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 Technology

Edmund G. Brown Jr., Governor

December 2017

California Department of Technology Sustainability Roadmap 2018-2019: Zero Emission Vehicles

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Acronyms

EO	Executive Order
EVSE	Electric Vehicle Supply Equipment (charging equipment)
GHGe	Greenhouse Gas Emissions
MM	Management Memo
SAM	State Administrative Manual
ZEV	Zero Emission Vehicle

EXECUTIVE SUMMARY

The California Department of Technology (CDT) Gold Camp Data Center provides information technology services to many state, county, federal and local government entities throughout California. Through the use of a scalable, reliable and secure statewide network, combined with expertise in voice and data technologies, CDT delivers comprehensive, cost-effective computing, networking, electronic messaging, and training solutions to benefit the people of California.

As power consumption, and the resulting Green House Gas (GHG) emissions from computer rooms and IT equipment continue to increase at a time when the power production industry is in a fundamental state of change, striving towards sustainability continues to be a challenge for all departments and their facilities. As the state's Information Technology (IT) leader, CDT continues to lead efforts to reduce total state department IT energy equipment use by at least 20 percent, as required by Assembly Bill 2408 (Smyth and Huber, Chapter 404, Statutes of 2010). To meet required energy reductions, many state departments consolidated their IT equipment into CDT's ENERGY STAR® rated data center, including equipment from two of CDT's data centers, which were decommissioned in 2010. Although energy, water, and GHG emissions increased at CDT's state-owned data center as a result of these consolidation efforts, departmental totals from data center operations were significantly reduced.

CDT has implemented significant energy and water efficiency strategies at its mission-critical, LEED Gold and ENERGY STAR® rated data center in Rancho Cordova. These strategies included site-wide power, lighting, and computer room equipment mechanical upgrades and real-time cooling tower control and monitoring equipment installation. This strategic implementation reduced energy use at the data center by 1.7 million kilowatt-hours annually, equal to the energy used by 91 homes, and saves over a million gallons of water per year. Energy and water improvement initiatives currently underway include server virtualization through cloud computing, improved computer room cooling efficiencies, replacement of cooling towers with more water-efficient models, LED lighting replacement, electric vehicle charging station installation, and a 1 megawatt solar panel installation in the parking lot.

As part of the Governor's 10-year plan to reduce carbon emissions at the state level, state agencies have been directed to demonstrate sustainable operations and lead the way by implementing various sustainable policies set by the Governor's office. One of these initiatives is zero emissions vehicles (ZEV), which aims to increase state government's ZEV purchases (for light duty replacement vehicles in the state fleet) to 50% by 2025 and expand the state's vehicle charging station infrastructure to at least 5% of workplace parking spaces at state facilities. This directive is supported by numerous executive orders outlining sustainable state operations relevant to zero emissions vehicles. These include, Executive Orders, B-18-12, B-16-12, B-30-15, AB 32 Scoping Plan, Public Resources code 25722.8, various State Administrative

Manual/Management Memos and the Zero Emission Vehicle Action Plan. All provide the direction to meet the objectives related to fleet operations and ZEV's.

The California Department of Technology (CDT) maintains a small fleet of seven (7) vehicles that employees may use for state business in the Sacramento metropolitan area. In addition, CDT's Program Services unit uses these fleet vehicles daily to provide mail and courier services to and from the various department locations. The CDT operates one state owned facility and leases four additional facilities. Parking lots at these locations are for employee, visitor, and customer use and not physically separated. CDT fleet vehicles are maintained at four of the facilities and parking spaces are reserved for their use.

Based on estimates of future ZEV fleet vehicle replacements and an inventory of parking spaces it has been determined that the Department will require eight (8) additional L2 (Level 2) chargers to adequately serve the Gold Camp Data Center facility and achieve the goals established in the ZEV Action Plan. This location currently has two (2) L2 dual charging stations which are capable of charging four ZEV's at one time. CDT has hired an outside firm to assess and perform an engineering study on the current and future infrastructure needed to support additional L2 charging stations at the Gold Camp Data Center.

It is important to note that CDT can only control the future number of charging stations for ZEV's in the state owned Gold Camp Data Center. In its leased facilities, CDT has proactively worked with DGS to include additional L2 chargers and associated reserved parking spaces when leases are renewed. Three (3) dual port EV charging stations were installed in 2017 at the Department's leased Prospect Green facility. CDT will continue to include EV charging stations in all future lease negotiations.

Amy Tong
Director

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
- 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

The Governor has issued numerous executive orders directing sustainable state operations. The orders relevant to zero emission vehicles are:

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 onsite 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.

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 ten percent with ZEVs, and by 2020 to purchase at least 25% replacement fleet as ZEVs.

Executive Order 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 greenhouse gas emission reduction target of 40 percent below 1990 levels by 2030, and reaffirms California's intent to reduce greenhouse gas emissions 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 Zero Emission Vehicle Action Plan

The plan establishes a goal to provide electric vehicle charging to 5% of state owned parking spaces by 2022. It also advances 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 GHG by 2030 and 80% reduction by 2015.

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.

State Administrative Manual & Management Memos

The following sections of the State Administrative Manual (SAM), 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 EVSE Infrastructure Requirements

FLEET VEHICLES

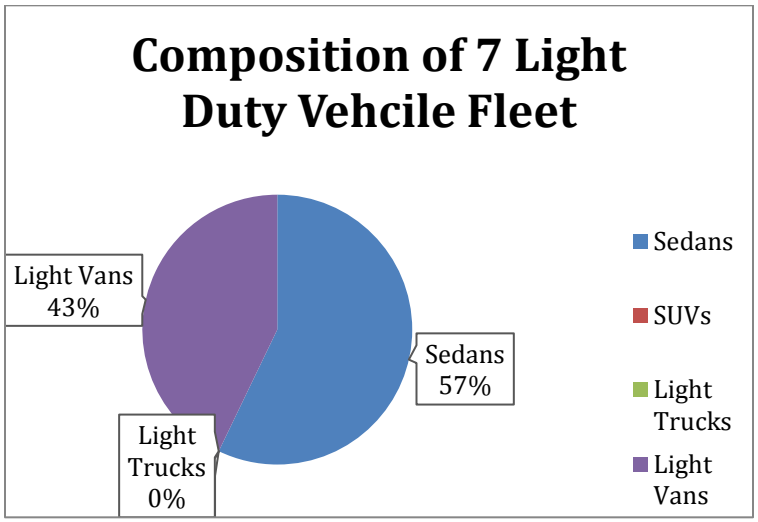
Department Mission and Fleet

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.

The California Department of Technology (CDT) has a light-duty vehicle fleet comprised of seven (7) vehicles; three vans, two hybrid sedans, and two traditional gas sedans. Two of the three vans are used daily, in performance of the department's courier runs from Rancho Cordova to the downtown Sacramento area, while the third can be booked for trips requiring more seating or storage capability. The majority of both courier runs take place on paved highways, with city driving also occurring, but to a lesser extent. The courier runs are staggered, each taking approximately 2.5 hours to complete. Outside of their regularly scheduled runs, the courier vans are only used sporadically. Courier vans are stored at the Department's warehouse location.

Using CDT's Vehicle Reservation Program, employees making work-related trips can reserve any of the other CDT fleet vehicles, excluding the two courier vans. These trips are generally short distances within the greater Sacramento area, but can occasionally extend to the Bay Area or Southern California. The majority of travel for all of CDT's fleet vehicles is a combination of city and highway.

Graph 1: Composition of Department's Light Duty Fleet



CDT's fleet currently averages 28.22** miles per gallon and 60,533 lbs. of CO_2 emitted. These figures continue a five-year trend and improve upon 2016's yearly averages of 26.88 miles per gallon and 63,897 lbs. of CO2 by 4.9% and 5.6%, respectively. CDT strives to continue to reduce its carbon footprint and to meet its sustainability goals.

**Per DGS Office of Fleet Management

Table 1: Total Purchased Fuel 2016

Purchased Utility	Quantity	Cost ($)
Gasoline	3090 Gallons	$ 8,253.73
Diesel	0 Gallons	$ 0
Renewable Diesel	0 Gallons	$ 0
TOTAL GGE	**3090 Gallons**	**$ 8253.73**

Incorporating ZEVs into the State Fleet

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

The Department of Technology (CDT) has a fleet of seven (7) vehicles that are leased from DGS Office of Fleet and Asset Management (OFAM). CDT will request that these vehicles be replaced with ZEV's when they become available for replacement, if practical. Currently, DGS runs a replacement report annually to determine which vehicles meet or come close to meeting the age and mileage replacement thresholds. Of our current fleet, we do not have any vehicles coming close to the replacement thresholds. Vehicles over meet 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 3 vehicles in our fleet that are currently eligible for replacement in vehicle classes for which ZEVs are

available on contract. The Department is working with DGS to determine when the vehicles can be replaced.

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	1	0	0	2	3

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.

The Department does not currently purchase vehicles. All fleet vehicles are leased from DGS-OFAM.

Table 3: ZEV Additions to the Department Fleet

Table Header Format	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Battery Electric Vehicle								
Plug-in Hybrid Vehicle					3			
Fuel Cell Vehicle								
Percent of total purchases								
Required ZEV Percentage	10%	10%	10%	15%	20%	25%	30%	35%
Total number of ZEVs in Fleet								

Telematics Plan

Telematics is a method for monitoring vehicle use. Using GPS and 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.

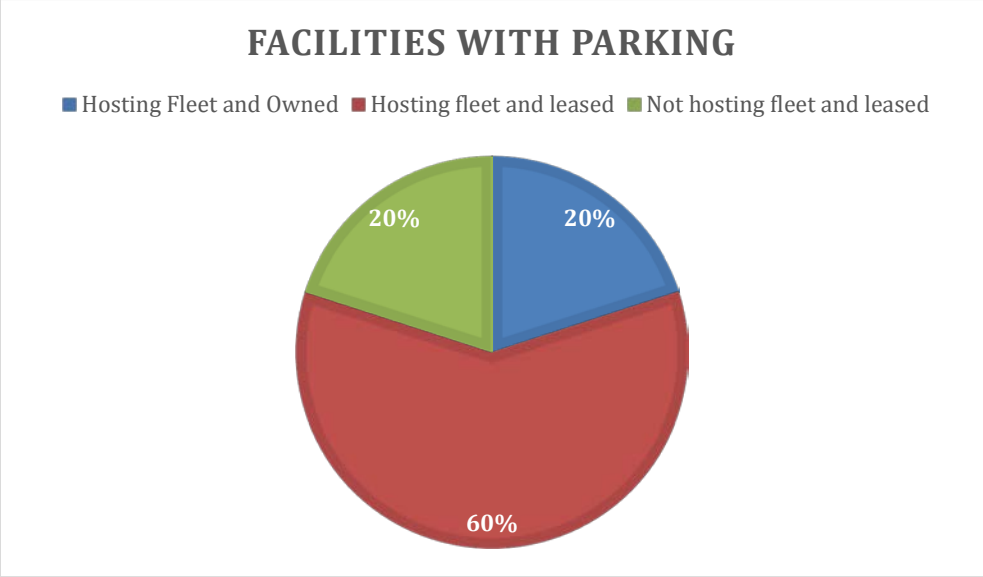
DGS has a plan to install telematics on its daily and monthly rental vehicles once the statewide contract is executed. However, because the installation of telematics requires union involvement, to install it on all leased vehicles will require significant coordination with DGS' customer departments. The contract is still in the beginning stages of possible telematics integration per DGS. When the telematics contract is approved, DGS will begin reaching out to their leased customer departments to coordinate these efforts.

ZEV INFRASTRUCTURE

Introduction to the Department of Technology Parking Facilities

The Department of Technology operates one state owned facility and four leased facilities. The parking lots are for employees, visitors, and customers and are not physically separated. The department hosts fleet vehicles at four of the facilities and parking spaces are reserved for their use.

Graph 2: Parking Facilities



Given the nature of the department's fleet operations, the length of stay for visitors and employees we have determined that it is appropriate for L2 chargers make up approximately 1% of chargers in employee parking areas and 25% of chargers in fleet parking areas. This was directed in large part by the Governor's Executive Order B-16-2012 and DGS implementation plan of this order. Additionally, we also surveyed employees in 2014 during LEED certification and are slated to again in spring 2018 to help assist in potential rising charging station needs.

Based on estimates of future ZEV fleet vehicles and a count of visitor and workplace parking spaces it has been determined that the Department will need 8 L2 chargers to adequately serve the facility parking lots and achieve the goals established in the ZEV Action Plan.

It is important to note that CDT can only control the future number of parking spaces for EVSE at the state owned Gold Camp Data Center. CDT has proactively worked with DGS to include additional L2 chargers and associated reserved parking spaces in facility lease renewals. Based on estimates and observed demand for visitor, employee, and fleet vehicles EVSE parking stalls, CDT will continue to seek to add the appropriate number of charging stations in all future lease negotiations.

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

Table 4: High Priority EVSE Projects

Facility Name	Total Parking Spaces	Existing L1 Chargers	Existing L2 Chargers	New L1 Chargers Needed	New L2 Chargers Needed
CDT Gold Camp Data Center	386	0	2*	0	8*
Total	386	0	2	0	8

* L2 chargers are dual models that serve 2 parking spaces concurrently.

Outside Funding Sources for EV Infrastructure

CDT plans to take advantage of SMUD incentive programs to offset the cost of purchasing L2 charging stations. The current incentive offers $1,500 per charger port which would represent a 48% savings versus the list price paid for each L2 charging station. CDT will continue to look for any and all means for outside funding of EV infrastructure in the future.

Hydrogen Fueling Infrastructure

The need for Hydrogen fueling infrastructure is currently in the early stages of evaluation. Should the demand surface, CDT will look into practical means for the installation of the needed 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.

Table 4: 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
CDT Gold Camp Data Center	0	2	TBD*	0	8
Total					

* Cost to be determined by engineering study listed in EVSE Construction Plan

EVSE Construction Plan

CDT has hired an outside firm (Criterion Critical Systems) to assess and perform an engineering study on the current and future infrastructure needed to support additional level 2 charging stations. The engineering study will include professionally stamped electrical, and civil (site) drawing suitable for construction. It is anticipated that this study will be completed by May of 2018. Gold Camp Data Center is also in the process of having solar canopies built as part of a PPA (Power Purchase Agreement) project led by DGS. CDT will work with DGS and the solar PPA

contractor to have conduit run to locations identified on the engineering study for future EV charging stations. The solar canopy construction is scheduled to be completed by July of 2018. Leveraging the electrical conduit infrastructure in place, CDT plans to release an IFB in the fall of 2018 for the installation of the transformer and wiring needed to support an initial 8 L2 charging stations with capacity to add four additional in future locations. Based on tracking the use and demand on the existing L2 charging stations, the department may execute a contract by the beginning of FY 18/19 for additional L2 chargers.

EVSE Operation

Working with Charge Point, the Department of Technology upgraded its infrastructure to support level 2 EVSE. Charge Point's graphical user interface (GUI) allows CDT EV administrators to generate environmental reports and analytics to track GHG savings and energy usage.

CDT installed level 2 charging stations at their Gold Camp Data Center campus and at their leased facility, Prospect Green campus in 2016. CDT's Facilities unit is responsible for overseeing the department's electric vehicle (EV) program, which includes, enforcing the EV guidelines, maintaining EV user database, and general upkeep of the machines. At the Gold Camp facility, the onsite building engineers are responsible for repairing the EV stations in the event they require maintenance. If parts need to be purchased, the Facilities unit would purchase from the ChargePoint parts catalog negotiated by the DGS state contract.

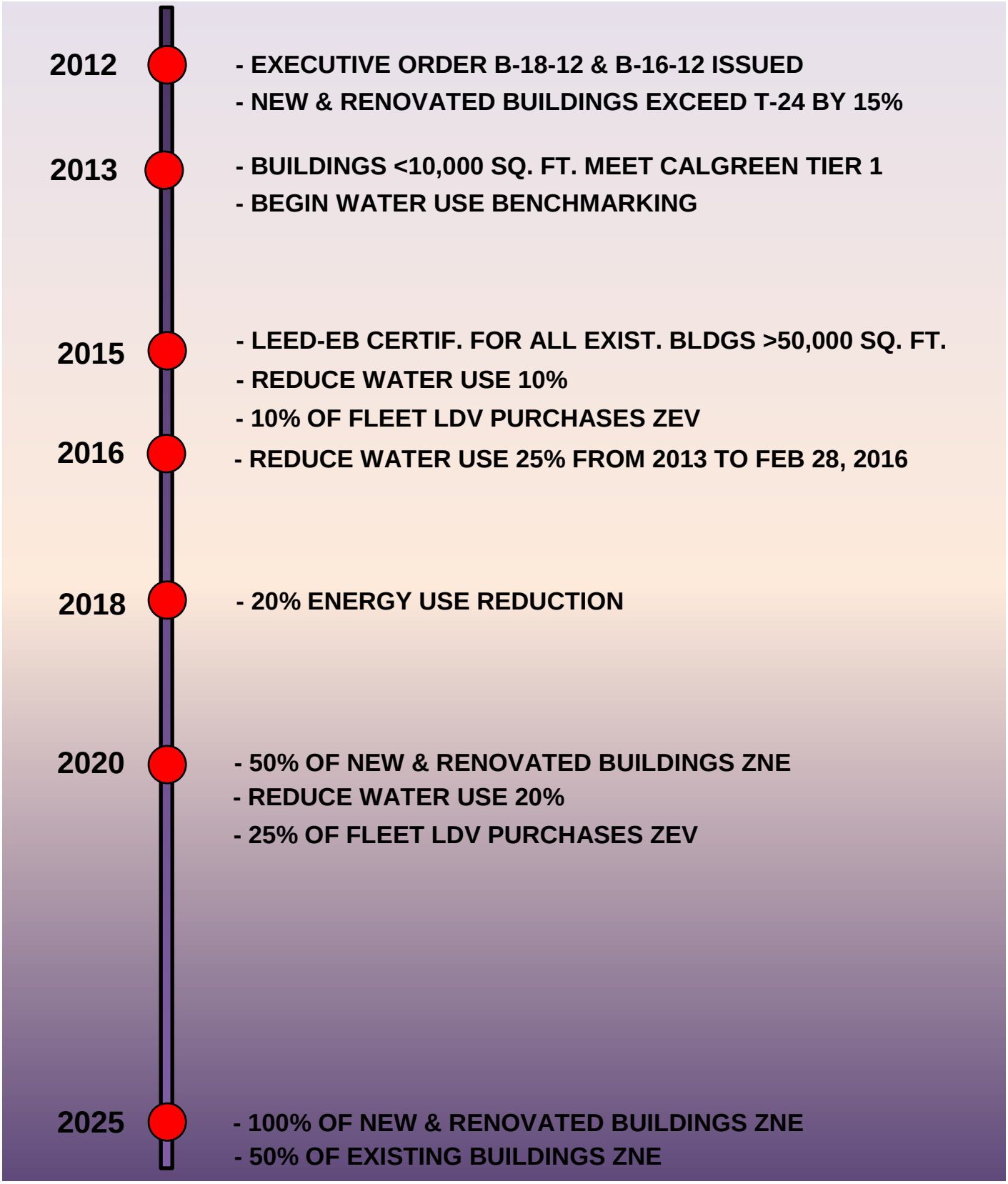
A three year parts and service warranty was purchased for the EV charging stations at the Prospect Green Campus. The warranty covers all damage and service work to be completed by a ChargePoint approved technician. Per Management Memo 16-07, CDT has elected not to charge a monetary fee for use of the EV charging stations at any of their locations and the Department's actions are considered a public benefit.

ChargePoint's website also serves as a database for CDT's electric vehicle users and can track individual statistics. In addition, Charge Point provides the option to provide major oversight on the EV charging units, limiting access to employees and visitors only. In the near future, CDT will be implementing an EV reservation policy providing the following options:

- Maximum time limit for charging
- EV drivers reserving chargers in advance
- Queue notification when it is their turn to charge vehicle
- Time limit to move vehicle to allow the next driver to use the charger

CDT does not currently enforce a cost policy for using the EV chargers. However, Charge Point's GUI provides flexibility to build a pricing policy best suited for the department's needs.

SUSTAINABILITY MILESTONES & TIMELINE



DEPARTMENT STAKEHOLDERS

Incorporating ZEVs Into the Department Fleet	
Program Services Unit	Albert Lacy, Fleet coordinator

Telematics	
Program Services Unit	Albert Lacy, Fleet coordinator

Outside Funding Sources for ZEV Infrastructure	
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Hydrogen Fueling Infrastructure	
Facility and Administrative Services Branch	Mark Standley, Facility and Administrative Service Branch Manager Ian Noumov, Senior Information Systems Analyst Sarah Do, Sustainability Coordinator

Comprehensive Facility Site and Infrastructure Assessments	
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EVSE Construction Plan	
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