Sustainability Roadmap 2018-2019: Zero Emission Vehicles

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

California Department of Food and Agriculture

Edmund G. Brown Jr., Governor

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California Department of Food & Agriculture Sustainability Roadmap 2018-2019: Zero Emission Vehicles

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Acronyms

BEV	Battery Electric Vehicle
BPMU	Building and Property Management Unit
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CDFA	California Department of Food and Agriculture
CO2	Carbon Dioxide
DGS	Department of General Services
EO	Executive Order
EPP	Environmentally Preferable Purchasing
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment (charging equipment)
FY	Fiscal Year
GHGe	Greenhouse Gas Emissions
IEQ	Indoor Environmental Quality
L1	Level 1 (Lowest power charging station)
L2	Level 2 (240 volt charging station – for faster charging)
LBS	Pounds
MBCx	Monitoring Based Building Commissioning
MPG	Miles Per Gallon
MM	Management Memo
PHEV	Plug-in Hybrid Vehicle
SUV	Sport Utility Vehicle
ZEV	Zero Emission Vehicle

EXECUTIVE SUMMARY

Over 98 years ago, the California Legislature created the California Department of Food and Agriculture (CDFA) to serve the citizens of California by promoting and protecting a safe, healthy food supply, and enhancing local and global agricultural trade, through efficient management, innovation, and sound science, with a commitment to environmental stewardship. Currently organized in seven Divisions and located at more than 100 locations throughout the State, CDFA's employees work with its federal and county partners in striving to support and advance the success of those that have made California agriculture the recognized leader of food and agricultural products in the world.

With direction from the Governor's Office and the Department of General Services (DGS), CDFA was tasked with preparing a Road Map document to describe the status and steps CDFA is taking to meet the requirements of the Governor's Executive Orders (EO) B-18-12, B-16-12, and other water and energy conservation policies. This document is intended to outline the requirements and describe what next steps CDFA will take to comply with each EO.

CDFA currently owns 22 facilities throughout the State. These facilities provide a vast array of purposes for the Department. From greenhouses in Arvin to the 16 Border Protection Stations along California's borders, every facility is critical to meeting CDFA's mission. CDFA seeks guidance from DGS for all property management needs related to these facilities, from construction to minor maintenance repairs.

CDFA has also made it a priority to significantly reduce its fleet and purchase Zero Emission Vehicles (ZEV). Ten percent of the vehicles CDFA purchased in the last three years are hybrids and electric vehicles. CDFA currently has 21 electric vehicles, 24 hybrid vehicles, and five charging stations (ten ports); exceeding the requirements set forth in the Governor's EOs and joining a few other State agencies in leading the movement toward reducing fleet energy consumption and gas emissions.

CDFA is committed to meeting the requirements set forth in EO B-18-12, B-16-12, and other water and energy conservation policies. I look forward to working closely with staff to achieve our goals through the execution of this Road Map.

Yours truly,

Kevin Masuhara
for

Karen Ross
Secretary

SUSTAINABILITY GOALS

The Governor has directed California State Agencies to demonstrate sustainable operations and to lead the way by implementing sustainability policies set by the state. Sustainability includes the following general initiatives:

- Greenhouse Gas Emissions Reductions (GHGe)
- 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
- ZEV Fleet Purchases
- Electric Vehicle Charging Infrastructure
- Monitoring and Executive Oversight

The Governor has issued numerous EOs directing sustainable state operations. The orders relevant to ZEVs are:

EO B-18-12

EO B-18-12 and the companion Green Building Action Plan requires state agencies to reduce the environmental impacts of state operations by reducing GHGe, managing energy and water use, improving indoor air quality, generating onsite renewable energy when feasible, implementing environmentally preferable purchasing, and developing the infrastructure for electric vehicle charging stations at state facilities. To ensure these measures are met, the Green Building Action Plan also established two oversight groups: the staff level Sustainability Working Group and the executive level Sustainability Task Force.

EO B-16-12

EO B-16-12 directs state agencies to integrate 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 ten percent with ZEVs, and by 2020 to purchase at least 25% replacement fleet as ZEVs.

EO B-30-15

EO B-30-15 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 GHGe reduction target of 40 percent below 1990 levels by 2030, and reaffirms California's intent to reduce GHGe by 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.

2016 ZEV Action Plan

This plan established a goal to provide electric vehicle charging to 5% of state owned parking spaces by 2022. It also advanced the ZEV procurement target to 50% of light duty vehicles by 2025.

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% reduction in GHGe by 2030 and 80% reduction by 2050.

Public Resources Code §25722.8

Statute requires reducing consumption of petroleum products by the state fleet compared to a 2003 baseline and mandates a ten percent reduction or displacement by Jan. 1, 2012 and a 20 percent reduction or displacement by Jan. 1, 2020.

State Administrative Manual and Management Memos

The following sections of the State Administrative Manual, and associated Management Memos (MM), currently impose sustainability requirements on the department under the Governor's executive authority:

- MM 15-03: Minimum Fuel Economy Standards Policy
- MM 15-07: Diesel, Biodiesel, and Renewable Hydrocarbon Diesel Bulk Fuel Purchases
- MM 16-07: Zero-Emission Vehicle Purchasing and Electric Vehicle Supply Equipment (EVSE) Infrastructure Requirements

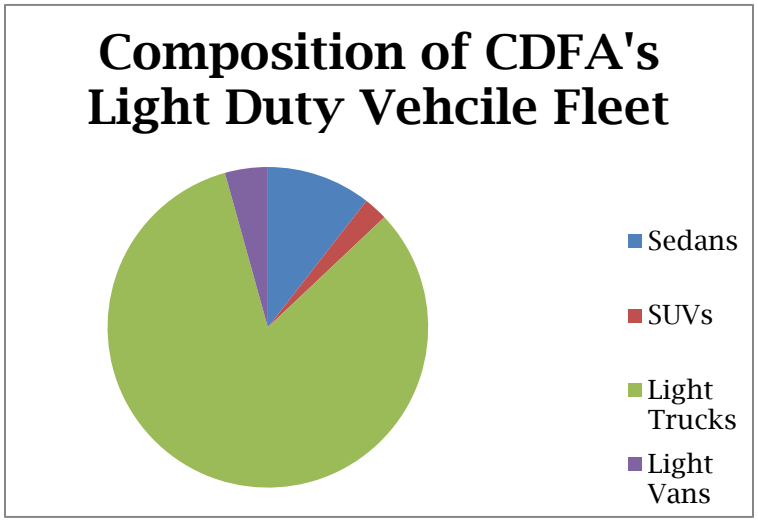
FLEET VEHICLES

Department of Food and Agriculture's 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 ZEVs. This report identifies successful accomplishments, ongoing efforts, outstanding challenges and future efforts.

CDFA has a fleet of 579 vehicles. Every year these vehicles are used for mission critical activities that include but are not limited to investigations, inspections, travel between facilities and site locations, travel for various meetings, and conducting test experiments that impact agriculture statewide. Since CDFA has locations all over California, these commutes also take place all over California, from rural areas with uneven dirt roads, to paved highways and city streets. Usage also varies depending on the need. Some vehicles are used constantly, being driven every day to attend to departmental needs such as meetings and emergencies; while other vehicles are utilized for specific projects such as those with spray rigs affixed to respond to crucial, specialized, seasonal needs for a cumulative amount of two to three months out of the year.

Chart 1: Composition of Department's Light Duty Vehicle Fleet



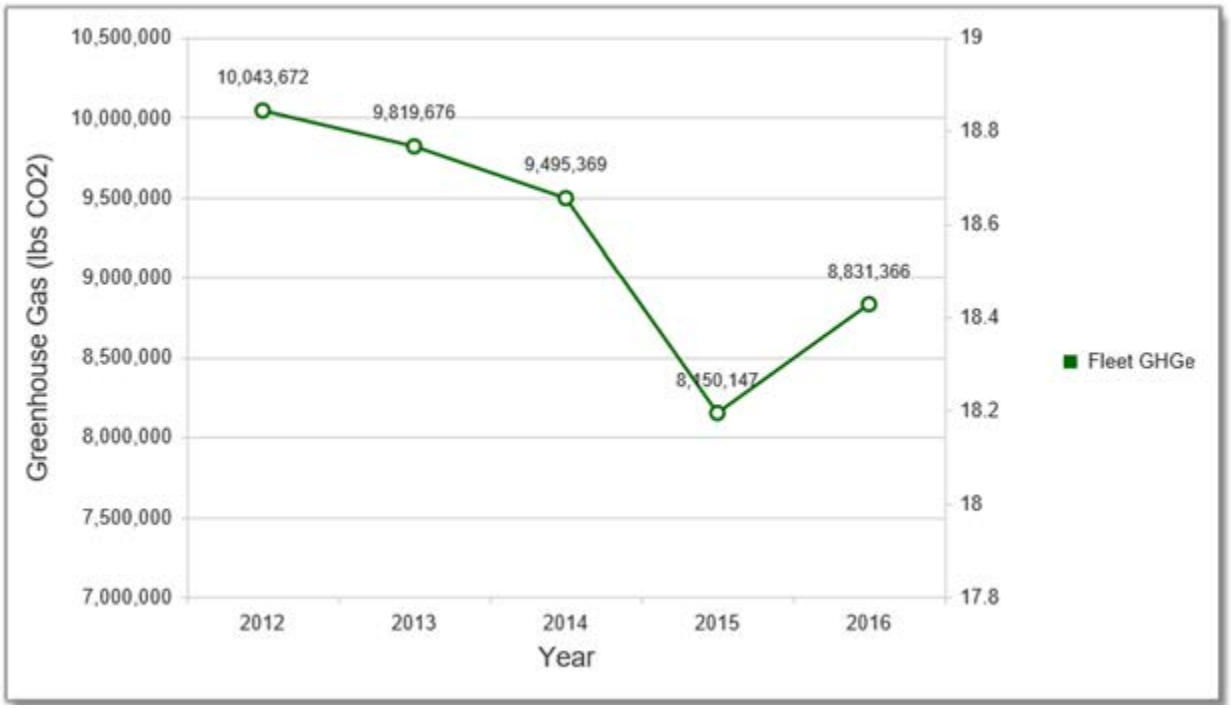
The information in the above chart was pulled from CDFA's internal historical data.

CDFA has **25** Cargo/Passenger Vans, **479** Trucks, **14** Sport Utility Vehicle (SUV)s, **61** Sedans/Station Wagons (the Sedans/Station Wagons include 45 ZEVs: 24 hybrids/Plug-in Hybrid Vehicle (PHEV)s and 21 Battery Electric Vehicle (BEV)s).

In 2016, 14 Miles Per Gallon (MPG) was the CDFA average (6,847,402 miles driven in fleet vehicles + 699,794 miles driven in rental vehicles [from private rental agencies] = 7,547,196

total miles driven/ 539,160 gallons of fuel used = 14 MPG). In 2015, the average was 15 MPG (7,381,083 miles driven in fleet vehicles + 1,188,292 miles driven in rental vehicles = 8,569,375 total miles driven/ 565,788 gallons of fuel used = 15 MPG). This decrease in MPG is due to an increase in dense, congested traffic and an increase in special projects requiring heavy-duty trucks without efficient mileage per the use requirements. Projects required to support California's agriculture through research and prevention of negative impacts caused by pests and diseases, such as the Asian Citrus Psyllid, has and will continue to change; impacting the driving routes taken to new project locations. Some routes contained more congested areas or additional mileage through uneven and loose terrain for field experiments; which used more gas per mile.

Graph 1: Light Duty Fleet GHGe



The information in the above graph (annual pounds (lbs.) of Carbon Dioxide (CO2)) can be found at http://green.ca.gov/fleet

Table 1: Total Purchased Fuel 2016

Purchased Utility	Quantity	Cost ($)
Gasoline	539,159.56 Gallons	$ 1,515,913.29
Diesel	4,744.45 Gallons	$ 12,545.79
Renewable Diesel	0 Gallons	$ 0
TOTAL GGE	**543,904.01 Gallons**	**$ 1,528,459.08**

The information in the above table was pulled from CDFA's internal historical data.

Incorporating ZEVs into the State Fleet

A widespread shift to ZEVs is essential for California to meet its GHGe goals. State departments are now required to incorporate larger numbers of ZEVs in their vehicle fleets. Starting in Fiscal Year (FY) 17/18 the percentage of new light duty vehicles that must be ZEVs increases by 5% each year, reaching 25% in FY 19/20 and 50% in FY 24/25.

CDFA currently uses ZEVs throughout the department for short commutes to meetings, small distances between CDFA facilities and other state buildings, and mail distribution between Sacramento locations. CDFA has and will continue to meet all requirements set forth by the Governor's EOs and will continue to evaluate usage and additional feasible vehicle roles for ZEVs to determine viable options to expand the percentage of ZEVs in the department's fleet.

Vehicles over specified mileage and age thresholds are eligible for replacement. Currently ZEVs are available on statewide commodity contracts in the sub-compact, compact, mid-size sedans and mini-vans vehicle classes. There are 15 vehicles in CDFA's fleet that are currently eligible for replacement in vehicle classes for which ZEVs are available on contract.

Table 2: Vehicles in Department Fleet Currently Eligible for Replacement

	Sub-Compact Sedan	Compact Sedan	Midsize Sedan	Mini Van	Total
# of vehicles eligible for replacement	0	0	15	0	15

The information in the above table was pulled from CDFA's internal historical data.

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

Table 3: ZEV Additions to the Department Fleet

Table Header Format	04/05-13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Battery Electric Vehicle	0	10	3	8	15	20	25	30	35
Plug-in Hybrid Vehicle	8	1	10	5	0	0	0	0	0
Fuel Cell Vehicle	0	0	0	0	0	0	0	0	0
Percent of total purchases	-	11%	13%	13%	15%	20%	25%	30%	35%
Required ZEV Percentage	-	10%	10%	10%	15%	20%	25%	30%	35%
Total purchased per year	8	11	13	13	15	20	25	30	35
Total number in Fleet	8	19	32	45	60	80	105	135	170

The information in the above table was pulled from CDFA's internal historical data.

CDFA owns 21 ZEVs: ten ZEVs purchased in FY 14/15, three purchased in FY 15/16, and eight purchased in FY 16/17.

CDFA also owns 24 Hybrid Vehicles: one hybrid purchased in FY 04/05, six hybrids purchased in FY 12/13, one hybrid purchased in FY 13/14, one hybrid purchased in FY 14/15, ten Chevy Bolts purchased in FY 15/16, and five Chevy Bolts purchased in FY 16/17. Chevy Bolts are to be counted toward ZEV goal on a one to one ratio; all other hybrids are to be counted on a two to one ratio.

CDFA has met all goals set forth by the Governor's EO and will continue to explore and evaluate options to meet Zero Net Energy requirements by 2020 such as purchasing ZEVs and integrate charging stations to support all ZEVs purchased.

Telematics Plan

Telematics is a method of monitoring a vehicle's mileage and usage by combining a Global Positioning System with on-board diagnostics. Telematics provides valuable information that often results in fuel savings and improved vehicle utilization. Telematics is especially important for verifying that Plug-in Hybrid Vehicles are maximizing the use of electric fuel rather than gasoline. The rule requiring 50% of ZEVs purchased to be BEVs is not in place for fleets making use of telematics for all ZEVs.

CDFA intends to explore installing telematics for its vehicles and has consulted with representatives from the California Department of Transportation (Caltrans) and DGS' office of Fleet and Asset Management. CDFA will explore leveraging the statewide telematics contract, which DGS Office of Fleet and Asset Management and Caltrans are currently developing.

ZEV INFRASTRUCTURE

Introduction to the Department of Food and Agriculture's Parking Facilities

CDFA has 22 owned facilities and 49 leased facilities.

The 22 CDFA-owned facilities include 16 Border Protection Stations and six other buildings, which function as laboratories, greenhouses, or fruit and vegetable quality control centers.

The Border Protection Stations are small structures on freeways and highways used as check points to stop the public from spreading insects and plant disease throughout California, which could negatively impact California's agriculture. These facilities do not have much capacity for impacting GHGe and generally don't have a large amount of space designated specifically to parking. These geographical locations tend to be impractical to use electric vehicles.

Two other facilities – Banning, which measures 251 square feet; and Wheeler Ridge, which measures 375 square feet; also lack the capacity to impact GHGe, as they do not have available parking.

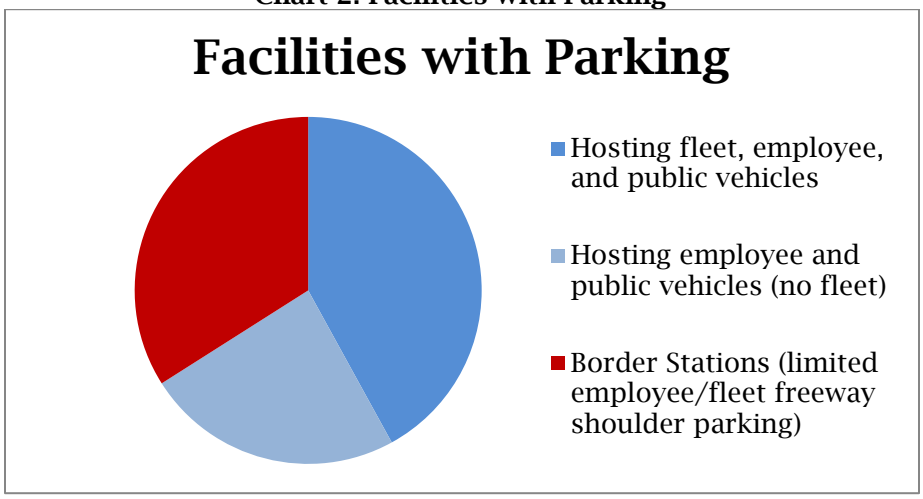
Four CDFA-owned facilities (two Veterinary Laboratories, the Meadowview facility, and the Arvin location for the Glassy Winged Sharpshooter program) are more practical for impacting GHGe, as they contain more parking spaces and more square footage. CDFA's Veterinary Laboratories have 1,700 and 2,765 square feet, including one floor each and 23-30 parking spaces each. CDFA's Meadowview facility has 101,238 square feet, which includes two floors and 196 parking spaces. CDFA's Arvin location has 14,300 square feet, including buildings (main building is 2,000 square feet, seed storage is 750 square feet, growing buildings are 750 square feet, and greenhouses are 10,800 square feet) and 5 parking spaces.

CDFA's GHGe reduction plan focuses on leased facilities and owned facilities large enough for feasible GHGe reductions.

- CDFA analyzed its State-owned facilities for EVSE parking capacity to determine where installation will be most cost-effective and appropriate, completed an EVSE Infrastructure Plan in 2015 per MM 16-07.
- CDFA worked with DGS in acquiring and installing five dual Electric Vehicle Charging Stations (10 ports total) for three Sacramento locations – Meadowview (one dual charger), Florin-Perkins (one dual charger), and Gateway Oaks (three dual chargers).
- CDFA corresponded with DGS to install four ZEV solar panel charging stations at the 13th and P parking garage roof with energy coming directly from solar panels so they could be separate from the electric grid. DGS ended up installing eight dual charge-point stations (16 total) connected to the electric grid, and a row of solar panels on the roof.

Four out of the 22 CDFA-owned facilities have parking; and 29 out of the 49 leased facilities have parking. From the total of 33 facilities with mixed parking spots available for employees and members of the public, 21 facilities have spots available for Fleet Vehicles.

Chart 2: Facilities with Parking



The information in the above table was pulled from CDFA's internal historical data.

CDFA determined that Level 2 (L2) 240 volt charging stations are the most practical as they charge vehicles faster than the Level 1 (L1) lowest power charging stations and are less expensive than more advanced models. L2 chargers will make up 100% of the chargers in employee and fleet parking areas.

CDFA currently has 45 ZEVs and five dual chargers (ten total) and will be required to purchase 35 more ZEVs by 2020 (15% of vehicles purchased in 2018 and 20% of vehicles purchased in 2019 must be ZEVs). Since the ZEVs CDFA owns will be increasing, there will need to be enough chargers to support them. Based on estimates of future ZEV fleet purchases and a count of visitor and workplace parking spaces, CDFA determined that the Department will need five additional dual L2 chargers (ten total) by 2020 to adequately serve fleet vehicles and achieve the goals established in the ZEV Action Plan. The locations for these new chargers have not yet been determined so the locations for the current chargers are listed for the new chargers as well until the planning can be finalized and formalized.

The facilities with the most urgent need for Electric Vehicle (EV) charging are listed below.

Table 4: High Priority EVSE Projects Needed by 2020

Facility Name	Total Parking Spaces	Existing L1 Chargers	Existing L2 Chargers	New L1 Chargers Needed	New L2 Chargers Needed
Meadowview	196	0	1 dual(2 total)	0	2
Florin-Perkins (DMS)	67	0	1 dual(2 total)	0	2
Gateway Oaks North	339	0	3 dual(6 total)	0	6
Total	602	0	5 dual(10 total)	0	10

The information in the above table was pulled from CDFA's internal historical data and future estimates.

All chargers provide dual charging (one charger [two ports] for Meadowview, one charger [two ports] for Florin-Perkins, and three chargers [six ports] for Gateway Oaks North).

There were no L1 or L2 chargers prior to the benchmark. CDFA purchased five dual L2 charging stations (10 total) for electric vehicles for CDFA facilities: one was installed by a private contractor at Meadowview and the rest were installed by DGS, including three at Gateway Oaks and one for the Division of Measurement Standards at Florin-Perkins. Additional chargers will be needed as the number of ZEVs grows to meet the goals set forth in the Governor's EOs. CDFA will work on plans to install the additional chargers needed as the plans develop with the locations for these vehicles. By 2022, CDFA will have approximately 162 ZEVs throughout California and will need chargers to support them. The locations for these vehicles may have chargers owned by DGS or other properties CDFA leases. The chargers listed in Table 4 represent the additional chargers CDFA plans to install by 2020.

Outside Funding Sources for EV Infrastructure

CDFA has engaged with DGS and California Environmental Protection Agency (CalEPA) to explore funding assistance for energy conservation and EV infrastructure. Most of CDFA's owned facilities are Border Protection Stations that cannot support the EV infrastructure because they are on the highway with only highway shoulder parking instead of official dedicated parking owned by CDFA. CalEPA has advised CDFA on a few possible opportunities for assistance from Utilities for EVSE installation efforts. CDFA will continue to evaluate the feasibility in using various programs, such as Electrify America, to install EVSE in leased and owned facilities at reduced cost to the state.

Hydrogen Fueling Infrastructure

CDFA determined that installation of hydrogen fueling infrastructure at department facilities is not an efficient use of state funds to reduce GHGe, especially since CDFA does not own any hydrogen fueled vehicles. CDFA will continue to pursue alternate options to better serve the reduction of GHGe.

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.

Table 5: 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
Meadowview	0	1 dual(2 total)	Approximately $6,225	0	N/A
Florin-Perkins (DMS)	0	1 dual(2 total)	Approximately $6,225	0	N/A
Gateway Oaks North	0	3 dual(6 total)	$18,673	0	N/A
Total	0	5 dual(10 total)	$31,123	0	0

The information in the above table was pulled from CDFA's internal historical data.

All chargers provide dual charging (one charger [two ports] for Meadowview, one charger [two ports] for Florin-Perkins, and three chargers [six ports] for Gateway Oaks North).

EVSE Construction Plan

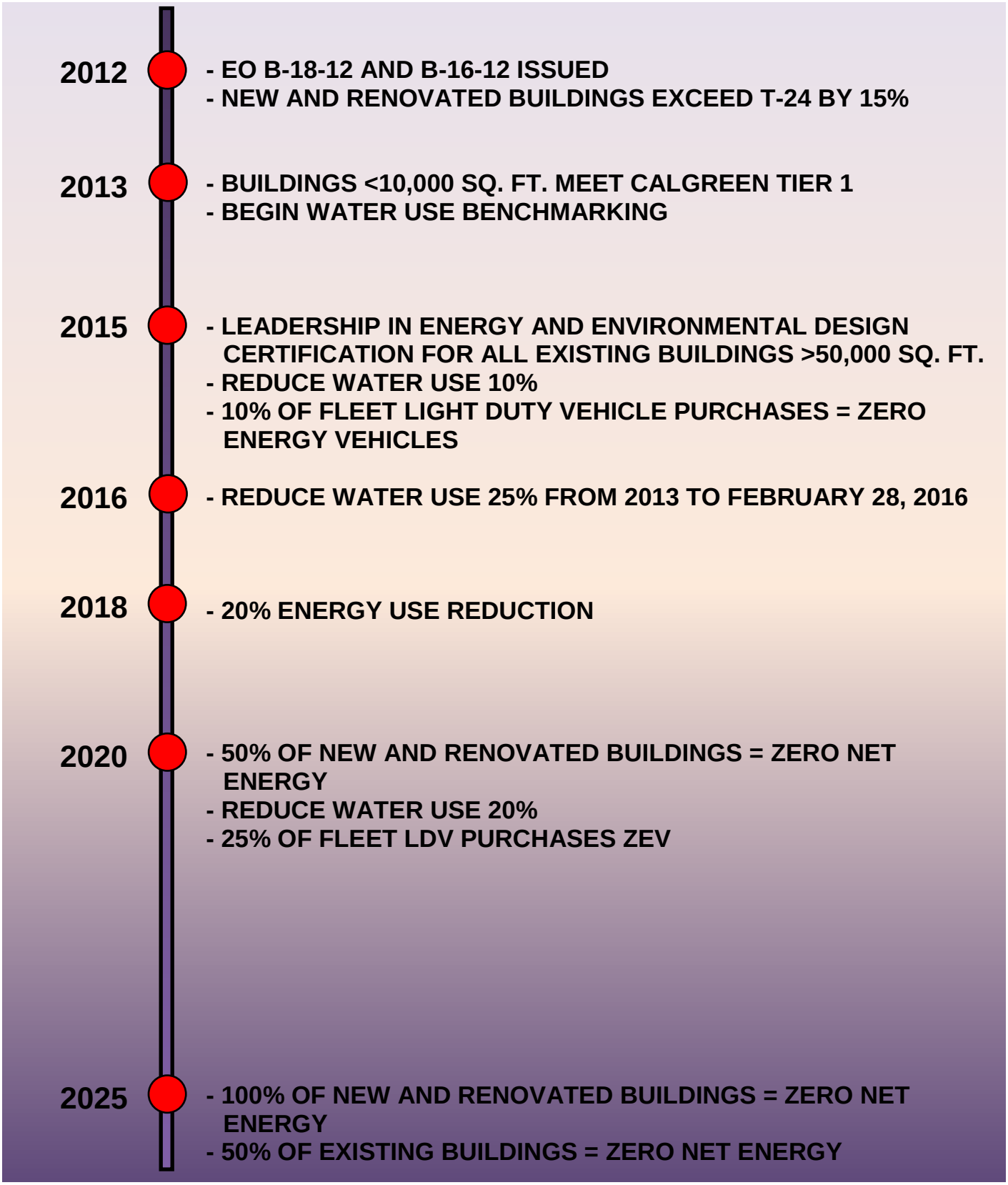
CDFA will work closely with DGS to ensure design, bid, construction and activation of EV charging infrastructure to support increase in electric and hybrid vehicles required to meet the Governor's EOs and other regulations impacting fleet purchases.

EVSE Operation

CDFA will continue to endeavor to keep pace with the increasing regulations and requirements to reduce GHGe and other negative impacts on the environment. As CDFA purchases more ZEVs/BEVs and PHEVs/hybrids to meet the increasing regulations, CDFA will install the infrastructure (charging stations) necessary to support these additional charging vehicles.

Current CDFA charging stations require employees to type in a code connected to the specific vehicle being charged every time they plug in. CDFA tracks the mileage on each vehicle. CDFA plans to use this information to report EVSE data and anticipates to continue this process in the future. CDFA has been working closely with DGS to ensure all aspects of installation and maintenance are addressed.

SUSTAINABILITY MILESTONES AND TIMELINE



DEPARTMENT STAKEHOLDERS

Incorporating ZEVs Into the Department Fleet	
Administrative Services, Building and Property Management	Mari McNeill, Energy Conservation Liaison

Telematics	
Administrative Services, Building and Property Management	Mari McNeill, Energy Conservation Liaison

Public Safety Exemption	
Administrative Services, Building and Property Management	Mari McNeill, Energy Conservation Liaison

Outside Funding Sources for ZEV Infrastructure	
Administrative Services, Building and Property Management	Mari McNeill, Energy Conservation Liaison

Hydrogen Fueling Infrastructure	
Administrative Services, Building and Property Management	Mari McNeill, Energy Conservation Liaison

Comprehensive Facility Site and Infrastructure Assessments	
Administrative Services, Building and Property Management	Mari McNeill, Energy Conservation Liaison

EVSE Construction Plan	
Administrative Services, Building and Property Management	Mari McNeill, Energy Conservation Liaison

EVSE Operation	
Administrative Services, Building and Property Management	Mari McNeill, Energy Conservation Liaison