates contamination by properly recycling the contents of the organic's recyclables daily. At this time CARB does not create enough organic or solid waste to comply with the assembly bill outlined above due to the pandemic and emergency telework policy.

Edible Food Recovery Program
Commercial edible food recovery begins January 1, 2024 for Tier 2 generators which most state agencies would fall under. SB 1383 requires that by 2025 California will recover 20 percent of edible food that would otherwise be sent to landfills, to feed people in need.
Click here for What is edible food?
Click here for Commercial edible food generator requirements

Hazardous Waste Materials

Recycling is taking place through recycling programs within each of our building locations. Regarding e-waste, we have been using CalPIA for disposal. Additionally, we use GovDeals through DGS to resell items that can be recycled or Repurposed by another entity.

Material Exchange

These programs promote the exchange and reuse of unwanted or surplus materials from your agency. 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, including the reduction of greenhouse gas emissions, purchasing and disposal costs.

CARB utilizes internal property reuse and employee supplies exchange by participating in a Second Chance Outlet to encourage staff to reuse and recycle supplies. CARB utilizes the State surplus through DGS to reuse State-owned surplus items such as furniture. CARB also works with the Federal Surplus Property Unit at the Department of General Services to donate lab equipment to qualified donates.

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.

CARB utilizes several different waste prevention/re-use activities throughout the organization. CARB staff also participate in office supply recycling and used equipment/office furniture from DGS Surplus, whenever possible.

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.

Recycling receptacles and signage are adequately displayed. Employees are aware of the recycling programs at the agency and have successfully reduced waste as compared to prior years. Training/education is ongoing for staff. CARB has a dedicated recycling coordinator that serves as the coordinator for all CARB locations. CARB is relocating its Southern location from El Monte to Riverside in 2021, therefore, will need a dedicated recycling coordinator i.e. Southern California Recycling Coordinator. CARB will address this by dedicating a recycling coordinator and ensuring that the employee is properly trained.

The methods for waste reduction training and end education at our new Riverside facility will mirror those already in place at our Sacramento headquarters. The Northern California Recycling Coordinator, formerly CARB Recycling Coordinator, will work to onboard thew Southern California Recycling coordinator helping them to implement the already successful structure in our new facility.

Each year CARB leverages the annual CalRecycle State Agency Reporting Center (SARC) Report to evaluate our waste reduction effectiveness and identify avenues for improvement.

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.

This section does not apply to CARB

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 the Department of General Services (DGS) to implement state laws requiring state agencies and the Legislature to purchase recycled-content products (RCP) and track those purchases. Both state agency and its contractors must be track purchases that fall under eleven product categories. Click here for the current product categories. It complements the intent of the Integrated Waste Management Act (AB 939, Sher, Chapter 1095, Statutes of 1989 and Public Resources Code 4000 et al), which was enacted to reduce the amount of waste going to California's landfills. An annual report detailing state agencies' annual RCP purchase is due to CalRecycle by October 31 of each year.

Pursuant to Public Contract Code Sections 12203 and 12211 (AB 2675, Lowenthal. State agency: public contracts), effective January 1, 2020, this bill requires each state agency to ensure that at least 75 percent of the total purchases under the reportable categories contain recycled-content products meeting the minimum percentage content, except for paint, antifreeze, and tires which would remain at the 50 percent requirement. Click here for current SABRC compliance percentages

Reducing Impacts

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

CARB procurement buyers utilize State Contracts and Leveraged Procurement agreements that offer energy efficient and recycled products. For non-contract items, buyers focus on purchasing electronics or appliances that are Energy-Star certified or energy efficient whenever possible. In completing purchases, buyers are also focused on conserving energy by maintaining their records as electronic files rather than physical paper files. This reduces the need for paper and the energy and ink required to print documents.

Each procurement/bidding packet contains the CalRecycle Form 74 and contractors/vendors are required to fill it out and certify which goods meet SABRC requirement.

CARB's OIS division handles IT purchases. For items like computers, laptops, peripherals, and copiers, State Contracts and LPAs that feature Energy Star Certified products are utilized. OIS utilizes contracts with vendors like HP that offer recycled toner cartridges or have a cartridge take-back program that allows us to return used cartridges for recycling.

For the majority of our printing needs, CARB utilizes a Statewide Contract that makes recycled paper available. Line items with the highest PCRC are selected. For non-contract paper products, buyers do research on which products have PCRC and request these from vendors or ask vendors to provide a like product with the required PCRC.

Measure and Report Progress

CARB plans to integrate into their acquisitions for EPP a robust training and tracking system over the coming years to successfully identify opportunities to "green" purchases and to provide buyers with the correct training for EPP criteria when considering items for purchase.

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

Product Category	SABRC Reportable Dollars	SABRC Compliant Dollars	% SABRC Compliant
Antifreeze	NA	NA	NA
Compost and Mulch	NA	NA	NA
Glass Products	$2,510.00	$2,200.00	87.65%
Lubricating Oils	NA	NA	NA
Paint	NA	NA	NA
Paper Products	$9,904.12	$9,031.13	91.19%
Plastic Products	$18,715.68	$5,251.54	28.06%
Printing and Writing Paper	$39,765.49	$27,010.50	67.92%
Metal Products	$142,526.72	$98,564.46	69.16%
Tire Derived Products	NA	NA	NA
Tires	NA	NA	NA

The Green Buyer website tracks and offers transparency in agencies performance for buying EPP goods. EPP goods are those identified as EPP when entered into SCPRS. These goods are available from statewide contracts or

complaint with DGS Purchasing Standards or SABRC. EPP goods are categorized by UNSPSC and compared with goods of the same category to establish the percent EPP spend as reported in SCPRS. EPP goods are found on DGS Buying Green website.

Table 5.6: Commodities categories with the greatest Potential to Green

Commodity	2020 Total Spend ($)	2020 Percent EPP Spend (%)	EPP Target (%)
Plastic	$18,715.68	28.06%	75%
Printing & Writing Paper	$39,765.49	67.92%	75%
Metal Products	$142,526.72	69.16%	75%
Glass Products	$2,510.00	87.65%	75%
Plastic	$18,715.68	28.06%	75%

Sustainability Development and Education

CARB currently has minimal construction contracts, A&E, or transportation agreements. No information was available for how bidders are notified of EPP requirements for types of purchases, grants, or interagency agreements.

Total Number of Employees Assigned as Buyers: **N/A**

Table 5.7: Buyers who have completed EPP Training

CalHR Classification	Total Number of Buyers	Percent Completing EPP Training	Commitment to have buyers complete EPP training (%)
N/A	N/A	N/A	N/A

CARB does not currently have any data that identifiers buyers who have completed EPP training through the CALPCA. Future efforts towards this requirement will be developed in the coming year.

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, contributes 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.

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

CARB has not executed any new leases that began with a site search after January 1, 2017. The majority of CARB lease portfolio is air monitoring stations throughout the state of California. These small air monitoring stations are not always brick and mortar locations nor are they driven by smart location scores. The selection of the locations is in compliance with Federal and State regulations to ensure monitoring of specific air emissions in specific locations. Additionally, CARB works with local air monitoring pollution districts to agree upon site locations. Many of these sites are small trailers or shelters that require minimal power.

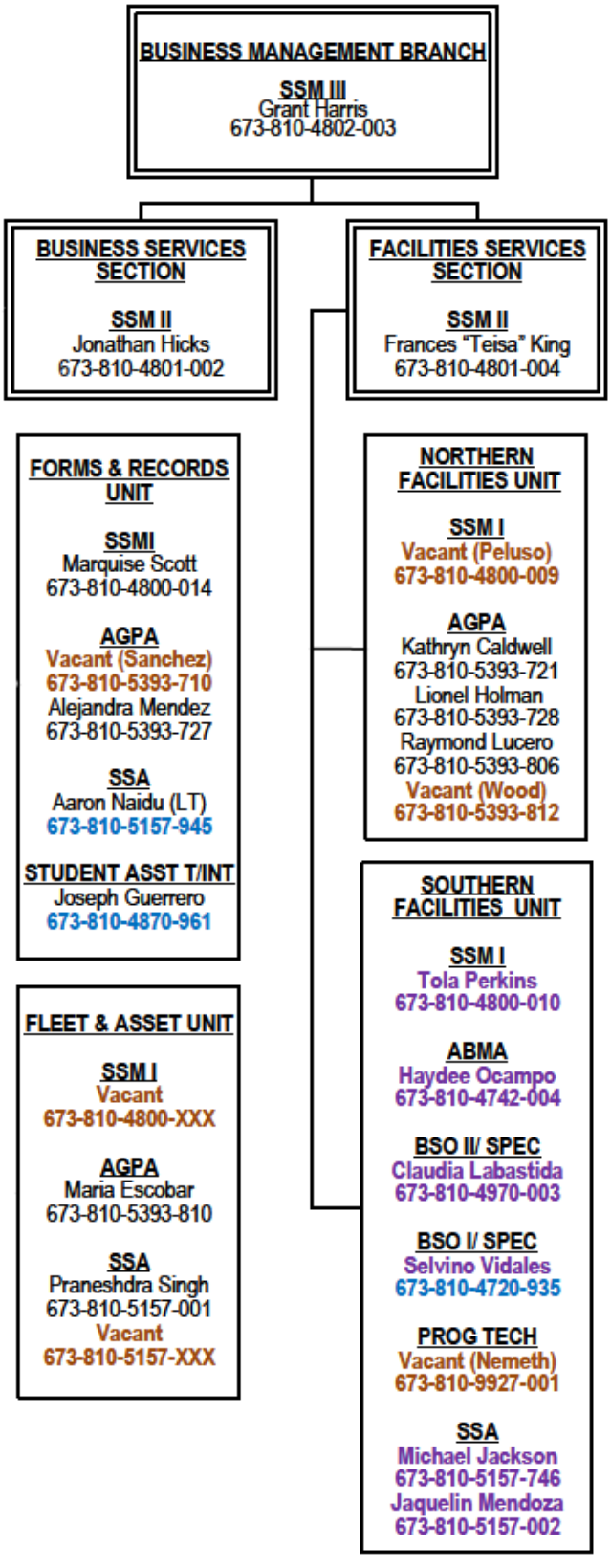
Table 5.8: Smart Location Score for new Leases

Facility name	Smart Location Calculator Score
N/A	N/A
Average	
Baseline	
% change from Baseline	

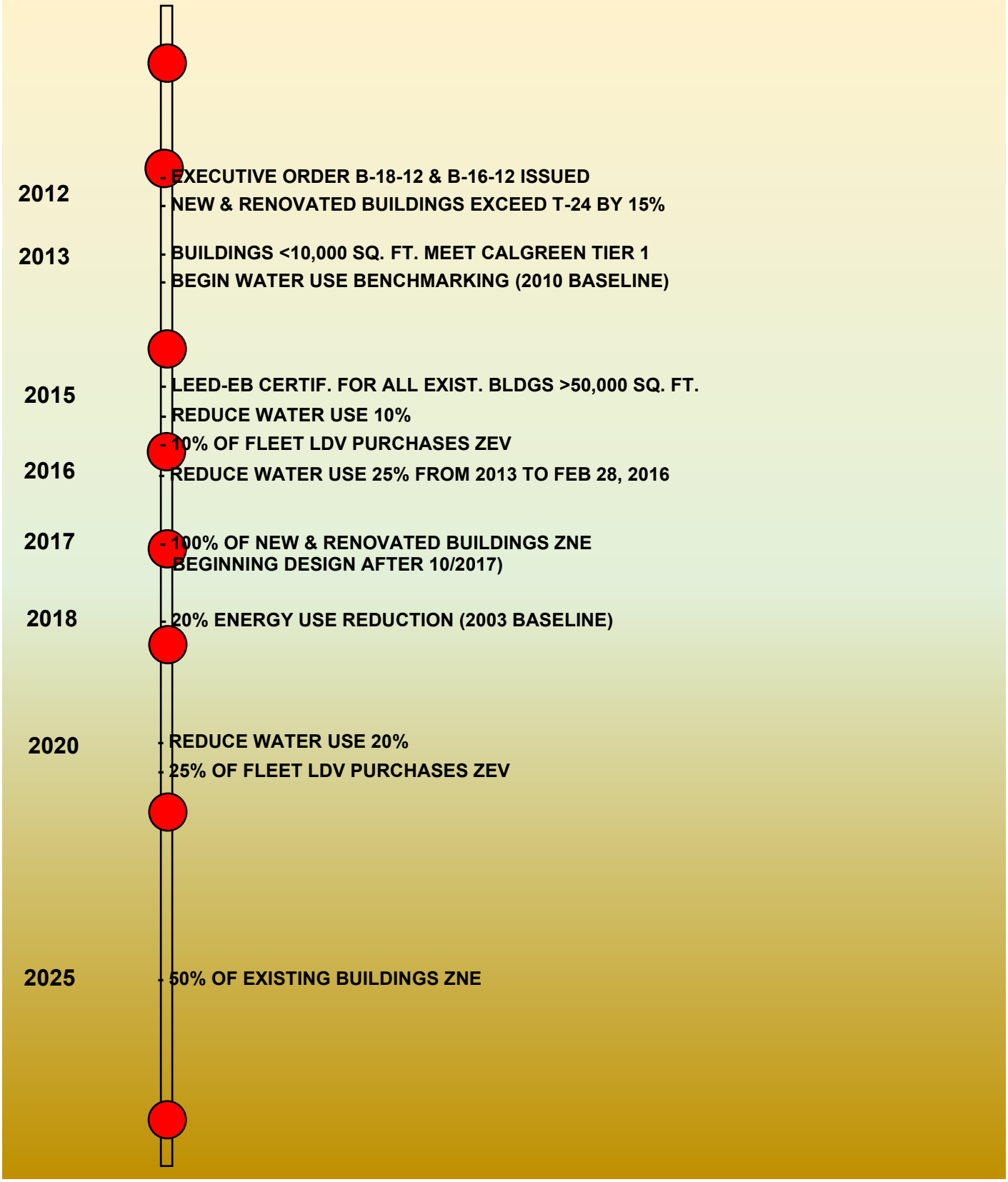
Table 5.9: Lowest Smart Location Score Leases

Facility name	Smart Location Calculator Score
Arvin AMS	26
Madera AMS	5
Paradise Airport AMS	20

Appendix A – Facilities



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 us 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 conversation.

☐ 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
DGS	Department of General Services
DWR	Department of Water Resources
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)
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	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Understanding Climate Risk at Planned Facilities	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Integrating Climate Change into Department Planning and Funding Programs	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Measuring and Tracking Progress	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Zero Emission Vehicles

Incorporating ZEVs Into the Department Fleet	
ASD	Grant Harris – Branch Chief Jon Hicks – Section Chief Marquise Scott – Unit Chief

Telematics	
ASD	Grant Harris – Branch Chief Jon Hicks – Section Chief

	Marquise Scott – Unit Chief

Public Safety Exemption	
ASD	Grant Harris – Branch Chief Jon Hicks – Section Chief Marquise Scott – Unit Chief

Outside Funding Sources for ZEV Infrastructure	
ASD	Grant Harris – Branch Chief Jon Hicks – Section Chief Marquise Scott – Unit Chief

Hydrogen Fueling Infrastructure	
ASD	Grant Harris – Branch Chief Jon Hicks – Section Chief Marquise Scott – Unit Chief

Comprehensive Facility Site and Infrastructure Assessments	
ASD	Grant Harris – Branch Chief Jon Hicks – Section Chief Marquise Scott – Unit Chief

EVSE Construction Plan	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief

EVSE Operation	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief

Energy

Zero Net Energy (ZNE)	
ASD	Grant Harris – Branch Chief

	Teisa King – Section Chief Tola Perkins – Unit Chief

New Construction Exceeds Title 24 by 15%	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief

Reduce Grid-Based Energy Purchased by 20% by 2018	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Server Room Energy Use	
ASD and OIS	Grant Harris – Branch Chief Teisa King – Section Chief Gordan Roberts – Info. Tech Specialist III

Demand Response	
	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Renewable Energy	
	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Monitoring Based Commissioning (MBCx)	
	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Financing	
ASD	Grant Harris –Branch Chief Lu Saephanh – Budgets Branch Chief

Water Efficiency and Conservation

Indoor Water Efficiency Projects In Progress First initiative	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Boilers and Cooling Systems Projects In Progress	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Landscaping Hardware Water Efficiency Projects In Progress	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Living Landscaping Water Efficiency Projects In Progress	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Buildings with Urban Water Shortage Contingency Plans In Progress	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Green Operations

Greenhouse Gas Emissions	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Building Design and Construction	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

LEED for Existing Buildings Operations and Maintenance	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Indoor Environmental Quality	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Integrated Pest Management	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Waste Management and Recycling	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

Environmentally Preferable Purchasing	
ASD	Alice Kindarara – Acquisitions Branch Chief

Location Efficiency	
ASD	Grant Harris – Branch Chief Teisa King – Section Chief Tola Perkins – Unit Chief

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.

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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	

Appendix I - List of Tables & Graphs