Sustainability Roadmap 2020-2021

California Department of Technology

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

California
DEPARTMENT OF TECHNOLOGY

Gavin Newsom, Governor

December 2021

California Department of Technology Roadmap

Sustainability Road Map 2020-2021

California Department of Technology

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Executive Summary

The California Department of Technology (CDT) Rancho Cordova Data Center provides IT infrastructure services to its customers, for their public facing and mission critical systems, and offers a myriad of cloud and on premise services. The Department also employs a strategic focus on innovation, enterprise, and workforce development solutions to expand the state's operational capacity and provide the agility and scalability necessary to keep pace with the ever-changing demands of doing business.

CDT has implemented significant energy and water efficiency strategies at its mission-critical, LEED Platinum and ENERGY STAR® rated data center in Rancho Cordova. These strategies include solar canopies in the parking lot, site-wide power, lighting, and computer room equipment mechanical upgrades and real-time cooling system control. This strategic implementation reduced grid based energy use at the data center by 4.05 million kilowatt-hours annually, equal to the energy used by 376 homes, and saves up to a million gallons of water per year. Energy efficiency and water conservation initiatives currently underway include server virtualization through cloud computing, improved computer room cooling efficiencies, replacement of cooling towers with more efficient models and adding electric vehicle charging stations.

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 have consolidated their IT equipment into CDT's Rancho Cordova data center, including equipment from two of CDT's former data centers, which were decommissioned in 2010. Although energy, water, and GHG emissions increased at CDT's state-owned data center due to these consolidation efforts, overall state departmental totals from data center operations were significantly reduced.

Executive Order B-30-15 has declared climate change to be a threat to the well-being, public health, natural resources, economy, and environment of California. For the CDT and its mission critical data center, climate change

certainly has an effect. A future increase in average maximum temperatures will negatively affect Power Usage Effectiveness (PUE), water usage, power usage, and reduce overall cooling performance. CDT anticipates this will not affect the structural integrity or staff/occupant health and safety of the Rancho Cordova Data Center. An increase in extreme heat will, however, affect the useful life of the cooling and backup power generation equipment. Strategies implemented from 2017 and 2018 to reduce the impact of temperature change include: installation of a cool roof, re-designed landscaping, installation of solar canopies, and HVAC equipment replacement. As we move towards the end of the century, where average temperature is expected to rise significantly, CDT will adapt and upgrade equipment as needed to remain operational and as efficient as possible.

As part of the Governor's 10-year plan to reduce GHG 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. The single largest challenge CDT faces in meeting the Governor's goals for the Rancho Cordova Data Center is that the computer room directly supporting the data processing and critical cooling systems consumed 91% of the electricity and 49% of the natural gas purchased in 2018 for use by the facility.

To reduce energy consumption, CDT invested in cold aisle containment and installed a Vigilent Dynamic Cooling Management system. In addition, CDT's five-year capital improvement plan includes several energy efficiency infrastructure upgrades for the Rancho Cordova Data Center. Executive Order B-18-12 requires that 50% of all state-owned buildings be Zero Net Energy (ZNE) by 2025. CDT will meet the ZNE requirements only when isolating the office space from the computing facility at the Rancho Cordova Data Center facility.

From the first day of operation, CDT incorporated an energy management control system (EMCS) from Automated Logic Corp (for power) and Alerton (for HVAC). These original systems gave facility and engineering staff insight into where power and natural gas was being used. This enabled set point changes to be adjusted to increase reliability, availability, and energy savings for the building. Over time, the department has made upgrades to the EMCS system to increase the number of monitoring and control points to optimize and increase efficiency.

As California faced an unprecedented drought, the CDT has taken several measures to improve water efficiency throughout its Rancho Cordova Data

Center facility. With an estimated 72% of the facility's water use attributed to cooling the facility's computer room, emphasis is placed on identifying ways to more efficiently use water for this purpose. One approach has been to maximize the effectiveness of the open loop cooling systems through precise monitoring of water quality, which in turn increases the number of circulation cycles before blowdown occurs. CDT has also either replaced or retrofitted all toilets, urinals, faucets, and showerheads. These changes have helped to minimize water waste. Additionally, the Department installed a new efficient landscape drip irrigation system in the spring of 2016. Nearly all grass turf was replaced with mulch or decomposed granite. Since the project was completed, an annual savings of over one million gallons has been realized. CDT continues to explore the latest cooling technology advances and is evaluating proposals to replace a majority of the open loop cooling system with closed looped air cooled chillers. Early concept estimates indicate the data center may be able to save 7.5 million gallons a year on indoor water use with the air cooled systems.

CDT achieved the Governor's goal of reducing greenhouse gas (GHG) emissions by 20% through data center consolidation. In February 2020, CDT achieved LEED-EB (Leadership in Energy and Environmental Design for an Existing Building) Platinum status for its Rancho Cordova Data Center. This was accomplished with the combined effort of an energy consulting firm, the Department's building engineering contractor, and CDT's facility staff. In the process of obtaining LEED certification, an American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) level 2 energy audit was conducted on the Rancho Cordova data center.

CDT is aware of the significance of maintaining appropriate indoor environmental quality (IEQ) and ensures all alterations, modifications, maintenance repairs, and cleaning procedures are performed in accordance with the California Green Building Standards code. Additionally, CDT requests its contracted pest management vendor to follow an integrated pest management (IPM) strategy that focuses on long-term prevention of pest problems. In similar respect, CDT emphasizes the importance of purchasing energy efficient and sustainable products. CDT is committed to following DGS's Environmentally Preferred Purchasing Program (EPP) and the Federal Energy Management Program (FEMP).

Incorporating sustainable practices within the Department of Technology saves money, which translates into lower rates for our customers and also benefits the environment. CDT also seeks to lower state government's "ecological footprint"

by actively advising other state departments on how to reduce the amount of energy used to power and cool IT equipment.

While the Department has made great strides in improving the sustainability of its nearly two decades-old Rancho Cordova Data Center, it is committed to continuing this effort into the future.

Russ Nichols,

Acting Director, and Acting Chief Information Officer

CHAPTER 1 - CLIMATE CHANGE ADAPTATION

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).

CDT uses the assumption that the current state-owned data center will have an additional 23 years of effective use. CDT's rolling 15-year infrastructure plan will continue to consider climate change throughout the full lifespan of the data center. While the current role as a primary state data center may not last this expected duration, some hosting of legacy systems and networking equipment is anticipated over the remaining facility lifespan. The general increase in expected temperatures will require an intelligent plan of mechanical and electrical equipment replacement to maximize efficiency (keeping increases in utility costs to a minimum) and preventing statewide data processing outages due to facility equipment failure.

To date, CDT replaced original infrastructure equipment with equipment that can operate in higher temperature ranges while offering the same or greater capacity for data center support. While the choice of more efficient equipment is a priority, the desire for energy savings balances with the selection of equipment that has an extended operating safety margin. This margin ensures that anticipated worse case temperature conditions over the next 23 years will not cause catastrophic equipment failure. CDT believes the approach taken will leave the department well prepared for expected climate change events.

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)).

CDT is working with the Sacramento Tree Foundation and the City of Rancho Cordova to plant natural infrastructure like native trees to help reduce the impact of higher temperature days. Additionally, building engineers and landscaping staff actively inspect and maintain the drainage system to prevent flooding incidents.

Understanding the Potential Impacts of Facilities on Communities

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

Climate change disproportionately impacts vulnerable communities, with certain populations experiencing heightened risk and increased sensitivity to climate change and have less capacity to recover from changing average conditions and more frequent and severe extreme events. A number of 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.

Understanding Climate Risk to Existing Facilities

Risk from Changing Extreme Temperatures:

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

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

Facility Name	Extreme heat threshold (EHT) °F	Avg. # of days above EHT (1961-1990)	Avg. # of days above EHT (2031-2060)	Avg. # 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)
CDT Rancho Cordova Data Center	103.92	4.45	23.36	46.79	18.91	42.35

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)
CDT Rancho Cordova Data Center	74.35	79.38	5.02	83.13	8.78

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)
CDT Rancho Cordova Data Center	49.59	53.94	4.34	57.81	8.22

Heating and Cooling Degree Days

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

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

Facility Name	Heating/Cooling Degree Days (1961-1990) (HDD/CDD)	Heating/Cooling Degree Days (2031-2060) (HDD/CDD)	Heating/Cooling Degree Days (2070-2099) (HDD/CDD)
CDT Rancho Cordova Data Center	2511/1403	1661/2443	1217/3213

There is a definite sensitivity of operations to change in temperature. An increase in mean maximum temperature would increase water usage, power usage and

reduced overall cooling performance. There is no anticipated impact to facility structural integrity or occupant health and safety. An increase in extreme heat events would affect useful life of the Data Center's cooling equipment. The facility can operate independently, using on-site diesel generators for an extended period of time in the event of a utility failure.

To reduce the impact of changing temperatures, the Department installed a cooler, more reflective roof, and are in the process of developing a contract for the planting of native trees and drought resistant vegetation by the fall of 2022. In addition, the 2018 installation of the solar canopies has provided added square footage of shade to the facility parking lot. There is a strategy in place to replace HVAC equipment to a more energy efficient and effective system. Additionally, the Department utilizes an employee awareness campaign to make employees aware of changes to the buildings during temperature changes. Based on the rolling 15-year plan, climate adaptation will be considered for mechanical equipment, but in the event of potential catastrophic failure, a planned shutdown and replacement of the data center facility will be implemented.

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.

Table 1.4: Facilities Located in Urban Heat Islands

Facility Name	Located in an urban heat island (yes/no)
CDT Rancho Cordova Data Center	No

CDT has a large employee parking lot; however, to reduce the facility's contribution to the urban heat island, CDT installed solar canopies to provide additional shade to the facility parking lot. In addition, the Department will continue to explore improved landscaping options. While the Department does not reside in an urban heat island, CDT will continue to monitor the situation and will reevaluate when deemed necessary.

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

Facility Name	Annual Mean Max. Precip. (1961 – 1990) (in/yr)	Annual Mean Precip. (2031 – 2060) (in/yr)	Percent Change by mid-century	Annual Mean Precip. (2070 – 2099) (in/yr)	Percent change by end of century	Extreme Precip (1961-1990) (in/day)	Extreme Precip (2031-2060) (in/day)	Extreme Precip (2070-2090) (in/day)
CDT Rancho Cordova Data Center	20.12	23.09	15%	24.46	22%	4.20	4.35	5.10

Although the provided table shows increases in annual precipitation, CDT bases planning on climate models that show extended future drought conditions. If extended drought conditions require the facility to use less water, the lifespan and reliability of the cooling equipment would diminish.

To reduce the impact of facility performance due to changing precipitation, the Department considered the following strategies:

- Recapture cooling tower grey water in the event of drought conditions.
- Replace open cooling systems with close looped systems to conserve water resources.

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 1.6 : All Facilities at Risk from Rising Sea Levels

Facility Name	Tide Chart Region	2050 Water Level (ft)	Exposed at 2050? (y/n)	2100 Water Level (ft)	Exposed at 2100? (y/n)
CDT Rancho Cordova Data Center	Delta	N/A	N/A	N/A	N/A

The Rancho Cordova facility is not currently located in an area that is considered the coastal zone or vulnerable to coastal flooding.

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[1]. 2017 and 2018 previously set records as the most destructive fire seasons in California's history[2]. To contextualize how wildfire hazards already

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

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

impact California's facilities, consider that 1 in 5 California children were affected by wildfire-related school closures during the 2018-2019 school year[3].

Table 1.7: Top 5-10 Facilities Most at risk to current wildfire threats

Facility Name	Fire Hazard Severity Zone (low, medium, high, very high)
CDT Rancho Cordova Data Center	N/A

Table 1.8: 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)
CDT Rancho Cordova Data Center	0	N/A	N/A

From Wildfire Technical Report prepared for California's 4th Climate Change Assessment (section on Spatial and Temporal Domain, page 2):

"Areas of the state outside the current combined fire state and federal protection responsibility areas have been excluded. This primarily excludes parts of the state landscape intensively converted to human uses— agricultural and urbanized areas—where large wildfires are uncommon and local fire protection is chiefly concerned with structure fires and small vegetation fires."

According to the CalFIRE report on Fire Hazard Severity Zones, CDT Rancho Cordova Data Center is part of an Incorporated Local Responsibility Area and its severity zone is therefore unidentifiable. CDT Rancho Cordova Data Center is also out of the area designated by CalAdapt for a wildfire risk and there is no data on acres burned to report.

Summarizing Natural Infrastructure Actions to Protect Existing Facilities

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

In summary, CDT is taking several proactive steps in reducing the risk of climate change to its existing facilities. Original infrastructure equipment has been replaced with equipment that can operate in higher temperature ranges. The Department installed a cooler, more reflective roof and completed the installation of solar canopies to shade the facility parking lot. Additionally, building engineers and landscaping staff actively inspect and maintain the drainage system to prevent flooding incidents.

Understanding the Potential Impacts of Facilities on Communities

As described at the beginning of the chapter, impacts on communities must be considered for resilience planning for State assets and buildings.

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 1.9: Facilities located in disadvantaged communities

Facility Name	CalEnviroScreen Score	Is it located in a disadvantaged community? Yes/No
CDT Rancho Cordova Data Center	56-60	No

Our building is not located in an identified Disadvantaged Community. As such, our Data Center provides no social services to people of the public. As a high security facility, we are unable to provide access to the public during emergencies.

Understanding Climate Risk to Planned Facilities

CDT currently has no plans to change facilities locations; however, should the need arise we would stay in the Rancho Cordova area.

Integrating Climate Change into Department Planning and Funding Programs

Table 1.10: Integration of Climate Change into Department Planning

Plan	Have you integrated climate?	If no, when will it be integrated?	If yes, how has it been integrated?
CDT Rancho Cordova Data Center	Yes	Climate change currently integrated into Department 15-year planning timeline	Department uses full LCCA planning for current facility equipment replacement, maintenance and operations, and future facility design and operation. The current facility has been designed and has operational procedures in place to be able to adapt to climate change while continuing to meet its required mission critical role.

Table 1.11: Engagement and Planning Processes

Plan	Does this plan consider impacts on vulnerable populations?	Does this plan include coordination with local and regional agencies?	Does this plan prioritize natural and green infrastructure?
CDT Rancho Cordova Data Center	N/A	Yes	Yes

Table 1.12: Climate Change in Funding Programs

Grant or funding program	Have you integrated climate change into program guidelines?	If no, when will it be integrated ?	Does this plan consider impacts on vulnerable populations?	Does this program include coordination with local and regional agencies?
Revolving Fund	Yes	N/A	N/A	Yes

Measuring and Tracking Progress

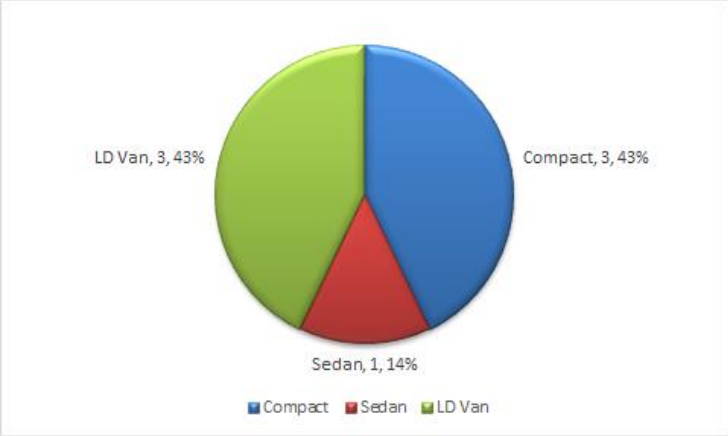
CDT plans to measure progress toward departmental goals with continued investments in monitoring tools for the accurate measurement of energy and water use. There is full accounting of energy efficiency measure costs, savings, and environmental impact. The Department forecasts the facility's cost as far into the future as possible to determine impact to customer rates and funding sources. The Office of Administration is developing a policy to integrate climate change into all infrastructure investment. Additionally, continued use of the rolling 15-year infrastructure plan will be utilized for investment prioritization and advanced customer rate planning.

CHAPTER 2 – ZERO-EMISSION VEHICLES

CDT 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.

Graph 2.1: 2020 Composition of Vehicle Fleet



Light Duty Fleet Vehicles

CDT has a light-duty vehicle fleet comprised of seven (7) vehicles; three vans (two caravans and one cargo), one hybrid sedan, and three pure electric compact cars. 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.

In 2019, CDT averaged 20.33 miles per gallon and increased almost 25% in 2020 as on older cargo van was upgraded to a more efficient, newer vehicle. We also swapped two gas sedans (one was a hybrid) for two PURE EVs, which is not calculated into the MPG average. This alone made a great difference in Total Fuel Use, which dropped by 600 gallons over the year. The fleet composition remains the same albeit much cleaner overall. CDT strives to continue to reduce its carbon footprint and to meet its sustainability goals.

Graph 2.2: 2020 Composition of Light Duty Vehicle Fleet

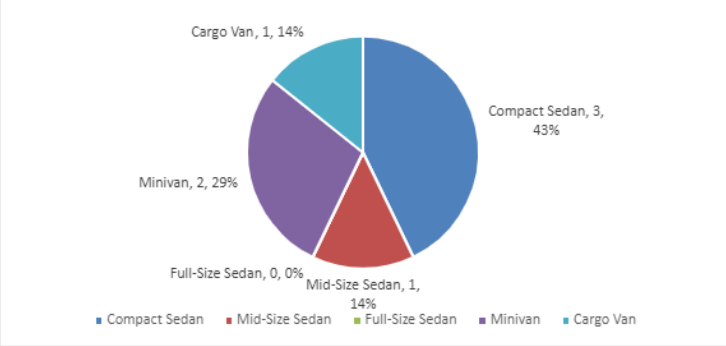


Table 2.1: Total Fuel Purchased in 2020

Description	Diesel	Gasoline	Renewable Diesel
Fuel Amount Gallons	N/A	2,006.67	N/A

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 1st, 2020, to purchase vehicles from authorized Original Equipment Manufacturers (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.

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.

CDT has been successful in converting their fleet to that of a primarily ZEV fleet. Currently, four of the seven vehicles are electric vehicles (one being a hybrid). These vehicles are all beneficial to the fleet and there are no vehicle classes missing that the Department would need to carry out its state functions.

Vehicles over the 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 is currently one vehicle in our fleet that are eligible for replacement in vehicle classes for which ZEVs are available on contract.

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

Status	Sedans	Minivans	Pickups	SUVs, 5 passengers	SUVs, 7 passengers	Total
# of vehicles eligible for replacement	-	1	-	-	-	1

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 2.3: Light Duty ZEV Additions to the Department Fleet

Type of Vehicle	21/22	22/23	23/24	24/25	25/26
Battery Electric Vehicle	0	1	0	0	0
Plug-in Hybrid Vehicle	0	0	0	0	0
Fuel Cell Vehicle	0	0	0	0	0
Percent of total purchases	0	100 %	0	0	0
Required ZEV Percentage	35%	40%	45%	50%	55%
Total number of ZEVs in Fleet*	4	5	5	5	5

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Table 2.4: ZEV Additions to the Department Fleet

Type of Vehicle	21/22	22/23	23/24	24/25	26/27
Battery Electric Vehicle	-	1	-	-	-
Plug-in Hybrid Vehicle	-	-	-	-	-
Fuel Cell Vehicle	-	-	-	-	-
Percent of total purchases	-	100 %	-	-	-

Total number of ZEVs in Fleet	4	5	5	5	5

ZEV Take-home Vehicles

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

CDT currently does not issue home storage permits and all the vehicles remain on site.

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.

DGS is planning to install telematics on its daily and monthly rental vehicles once the statewide contract has been executed. At that point, they would then begin installing the telematics devices on DGS-leased vehicles and agency-owned vehicles throughout the state. This was projected to be executed in late fall 2019, however at this time CDT is still waiting for further direction from DGS and does not have telematics devices installed on any of our vehicles.

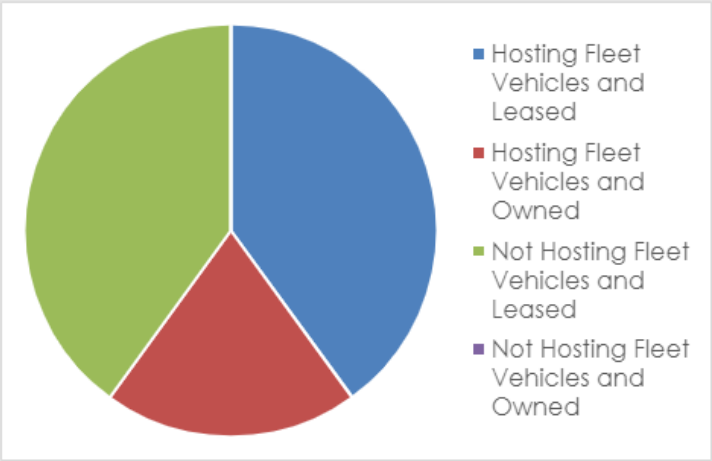
Public Safety Exemption

Management Memo 16-07 changed the requirements for Public Safety Exemptions, however CDT does not employ any sworn peace officers at this time.

Department of Technology Parking Facilities

The Department of Technology operates one state owned facility and four leased facilities. The parking lots are for security, employees, visitors, vendors and customers. The CDT-owned Rancho Cordova Data Center is gated and includes 316 shaded solar covered parking spots. The department hosts fleet vehicles at three of the five facilities and parking spaces are reserved for their use. The Rancho Cordova data center hosts two vehicles, Croydon Warehouse hosts four, and the PG1 campus holds one fleet vehicle.

Graph 2.3 Facilities with Parking



Given the nature of the department's fleet operations and the length of stay for visitors and employees, we have determined that it is appropriate for L2 chargers to make up approximately 4.5% of chargers in employee parking areas and 50% of chargers in fleet parking areas. This was directed in a large part by the Governor's Executive Order B-16-2012 and DGS implementation plan of this order.

It is important to note that CDT can only control the future number of parking spaces for EVSE at the state-owned Rancho Cordova 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 Rancho Cordova site added eight L2 dual port chargers in 2020. This allows 16 more parking spaces for EV charging. The BTC chargers were purchased under the DGS statewide contract, ensuring Energy star compliance. This project was in partnership with SMUD and the Sacramento County CALeVIP charger rebate program. Rebate programs will offset costs of installation and purchase of EV chargers by $77,000. In addition, our leased facilities have 13 Ports available of Level 2 chargers and 4 Charging Ports with Level 3 Chargers.

By 2025 CDT will add one accessible parking space for EV charging at the Rancho Cordova data center site. The current numbers are listed below.

Table 2.5: High Priority EVSE Projects

Facility Name	Total Parking Spaces	Existing L1 Charging Ports (2020)	Existing L2 Charging Ports (2020)	Existing L3 Charging Ports (2020)	Total Charging Ports (2020)	EV Charging Ports Needed by 2025
3101 Gold Camp Drive	386	0	20	0	20	21
10860 Gold Center Drive	275	0	13	4	17	0
10911 White Rock Road	130	0	0	0	0	0
10173 Croydon Way	15	0	2	0	2	0
1325 J Street	72	0	0	0	0	0
Total	878	0	35	4	39	40

Outside Funding Sources for EV Infrastructure

CDT applied for the SMUD and CAleVIP Sacramento County Incentive programs. to offset the cost of purchasing and installing eight L2 charging stations. This project was in partnership with SMUD and Sacramento County

CALeVIP charger rebate program. The rebate program will offsite costs of installation and purchase of EV chargers by $77,000.

Hydrogen Fueling Infrastructure

The need for hydrogen fueling infrastructure is under continuous evaluation. Should the demand surface, CDT will investigate 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.

CDT hired an outside firm (Criterion Critical Systems) who completed an engineering study in the summer of 2018 to determine the infrastructure needed to support additional level 2 charging stations. CDT also partnered with SMUD to approve installation plans.

As part of a future DGS CRUISE request for site security improvement a complete ADA assessment of the parking lot, including EV accessibly will be included in the scope.

Table 2.6: Result Facility Site Assessments

Facility Name	L1 Chargers with Electrical System Upgrades	L2 Chargers with Electrical System Upgrades	Total cost for Project using Upgrades Electrical System	L1 Chargers with Current Electrical System	L2 Chargers with Current Electrical System
Rqncho Cordova	0	16	$118,000		
Total	0	16	$118,000		

EVSE Construction Plan

The Rancho Cordova site added eight L2 dual port chargers in 2021. This allows 16 more parking spaces for EV charging. The BTCPower chargers were purchased under the DGS statewide contract, ensuring Energy star compliance.

This project was in partnership with SMUD and Sacramento County CALeVIP charger rebate program. The rebate program will offset costs of installation and purchase of EV chargers by $77,000.

In the future, we intend to install one dual port accessible EV charger to serve one ADA parking space. This will meet the requirements of the 22 charging ports by 2025.

EVSE Operation

Working with Charge Point's graphical user interface (GUI) allows CDT EV administrators to generate environmental reports and analytics to track GHG savings and energy usage. EVSE operation and monitoring is done through the Charge point Dashboard. The Facility unit monitors usage daily. Employees are granted access through Our Icentral Intranet page to sign up. Using the chargers are on a first come basis and we do not allow reservations. CDT is not looking to charge employees for the use of the chargers at this time.

CDT has 4 ChargePoint Chargers still in operation with the networks active.

CHAPTER 3 - ENERGY

CDT Mission and Built Infrastructure

Under the direction of the California Government Operations Agency, the California Department of Technology (CDT) maintains statutory authority over Information Technology (IT) projects and operates the state's data centers. CDT 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.

The Rancho Cordova facility, which is owned by the Department of Technology, is 154,250 square feet and divided into a computer room space (41,544 sq. ft.) and an office/computer room support space (92,444 /20,262 sq. ft). The computer room and support space that directly support the data processing and critical cooling systems for the computer room consume 91% of the electricity and 49% of the natural gas used by the facility. For the purpose of the comparison the office/computer support space is split 60/40 between the office and computer room 92,444 + 12,153 sq. ft = 104,597

Table 3.1: Total Purchased Energy 2020

Purchased Energy	2003 Baseline Quantity		2020 Quantity		% Qty. Change
Electricity	9,307,862	kWh	16,465,616	kWh	76.9%
Onsite Solar	0	kWh	1,785,000	kWh	N/A
Less EV Charging	0	kWh	27,529	kWh	N/A
Natural Gas	25,733	therms	13,068	therms	-49.2%
TOTALS	**34,331,725**	**kBtu Site**	**63,483,973**	**kBtu Site**	**84.9%**

.

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)
Rancho Cordova Data Center	154,250	63,483,973	178,097,703	1,115
Total for All Department Buildings	154,250	63,483,992	63,483,992	1,115
% of Totals	100%	100%	100%	---

Table 3.2A: Adjusted Energy Consumption for with Data Processing Usage Removed

Building Name	Floor Area (ft^2)	Site Energy (kBTU)	Source Energy (kBTU)	Source EUI ($kBTU/ft^2$-yr)
Rancho Cordova Data Center	104,597	5,713,558	16,028,792	153
Total for All Department Buildings	104,597		16,028,792	153
% of Totals	100%	100%	100%	---

- For table 3.2A the computer room and central plant square footage, that directly supports data processing, has been removed from the building total. The remaining square footage for office space and circulation is 104,597 sq. ft.
- CDT directly measures the circuit breakers that provide power to the office for air conditioning, lighting and plug loads. For the energy used by the chiller to support the office air conditioning; CDT measures the flow and entering/exit temperature of the water and converts it to tonnage and then to kW.
- The sum of the office usage is applied to the modified building floor area to calculate adjusted Site, Source kBTU, and Source EUI.
- The single largest challenge CDT faces in meeting the Governors' goals for the GC facility is the large percentage of process energy used in support of the IT systems housed in computer room. Table 3.2A above illustrates the impact to the energy use profile for the building when it is divided between traditional office and data center.

- CDT has led 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 GC, including equipment from two of CDT's data centers (in the amount of 62,000 sq. ft.), 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's Rancho Cordova Data Center facility is mission critical and provides information technology services to many state, county, federal and local government entities throughout California. To meet required energy reductions, many state departments consolidated their IT equipment into Rancho Cordova's ENERGY STAR® rated data center, including equipment from two of CDT's data centers, which were decommissioned in 2010. Although energy 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 implemented significant energy efficiency strategies which include site-wide power, lighting, and computer room equipment mechanical upgrades and real-time cooling tower control and monitoring equipment installation. Future energy improvement initiatives include server virtualization through cloud computing, improved computer room cooling efficiencies, replacement of cooling towers with more water-efficient models, and solar panel installation in the parking lot.
- California Department of Technology invested in cold aisle containment. This project involved the installation of barriers to separate different parts of the data center, to help maximize efficiency by containing the hot air produced by the data center equipment. This project has resulted in improved the power utilization effectiveness (PUE) by 7%.
- CDT installed solar panels at the Rancho Cordova Data Center facility parking lot. The panels were financed via a power purchase agreement (PPA). The solar panels contribute approximately 10% of total energy demand.
- CDT participated and later expanded on a DOE grant for the Installation of a Vigilent Dynamic Cooling Management system. System monitors temperatures throughout computer room and allocates cooling from the 36 computer room air handlers to efficiently respond, with real time pinpoint precision, to the demands of IT equipment. It is estimated that the

Vigilent system has reduced computer room air handler fan energy usage by 50% versus a traditionally controlled mechanical system.

- CDT has worked extensively with SMUD and is a participant in various SMUD incentive programs.

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

CDT Rancho Cordova campus is separated into two construction types and separated by a 4-hour fire wall. The total building area is 154,250 sq. ft. and is broken down as so:

- First and Second Floor, main building type II F.R.: 133,988 sq. ft.
- Single story Central plant, type II-N: 20,262 sq. ft.
- CDT's total building area: 154,250 sq. ft.
- On the first floor of the main building, 41,544 square feet is dedicated to the computer room and 12,153 square feet in the central plant is directly allocated for computer room support.

The solar canopy system produced 1,785,000 kWh in 2020 and the office space usage is estimated at 1,640,078 kWh (table 3.2A). Natural gas usage needed to support the office would be 5,560 therms.

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	N/A	N/A	N/A
% ZNE by 2025	N/A	N/A	N/A

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.

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	N/A	N/A
Under Design or Construction	N/A	N/A
Proposed Before 2025	N/A	N/A

The California Department of Technology has no plans of constructing new buildings or designing new major renovations. Additionally, CDT did not complete any new construction or major building renovations prior to 2012.

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.

- All computers, printers, and copiers go into energy saving mode when not utilized. Microsoft power saving mode is used for power management. Monitors and computers automatically utilize an energy saving mode when not in use after 15 minutes. Multifunction printers utilize an energy saving mode when not in use after 2 minutes.
- Rancho Cordova Data Center facility has installed occupancy sensors in all overhead lighting. All offices and the data center computer room have motion activated lights. As a 24/7 facility, some lights and equipment remain on at all times. Office areas have been measured for light levels and de-lamped, which has reduced the light level to exceed title 24 requirements by 7 percent. CDT replaced all incandescent light bulbs in the office spaces and data center computer room with LED lights by the end of as of August 2018The energy savings from incandescent light bulb replacement is estimated to be 145,226 KWh annually.
- Procurement unit purchases Energy Star rated equipment whenever practical and participates in the DGS Environmentally Preferred Purchasing program.

- On-site building engineers conduct daily inspections to ensure the department is in compliance for its single, 65 gallon hot water tank. Boilers are not used at the Rancho Cordova Data Center facility.
- Alerton Building Management Software (BMS) automatically places the office mechanical system in an unoccupied mode outside normal building hours. Some HVAC is needed in areas where 24/7 staffing is maintained. Controls are currently set at a +2 and -2 deadband using our BMS software listed above. Alerton BMS system actively controls outside air economizers to take advantage of temperatures under 68 degrees. If temperatures are above 68 degrees, the air economizers lock out and are not utilized. Preventative maintenance is conducted on monthly, quarterly, semi-annual, and annual basis by the on-site building engineers to ensure the effectiveness of all HVAC components. CDT is currently researching for feasibility of integrating a lighting control system into the EMCS/BMS.
- CDT has facility guidelines in place to ensure that employees are not using personal heaters without written permission. CDT will reject any refrigerators manufactured prior to the year 2000 and lacking the energy star rating due to safety and energy concerns. All appliances are inspected prior to accepting them into the facility per department guidelines. The Department has made a formal request to the Department of Rehabilitation to enforce compliance with their vending machine contractor. Facility guidelines require automatic shut-off of coffee makers. CDT ensures that kitchen, break room, and lunch room equipment is cleaned regularly and maintained to optimize efficiency. Rancho Cordova Data Center facility is a 24/7 operation and therefore snack vending machines, shredders, and water cooler timers will not be used. CDT will consider using timers for the above appliances for less traffic areas. CDT is currently drafting an annual email on the importance of minimizing electrical plug loads.
- CDT utilizes temperature sensors at the bottom and top of the computer room cabinets to measure and control the amount of cooling delivered through perforated floor tiles. The average temperature measured at the upper cabinet IT equipment inlets, for the GC data center is 74 degrees. CDT Building Engineering and Operations staff are currently evaluating increasing the average computer room temperature to save additional energy. The most significant barrier to increasing temperatures is the multi-tenant colocation design of the room and the requirement to host legacy customer equipment that is not designed for modern hot/cold aisle cooling configuration. Lower than industry standard temperature operating ranges and the placement of side blowing cooling fans are all factors that currently require the computer room as a whole to be set at a lower than optimal average temperature.

- CDT measures and reports on the PUE for the CDT 42,000 sq. ft. Rancho Cordova data center. The Rancho Cordova data center reported a PUE of 1.40 for 2020 (the lowest PUE out of 27 state-operated computer rooms required to report by MM 14-09). For PUE measurement purposes, total facility energy consumed (kWh) is measured at the SMUD utility meter. Office plug, lighting, and HVAC kW loads are separately monitored and trended in the BMS system. Flow and temperature meters for the office chilled water loop are trended in the BMS system to determine kW. The two categories of office kW loads are added together for a specified period of time, converted to kWh, and then subtracted from total facility energy. Remaining kWh are then divided by IT load (kWh) for the specified time period to calculate PUE. .
- CDT GC currently meets the MM 14-09 requirement, however the department is actively working to lower PUE through energy efficiency and optimization projects. Completing cold aisle containment for the computer room, increasing the average supply air and water temperature, and the replacement of central plant equipment with more efficient units are projects currently underway at the facility.
- All CDT purchases of network equipment meet IEE 802.3-2012 Section 6 standards. CDT is one of the leading departments in the state for server virtualization. The department offers two separate virtualized environments: On premise private cloud and a VMware Managed Cloud Services offering. All internal department servers have been virtualized and customers are highly encouraged to refresh existing physical servers into one of the virtualized CDT offerings
- The kBTU energy consumption and EUI for the Rancho Cordova facility peaked in 2014 as a result of the computer room absorbing data processing workload from other state facilities. From 2015 to 2020 energy consumption and EUI was decreased as facility energy efficiency initiatives, combined with a cloud first policy of the State CIO, halted what had previously been a steep % increase in IT power consumption. In 2018 and 2019 the department observed an IT equipment load decrease as customer departments shifted data processing workloads to the public and private cloud. Combined with further energy efficiency measures and the generation of 11% of the total energy demand for the facility onsite from solar, the source EUI for the facility decreased by 19% from 2018 to 2020
- Energy use and site EUI for the GC facility was reduced in 2020 versus 2018. IT energy use decreased during this time period, however PUE remained constant which is atypical of a data center with declining IT load. The continued low PUE of the data center can be attributed to the impact of energy saving initiatives in the computer room, and the building as a whole.

The EUI for the CDT GC facility as a whole is significantly higher than a standard office building due to the process use of power for data processing and network bandwidth. Due to the limitations of comparative building performance using EUI, Energy Star scoring is the chosen metric. The CDT GC facility had a 2020 Energy Star score of 99 which improved on a score of 97 for 2018.

- As described in the above sections dollar per year spent for energy purchases is higher than in the 2003 baseline year.

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

Year	Floor Area (ft²)	Total kBTU Consumption	Department Average EUI
Baseline Year 2003	154,250	102,843,936	667
2013	154,250	239,238,988	1551
2014	154,250	241,171,918	1564
2015	154,250	232,642,438	1508
2016	154,250	227,500,675	1475
2017	154,250	225,829,372	1471
2018	154,250	220,645,432	1430
2019	154,250	197,725,032	1282
2020	154,250	184,188,123	1194
% Change 2003-2020	0%	79%	79%

- The CDT GC facility is the primary data center for the state and as long as it continues that role and function the 20% reduction goal in relation the 2003 baseline will not be possible. Due to efficiency projects completed and economies of scale, the GC data center has the lowest PUE of any state computing facility. If data processing statewide had not consolidated primarily in a single, location a significant amount of energy would be wasted on cooling and power distribution losses at inefficient data centers with higher PUE ratios. The increased use of the on premise private cloud and public cloud offerings, along with infrastructure efficiency projects will continue to reduce kBTU consumption and average source EUI over the next 10 years. Advances in energy storage, fuel cells, and the expansion of onsite solar generation may enable the department to reduce source EUI to levels equivalent to 2003.

- The CDT GC facility was originally constructed in 1999 to be both energy efficient (for its time) and a reliable mission critical data center. Over the years CDT has identified the completion of energy efficiency initiatives as a priority both for the betterment of the environment and for the reduction in costs for energy purchases. Fixed operational costs directly impact the rates CDT charges to customers, and reducing these rates has been a departmental priority. The energy projects completed since the baseline year of 2003 include:
- 2007- Complete retro commissioning of the building including an upgrade of the EMCS/BMS, HVAC VAV calibrations and economizer settings, and lowered unoccupied occupancy schedules for the mechanical system. Total energy savings 2,842,234 kBTU/year
- 2011- New Computer room air conditioners (CRAH) with EC fans. Water Side economizer, chiller rebuild with VFD's, and office lighting replacement. Implemented Vigilent for real time algorithmic control of CRAH units. Total savings 7,176,280 kBTU/year.
- 2013- Replacement of three Uninterruptable Power Systems (UPS) and Phase 1 of computer room cold aisle containment. Savings 2,593,880 kBTU/year
- 2014- Replacement of last primary UPS, Phase II of containment, and return air chimneys. Savings 4,959,772 kBTU per year.
- 2016-2018- LED lighting replacement for the entire building, replacement of the existing make up air handlers for the computer room with more efficient units featuring VFD's, and the installation of a new EMCS/BMS for enhanced control of the building mechanical systems. Savings 255,832 kBTU per year.
- The goal and strategy for future energy projects will focus on the replacement of existing equipment with units that are both more efficient and designed to work in the temperature ranges predicated by climate models in the next 20 years. For existing and new equipment, the convergence of electrical and mechanical data from unified EMCS systems will enable better system control through the use of real time data to make intelligent optimizations based on demand. These projects have been identified on the 5-year infrastructure plan
- When analyzing the energy savings in Table 7 versus the energy trends in Table 5 consideration must be given to the impact of AB 2408 signed in February of 2010. The CDT GC facility received an influx of new data processing workload and equipment as other state departments reduced their IT energy by 33% by July of 2012. The kBTU savings through completed energy initiatives stemmed what would have been an even larger increase in 2012 and 2013. In 2014 energy use plateaued and in 2015 and 2016 the

energy savings achieved in Table 7 began to trend with the reported energy consumption in Table 5. From 2018 to 2020 kBTU usage by the data center continued to decrease due to previously completed energy efficiency projects and a continued focus on cloud first policies.

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			
2016			
2017	145,226	154,250	100%
2018	110,606	41,544	27%
2019			
2020			
2021			

The CDT Rancho Cordova data center achieved LEED Platinum EB in 2020. As part of certification 100% of the building square footage underwent an ASHRAE level 2 survey in 2019. Further mechanical system set point changes were identified and implemented as a result of the survey.

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	154,250		154,250		1000
2015					
2016					
2017					
2018					
2019	154,250		154,250		1000
2020					

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.

Rancho Cordova facility is a 24/7 mission critical operation and to avoid risk will not participate in a demand response program at this time. The department is aware of SMUD's PowerDirect Automated Demand Response program, but participation would compromise CDT's computing services to its customers. CDT does have the ability to mirror and replicate mainframe, private cloud, and other data processing services to the Vacaville data center, however there are significant software licensing costs, risks, and customer coordination issues that reserve this option for true disasters rather than for meeting local utility demand response goals.

Table 3.8: Demand Response

Demand Response Participation	Number of Buildings	Estimated Available Energy Reduction (kW)
Number of Buildings Participating in 2020	N/A	N/A
Number of Buildings That Will Participate in 2021	N/A	N/A
All Department Buildings (Percent)	N/A	N/A

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).

CDT had 1 mW of solar capacity installed at the Rancho Cordova facility in 2018. Given the single state owned building in the department's portfolio, renewable energy will be installed at 100 percent of the buildings in the specified time frame. CDT worked with DGS to successfully implement a solar PPA in 2018. 100 percent of the onsite solar power generated is used by the facility.

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	1000	1,800,000	100

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.

- When built, the CDT Rancho Cordova facility included energy monitoring systems from Automated Logic (power) and Alerton (HVAC). These original EMCS systems gave facility and engineering staff insight into how and where power and natural gas were being used, and enabled set point changes to be made which increased reliability, availability, and energy savings for the building.
- In 2007 these EMCS platforms provided the foundation for the successful retro-commissioning of the building by DGS and the department. During this project, the Alerton system was upgraded to the latest version which enabled advanced trending, chiller monitoring, optimized HVAC economizer operation, and the lowering of set points based on occupancy of the space.
- From 2010 to 2014 the department implemented new server based EMCS systems for precise computer room air conditioning control and electrical system monitoring. These EMCS systems directly led to energy saving initiatives, utility incentives and the replacement of existing equipment with more efficient models. The ability to identify power use at the branch circuit level has enabled the analysis and justification for projects by determining return on investment (ROI).
- The two main challenges CDT faces when updating EMCS systems is that GC is a mission critical facility that can never be completely taken down for maintenance/modifications, and IT security system restrictions on system functionality.

- Any changes in EMCS/BMS control systems must be done in a systematic manner on redundant equipment as to not affect the building operations. As such, major upgrades are typically only completed when replacing systems of equipment (example: replacing all of the computer room PDU's enabled SiteScan to be installed for precise cabinet power consumption monitoring).
- EMCS/BMS system functionality such as offsite monitoring, mobile device notifications, and wireless transmission are not currently used due to the need to have secure systems that are hardened against hacking and unauthorized access. Per our internal IT security policy, the Department cannot allow external vendor access to EMCS/BMS. Additionally, the Department allowed a DGS appointed ESCO to analyze 3 months of data in our EMCS/BMS system and had no recommended changes to the system.
- Monitoring based commissioning and EMCS/BMS systems are currently in place at the CDT GC facility as required by MM 15-04. CDT has 3 separate integrated EMCS/BMS systems that provide the required MBCx services.
- The CDT GC facility has a modern EMCS/BMS system that enables monitoring based commissioning (MBCx). Due to the identified challenges and the need to further achieve energy efficiency goals, in 2018 the department implemented a more advanced Automated Logic system. The new EMCS monitors and controls the make-up air units and humidity control for the computer room. Featuring 3 times the number of sensors, the system has enabled the VFD supply/exhaust fan motor control based on the real time humidity, temperature, and static pressure. This system along with innovative control schemes will eventually be expanded to include the central plant and office area mechanical systems.

Table 3.10: Planned MBCx Projects

Building Name	Location	Floor Area (ft^2)	EMCS Exists? (MBCx Capable, MBCx Difficult, No EMCS)	MBCx Projected To Start	Projected Cost ($)
CDT Rancho Cordova Data Center	Rancho Cordova	154,250	MBCx exists, enhancement, and modernization	2022	$60,000
Totals		154,250			$60,00

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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

- The Department of Technology is participating in DGS RFP for solar power purchase agreement (PPA). In addition, CDT was working with an Energy Savings Company (ESCO) to reduce energy use and GHG emissions. However, after evaluating the ESCO contract, the return on investment (ROI) on proposed projects were not practical. The Department actively pursue utility's incentive programs when practical and has periodic meetings with SMUD representative to discuss future incentive programs. CDT will consider financing of projects targeted on the 5-year infrastructure plan.

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.

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.

Department Mission and Built Infrastructure

Under the direction of the California Government Operations Agency, the California Department of Technology (CDT) maintains statutory authority over Information Technology (IT) projects and operates the state's data centers. CDT 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.

The Rancho Cordova facility, which is owned by the Department of Technology, is 154,250 square feet and divided into a computer room space (41,544 sq. ft.) and an office/computer room support space (112,706 sq. ft.). The computer room and office space utilize three 560 ton evaporative cooling towers which

remove heat from the chillers used to pump cool water through the closed loop air handling/conditioning system. Additionally, data center chillers are used to cool the building and were retrofitted with variable frequency drives to optimize efficiency. The data center also utilizes a 460 ton plate and frame water economizer that is able to take advantage of cooler outside air ambient temperatures to precool condenser water to the chiller. During the winter months the plate and frame, in conjunction with the cooling towers is able to provide enough cooling capacity to bypass and shut down the chillers. Based on meter readings of the cooling towers, and flow meters for the computer room versus office chilled water loops, it is estimated that 73% of the GC building water use can directly be attributed to the heat rejection needed for data processing equipment. Please note in 2009 the % of water needed for heat rejection is estimated at 60%

Table 4.1: 2020 Total Purchased Water**

Purchased Water	Quantity	Cost ($/yr)
Potable	14,315,224	$ 49,947
Recycled Water	0	$ 0
	14,315,224 gallons	$ 49,947

Table 4.2: Properties with Largest Water Use

Building Name	Area (ft^2)	Total 2020** Gallons	Total 2020 Irrigation in Gallons (if known)	Total Gallons used for IT cooling	Total Office Usage (Per capita + cooling)
CDT Rancho Cordova Data Center	154,250	14,315,224	2,245,665	8,690,083	3,379,477
% of Totals	100 %	100 %	100	100	100

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In addition to submetering water consumed for irrigation, CDT is also able to submeter the water used by the cooling towers.

Table 4.3: Properties with Largest Landscape Area

Building Name	Landscape Area (ft^2)
Rancho Cordova Data Center	56,000
Total Landscaping area for Buildings in This Table	A ft^2
Total Landscaping for All Department Buildings	X ft^2
% of Totals that is large landscape	100%

Table 4.4: Department Wide Water Use Trends

Table 4.4: Department Wide Water Use Trends (Data Center)

Year	Total IT bTU	Total Amount Used (Gallons/year)	bTU per gallon of heat rejected
Baseline Year 2009	27,050,763,492	5,514,670	4905
2016	46,509,378,998	9,258,738	5023
2018	45,283,874,796	8,933,328	5069
2020	43,931,203,931	8,690,082	5055

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Note for Table 4.1 through 4.4

* Problems with meter readings from 2008-2011 make establishing a baseline difficult. 2009 appears to come the closest in accuracy when compared to meter reading taken by the onsite engineers.

** Indoor Water meter was switched out at the end of 2019 and was found to be inaccurate until September of 2020. For comparison Sep 2020 to Sept 2021 used for Roadmap

Table 4.4A: Department Wide Water Use Trends By Use

Year	Total Amount Used (Gallons/year)	Total Irrigation	Total Building
Baseline Year 2009	11,523,000	3,514,948	8,008,052
2016	13,803,400	950,300	12,853,00
2018	13,822,500	1,415,000	12,407,500
2020**	14,315,224	2,245,665	12,069,559

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- One of the most difficult challenges the department faces in meeting the Governors water efficiency and conservation goals is that nearly 73% of the building water use is dedicated for the cooling of the computer room (2016-2020). For each Btu generated by data processing equipment, a corresponding amount of heat must be removed by the chillers from the water loop and in turn, from the chillers by the cooling towers. The cooling towers use water in two ways, primarily through evaporative loss. However, as the water travels in cycles through the towers it increasingly gains a higher concentration of silica and other dissolved solids. When this level reaches a high level, the basins must be released into the storm sewer/storm drain system. In order to save water, the department attempts to run as many cycles as possible without risking damage to the chillers.
- The Rancho Cordova data center used more water for irrigation for twelve months in 2020 and 2021 versus 2018. Several significant leaks in the drip irrigation system were found and repaired

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		
Less than 20% Reduction	14,315,224	N/A
Totals	14,315,224	N/A

CDT replaced and/or retrofitted all water fixtures within the building from 2015-2016. In addition, the department completed the drip irrigation project in spring 2016.

The water efficiency projects to replace/retrofit water fixtures and increase the number of cycles for the cooling towers, completed from 2015- 2016 track well with the water reductions show in table 4.4. During the same time period, more efficient management of the cooling towers and associate mechanical systems has kept the IT bTU per gallon of heat rejection ratio relatively level in 2020 versus previous years. What is important to note is that traditional data centers become more water inefficient as IT load is reduced.

Going forward CDT is exploring the use of air cooling for the Rancho Cordova data center in order to significantly reduce indoor water usage. The project is in the concept phase, however the data center may be able to achieve a savings of 7.5 million gallons of water annually.

Building Water Management BMPS

Monthly Water use is tracked using onsite GSH engineers who do meter reads daily. We verify meter reads with usage reports off the Golden state water dashboard. We track all water usage monthly using EnergyStar.

DGS custodial staff and GSH engineers visually inspect all water fixtures daily. Checking for leaks. 24 Faucets and showerheads were replaced with WaterSense aerators and to fulfill LEED Gold certification in 2014. 24 Touchless faucets were installed in 2020

The irrigation schedule is adjusted for seasonal changes twice yearly. The system is tested monthly to check for leaks and misalignment, and other malfunctions. Repairs are done immediately when needed. Watering is done early in the

morning or in the evening when wind and evaporation are lowest. Watering is never done between 10am and 6pm. CDT sprinklers direct water only to landscape areas, avoiding hardscapes such as parking lots, sidewalks, or other paved areas. No irrigation water leaves the site. Most plants are native to the

Leak Detection and Repair

DGS custodial staff and GSH engineers visually inspect all water fixtures daily. Checking for leaks. A leak detection survey is completed monthly. Leak repairs are completed by GSH engineers immediately.

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

Year Started	# Faucets	Water Saved (Gallons/yr)	Cost Savings per Year
2015	24	191,000	$668.50
2020	24	0	0

- CDT replaced and/or retrofitted all water fixtures within the building from 2015-2016. In addition, the department completed the drip irrigation project in spring 2016. CDT is pursuing a project to replace the three cooling towers with more water efficient models.
- The water efficiency projects to replace/retrofit water fixtures and increase the number of cycles for the cooling towers, completed from 2015- 2016 track well with the water reductions show in tables 4.4A and 4.4B. Gallons per person per day have dropped from the 2009 baseline year. During the same time period, more efficient management of the cooling towers and associate mechanical systems has increased the IT bTU per gallon of heat rejection ratio.

Building Heating and Cooling Systems BMPs

The building engineers are in compliance relating to annual HVAC inspections and are documented in writing. The inspection includes:

- Verification of minimum outdoor airflows using Building Management System (BMS) airflow measuring instruments.
- Confirmation that air filters are clean and replaced based on manufacturer's specified interval.
- Air filters used have a MERV rating of no less than 11.
- Verification that all outdoor dampers, actuators and linkages operate properly.
- Checking condition of all accessible heat exchanger surfaces for fouling and microbial growth, with action taken when fouling is found at the cooling towers.
- Checking the first 20 feet of ductwork downstream of cooling coils for microbial growth, take action if growth is found.
    - Rancho Cordova's HVAC system is a closed loop system and a closed loop VAV system does not require downstream microbial testing. Therefore this item is N/A.
- 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.
- Building engineers utilize a vendor supplied preventative maintenance system.

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	203,231	3
2015		
2016		
2017		
2018		
2019		
2020		

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			
2015			
2016	1,000,000*	$3,500	1
2017			
2018			
2019			
2020			

*When estimating water saved, CDT used 2013 irrigation totals at the time the drip irrigation project was proposed. In 2013, total outdoor irrigation was 3 million gallons of water annually. The drip irrigation project was completed in spring 2016. The 2016 outdoor irrigation total was 950,300, a savings of over 1 million gallons of water compared to 2013.

Landscaping Maintenance BMPS

DGS Landscaping is the current Landscaping vendor for CDT. DGS Staff Monitor the Landscaping Hardware on a weekly basis. Checking the Valves and replacing any nozzles, couplers and Hoses as needed. DGS and CDT Facilities staff work closely together For any living landscape or landscape hardware repairs.

Landscaping Hardware Maintenance BMPS

DGS Landscaping is the current Landscaping vendor for CDT. DGS Staff Monitor the Landscaping Hardware on a weekly basis. Checking the Valves and replacing any nozzles, couplers and

Hoses as needed.

Large landscape Water Use

Large landscape water use often represents a significant percentage of a facility's water use and significant water savings can often be achieved through better irrigation scheduling or inexpensive improvements in irrigation hardware. As part of the Water Use Guidelines and Criteria, the water uses for landscape areas over 20,000 sq. ft. shall be tracked through a water budget program.

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. The water budget establishes an efficient standard for the landscape area. The water budget programs use local weather measurements to adjust the irrigation schedule on a weekly, biweekly or monthly basis. A dedicated landscape meter or an irrigation sub-meter is required to track the actual landscape water use. The actual water use is entered the water budget program and the program compares the water use to an efficiency standard. A landscape water use tracking program will help improve irrigation scheduling and will also help detect irrigation system leaks. Landscape water budget management services in California are available by landscape associations and private vendors.

By reading the water meter and entering water use data into the program database, the landscape water manager can monitor water use and make immediate decisions regarding the irrigation schedule to maintain the landscape at or below the water budget. A landscape water audit and needed repairs to the irrigation system are advised at initiation of the Program to obtain optimum results. Costs for the program are the responsibility of the agency.

Water use data from the local water provider or data entered by the landscape manager and landscape water budget calculated specific to each landscape based on local climate and plant water needs is used for landscape water management. Data from dedicated landscape meters or in the case of facilities with mixed use meters, a landscape sub-meter can provide the necessary data. If a dedicated meter or sub-meter is not available a winter / summer water use comparison can be used to estimate the summer irrigation demand and landscape water budget.

Landscape maintenance staff should attend an EPA WaterSense labeled training program. WaterSense labeled irrigation training programs include the

Irrigation Association Certified Irrigation Auditor (CLIA), Certified Irrigation Contractor (CIC), Certified Irrigation Designer (CID), Sonoma Marin Water Saving Partnership Qualified Water Efficient Landscaper (QWEL)and the California Landscape Contractor Association 's Water Management Certification Program (WMCP). All listed EPA WaterSense labeled programs are available throughout California.

Water use baselines and targets do not have to be established separately for large landscapes. The large landscape water use should be included in the facilities baseline and target water use. If the landscape is served by a utility owned dedicated landscape account meter, the volume of water used should be added to the amount recorded by the utility meter serving the building. If the landscape water is sub-metered after it has gone through the mixed-use utility owned meter, it has already been accounted for in the total facility water use measurement.

CDT Contracts with DGS Landscaping, at this time DGS does not have staff that are Water Sense Certified.

Table 4.9: 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
1	N/A	N/A	0

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.

Energy Efficiency

The department met the GHG reduction goal primarily through the consolidation of two older, inefficient data centers into two energy efficient data centers (Rancho Cordova and Vacaville). Combined with the completion of energy efficient projects, described in previous Sustainability Reports, the department was able to significantly reduce the amount of GHG produced. CDT has identified several energy efficiency projects on their 15 year plan, such as replacing the cooling towers and rooftop air handlers, further reducing GHG emissions.

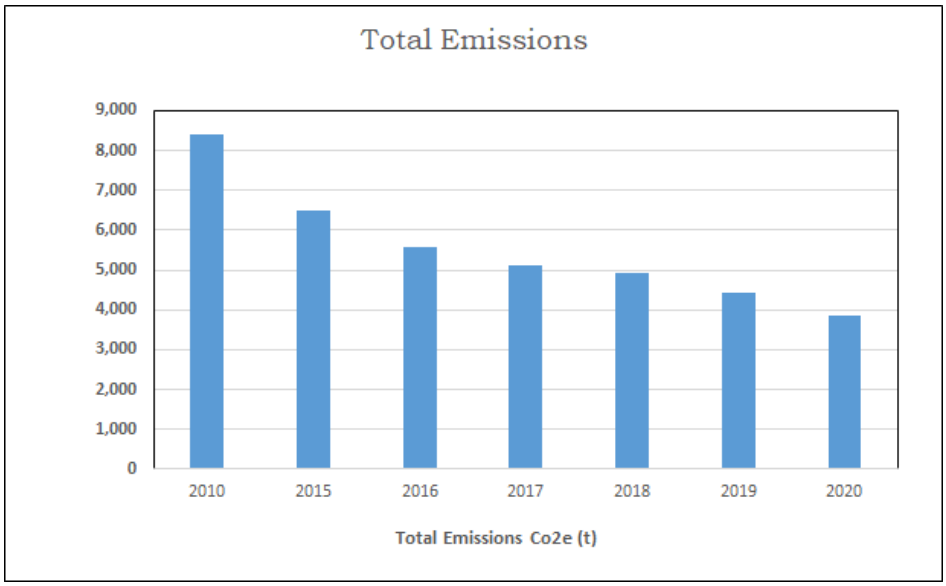
On-Site Renewable Energy

CDT completed a solar PPA project that generates a maximum of 1 megawatt (MW) of electricity and 10.0% of its total electrical demand annually. The reduction in grid based power purchases resulted in a continued reduction of GHG emissions beginning in 2018.

Table 5.1: GHG Emissions since 2010

Department of Technology	2010	2015	2016	2017	2018	2019	2020
Natural Gas	86	87	125	88	54	101	69
Vehicles	0	0	0	0	0	0	0
Purchased Electricity	8,310	6,416	5,439	5,015	4,881	4,420	3,789
Total Emissions Co2e (t)	8,396	6,502	5,564	5,103	4,935	4,430	3,858

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.

CDT is currently working with DGS BPM to increase the use of manual and or electric powered landscape equipment and methods at the Gold Camp facility. The replacement of a 15,000 sq. ft lawn area with bark and the removal of non-native trees and bushes has significantly reduced air pollution, dust and noise associated with grounds upkeep.

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.

- CDT has not constructed or moved into any new state buildings, occupied a build to suite leases and completed a major renovation of an existing state building since July 1 2012

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.

The Department achieved LEED Platinum- EBOM certification for its only Department owned 154,250 Rancho Cordova facility in February 2019. The facility was awarded LEED-Platinum status for achieving a total of 65 points. CDT contracted with an energy consulting firm, Envision Realty Services, to carry out processes and procedures to achieve LEED Platinum. Using a combination of onsite contracted engineers and state staff, CDT accumulated the necessary documentation to put the LEED program in motion and follow through with achieving Platinum accreditation.

In 2019, the Rancho Cordova campus achieved an Energy Star rating of 99 out of a maximum 100 points. Although not unprecedented, obtaining an energy star score on a facility with a high percentage of process energy dedicated to data processing introduced a unique set of challenges; however, state and contracted staff were able to overcome the challenges through effective teamwork and communication. Various loads were tested in the building including the IT equipment, lighting, and HVAC system. Through the energy audit and a HVAC analysis, various energy conservation measures were identified, such as demand control ventilation, heating lockout, supply air resets for the air handling unit, chiller sequencing, and water savings in the restrooms. Energy conservation measures for the building were simulated to analyze the overall effect on both energy usage and comfort condition. In the office space, indoor

air quality performance testing was also performed and CO2 monitoring was added for increased savings and employee comfort.

In 2019 the CDT Rancho Cordova data center applied and earned an LEED EB Platinum certification. In addition, the Rancho Cordova data center achieved an Energy Star rating of 99 out of 100.

Table 5.2: 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
1	1	100

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

While there are currently no plans for new construction or renovations, the Department will ensure that any new projects are implemented using CALGreen measures and will work with any contractors accordingly to ensure the standards are being met. This includes any renovation projects including air systems and daylighting.
Commissioning to ensure proper operation of all building systems, including delivering the required amount of outside air

- All relevant mandatory and all feasible voluntary measures from CALGreen Division 5.5 and Appendix section A5.5
- Specialized air treatment for buildings where air quality standards are routinely exceeded, including MERV 13 or MERV 16 air filters and ozone removing air cleaning devices
- Outdoor airflow monitoring systems

- An IEQ Construction Management Plan that meets CALGreen Sections A5.501.1-A5.504.2
  Providing a direct line of sight to the outdoors via vision glazing between 2.5 and 7.5 above the finished floor in 90% of all regularly occupied areas
- Using toplighting and sidelighting, light shelves, reflective room surfaces, means to eliminate glare and photosensor controls
- CDT is compliant and remains proactive in ensuring voluntary CALGreen measures related products used in construction and renovation. CDT does not currently have any projects at this time.
- IEQ are implemented in all building projects. CDT's Facilities and Procurement unit references a CALGreen checklist on all building materials before moving forward with a purchase.
- While there are currently no plans for new construction or renovations, the Department will ensure that any new projects are implemented using CALGreen measures and will work with any contractors accordingly to ensure the standards are being met. This includes any renovation projects including air systems and daylighting.

Furnishings

CDT is compliant and remains proactive in ensuring all furniture and seating purchased complies with all mandated specifications and requirements. CDT's Facilities and Procurement units purchase seating furniture from CALPIA and routinely reference the DGS Purchasing Standard when procuring new furniture. CDT actively participates in environmentally preferred purchasing.

Cleaning Products

DGS purchases cleaning supplies for CDT, DGS will follow EPP in the purchase of all supplies, tools, and equipment to minimize environmental impact. This includes purchase of Green Seal (GS) certified chemicals, recycled content paper products, and Cleaning and Rug Institute (CRI) certified machines and equipment. Minimum requirements for products and supplies will be:

Powered Equipment
Vacuum cleaners will meet no less than minimum CRI Green Label Program requirements and operate at a sound level less than 70dBA.
Carpet extraction equipment will meet no less than a minimum CRI Bronze Seal of Approval and operate at a sound level less than 70dBA.

Powered floor maintenance equipment will be equipped with controls or other devices to capture or collect particulates and operate at a sound level less than 70dBA.

Powered scrubbing machines will be equipped with a control method for variable rate dispensing to optimize the use of cleaning chemicals and operate at a sound level less than 70dBA.

Quarterly maintenance plan for inspection and maintenance of custodial equipment, and written maintenance records.

Cleaning Products and Supplies2

Cleaners: general purpose, floor, restroom, glass, and carpet cleaners will meet no less than GS-37.

Floor finishes and strippers: no less than GS-40

Hand soap: no less than GS-41.

Toilet tissue: no less than GS-1.

Paper towels: no less than GS-9.

Plastic trash can liners: will contain no less than 10% post-cons

Cleaning Procedures

DGS custodial staff comply and adhere to the following building cleaning standards:

- All vacuum cleaners used in department facilities achieve the Carpet and Rug Institute Seal of Approval. Facility staff review all requests for new vacuum cleaners from janitorial staff and verifies that they are certified. Printed copies of the appropriate sections of CA Code of Regulations have been placed in the janitor's closets for reference to TITLE 8 cleaning procedures.
- Entryways are maintained as specified in the CalGreen Section A5.504.5.1
- Green Seal GS-42 cleaning procedure standard
- Carpet and Rug Institute's *Carpet Maintenance Guidelines for Commercial Applications*
- Title 8 Section 3362 cleaning procedures

CDT/DGS Janitorial will follow OSHA safety standards (1919.1030), and training for cleaning of hazardous materials and/or blood borne pathogens. This includes:

· Use of safety cones or other barriers to ensure that building occupants do not come in contact with biological spills.
· Use of proper personal protective equipment (PPE), including at minimum gloves and goggles.
· Disinfection of areas with appropriate chemical solution(s) following OSHA's Bloodborne Pathogen Standard.
· Proper disposal of all contaminated materials in a biohazard bag.

HVAC Operation

Rancho Cordova Data Center's onsite building engineers ensure that the HVAC systems exceed the required minimum outdoor air requirements. The building engineers are in compliance relating to annual HVAC inspections and are documented in writing. The inspection includes:

- Verification of minimum outdoor airflows using Building Management System (BMS) airflow measuring instruments.
- Confirmation that air filters are clean and replaced based on manufacturer's specified interval.
- Air filters used have a MERV rating of no less than 11.
- Verification that all outdoor dampers, actuators and linkages operate properly.
- Checking condition of all accessible heat exchanger surfaces for fouling and microbial growth, with action taken when fouling is found at the cooling towers.
- Checking the first 20 feet of ductwork downstream of cooling coils for microbial growth, take action if growth is found.
    - Rancho Cordova's HVAC system is a closed loop system and a closed loop VAV system does not require downstream microbial testing. Therefore this item is N/A.
- 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.
- Building engineers utilize a vendor supplied preventative maintenance system. Rancho Cordova Data Center meets the minimum ventilation rate required in Section 120.1(c) 2 of Title 24 for 1 hour before 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.

CDT uses an internal intranet web page to communicate with staff when the pest management vendor is scheduled to spray any chemicals that may affect staff. Staff are highly encouraged to eat in the designated breakrooms to avoid pest infestations in the office space areas. Staff are aware to contact the Facilities Unit in the event they encounter or have any issues with pests. The current Vendor Follows CDT's IPM Program. Vendor is to use or supply environmentally sustainable products, as applicable. This includes any non-chemical control methods and any "least-toxic" pesticide formulations. The contractor shall only use these products and/or methods with the approval of the California Department of Technology contract manager or designee.

Table 5.3: Pest control contracts

Pest Control Contractor	IPM Specified (Y/N)
Bugman Pest Control	Y

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 1st of each year covering activities conducted during the prior calendar year.

CDT makes an effort to reduce waste in all our buildings. We achieve this by providing employees with education and opportunities to be involved in the department's reduction efforts and decision-making process. This is one of the primary tasks of the department's designated Waste and Recycling Coordinator.

Waste reports are received for all locations from property management (leased facilities) and directly from the waste hauler (owned facility). For our multi-tenant facilities, the total waste from that facility was divided by the number of floors or spaces occupied by CDT staff. The annual tonnage provided by these direct reports were added together to arrive at the total department waste tonnage.

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

Per Capita Baseline	2019	2020	Total Waste 2019	Total Waste 2020	% Change from 2019/2020
0.6	.13	.16	20.09 tons	30.22 tons	20.69%

0.6 is the baseline per capita for CDT. In 2019, we reported .13 per capita and in 2020 we reported .16 per capita which makes for a 20.69% difference. The department is staying well below their target and that is largely due to our ongoing efforts to create awareness around the subject of recycling and waste reduction.

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.

Other recycling efforts include such things as beverage containers, glass, plastics (#3-7), carpet, cardboard, newspaper, office paper (white and mixed), confidential shred paper, copier/toner cartridges, scrap metal, wood waste, and e-waste. The CDT janitorial team ensures that the bins remain free of general waste.

The Department of Technology's generated non-confidential and confidential paper is shredded and recycled by a mobile shred vendor. Total recycled paper for 2019 was 39,550 pounds.

The types of waste being thrown away include non-recyclable food containers, a small percentage of contaminated recyclables, and general office trash. CDT regularly releases updated flyers and emails to remind employees of established recycling and food waste programs. The Green Team, comprised of approximately 10 individuals from all branches within CDT, focuses on teaching employees ways to recycle more.

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. To comply with AB 1826 (Chesbro, Chapter 727, Statues of 2014), CDT has established an organic waste program in their contract with Republic Services of Sacramento, a waste and recycling removal and disposal service. At the state-owned Rancho Cordova Facility we have a 2 cubic yard organics bin that sits outside next to the recycling and garbage bins. This is used primarily for landscape trimmings and food waste. Additionally, we include organics bins in every break room next to the recycling bins and waste bins for employee use.

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

CDT is in contract with DGS Landscaping which captures the majority of landscape materials for compost. All campuses (leased and owned) have undergone extensive landscaping renovations to reduce the quantity of organics and save water.

Having employees spread out between buildings creates communication difficulties when managing recycling programs. Due to having multiple buildings, most of which are under different property management, this has proven difficult, especially in buildings where we are not producing much waste. In the cases of our leased buildings, they provide the janitorial/waste/recycling services so we go through them to add on organics.

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.

Hazardous Waste Materials

Universal waste, electronic waste, and other hazardous waste are recycled in accordance with California disposal guidelines and with approved haulers and recyclers. The total recycled for CDT in 2020 was 4.96 tons based upon reports from each location including at our on-site hard drive shredder. All batteries including single use batteries, rechargeable batteries, and lithium batteries generated by the department are recycled in accordance with the California disposal guidelines. The Department of Technology continued its battery recycling program through Big Green Box. In 2020, there were 186 pounds of batteries recycled.

Material Exchange

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.

The Department of Technology currently has an office supply exchange and re-inventory program for employees to drop off/pick up needed office supplies prior to purchasing new ones. Additionally, CDT recycled nearly 14 tons of metals and electronic waste through TKO Recycling Center in 2020.

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.

CDT promotes the use of online forms and cloud storage to reduce paper usage. In addition, bulletin boards are placed throughout the office to minimize paper distributed, along with the use of a Department Intranet and emails. All packing materials, pallets and boxes are reused whenever possible. CDT also stores and reuses office furniture and remodeling materials in its Croydon Warehouse for future use. Other department programs include Business Source Reduction, and buying recycled products as a purchasing source when applicable. Electric hand dryers are installed in the bathrooms to cut down on paper towel usage.

For printing services, CDT uses recycled toner cartridges. There is an established bizhub program that promotes black and white printing along with double-sided copies. In addition, the printers are installed with badge scanning software to prevent waste. Lastly, Xeriscaping is employed at the CDT campuses to reduce organics waste. All landscape haulers bring landscape materials to approved grass recycling facilities.

Additionally, the use of GovDeals allows us to offer surplus items to the public for reuse. Such items include inventory like desks, computer monitors, wood shelves, storage cabinets, mailing machines, desk phones, printers, binders, white boards, chairs and more. In 2019, CDT sold over 40 items in the amount of $4,575. In 2020, CDT sold 6 items in the amount of $565.

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 and organics receptacles are located near each trash area and in every break room. Additional recycling bins have been placed near high traffic

areas including busy conference rooms. Signage highlighting the Department's recycling program are placed on or near each bin location to remind individuals what can be recycled or thrown away. The recycling program information is assessed annually to see what needs to be changed.

Regular informational emails are released to ensure employee education as well as updated flyers placed near all trash and recycling areas. The intranet has a sustainability page where employees can refer to the program. This is at all facilities and is consistent throughout the agency.

There is a dedicated Recycling and Green Programs Coordinator for the Department. This is a function of a part-time employee. Also, the custodial staff at each location is aware of our recycling policies and adheres to them.

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.

At this time, the Department of Technology does not employ any food services at their facilities.

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 31st 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

Our department is committed to reducing the environmental impact of our goods and services we purchase.

CDT realizes the value and importance of exercising the purchase power of the State in energy efficient products in order to conserve electrical power and lower energy costs to State agencies. CDT is committed to purchasing products that meet the Federal Energy Management Program (FEMP) recommended standards. Products that meet FEMP recommended standards display the Energy Star Label. In addition, CDT utilizes recycled content products and considers recycled products when conducting its purchasing activities.

CDT purchase analysts rely on the program area submitting the purchase request to identify the necessary specifications on all IT and Non-IT goods purchases. In addition, CDT purchase analysts refer to the DGS Statewide Commodity contracts list to identify mandatory purchase contracts in existence that may offer EPP or SABRC compliant products. CDT Procurement incorporates as many recommended improvement practices as directed by the DGS EPP program or requested by CDT Facilities.

CDT Procurement has made commitments in purchasing only printing and copy paper, desk notepads, and a majority of other office paper supplies with a minimum post-consumer recycled content (PCRC) of 30%. This is through the statewide contract. CDT has purchased 100% PCRC in the past and unfortunately this caused issues with our printers.

CDT Facilities unit verifies that DGS custodial staff purchase only Green Seal (GS) -08 janitorial supply products. In the event custodial staff require cleaners without Green Seal certification, the facilities unit is notified before the product is purchased.

Measure and Report Progress

CDT Procurement makes every effort to incorporate EPP criteria in the goods and services the department purchases. CDT buyers of non-IT good are required to take CalPCA Environmentally Preferrable Purchasing training and work with purchase requestors to identify for purchase only goods that meet recyclable material percentage content minimums as prescribed by CalRecycle.

CDT tracks all non-IT goods purchases and requires non-IT goods vendors to complete and submit the CalRecycle 74 form with each bid/offer. CDT records and tracks Postconsumer Recycled Content of all non-IT goods purchases and identifies the content requirements when uploading purchases into the State Contract and Procurement Registration System (SCPRS). In addition, CDT submits the SABRC Purchasing Report annually to CalRecycle.

Table 5.4: State Agency Buy Recycled Campaign FY 19/20 Performance

Product Category	SABRC Reportable Dollars	SABRC Compliant Dollars	% SABRC Compliant
Antifreeze	$0	$0	0%
Compost and Mulch	$0	$0	0%
Glass Products	$0	$0	0%
Lubricating Oils	$0	$0	0%
Paint	$0	$0	0%
Paper Products	$2,637.50	$2,637.50	100%
Plastic Products	$3,978.35	$3,978.35	100%
Printing and Writing Paper	$14,732.30	$14,732.30	100%
Metal Products	$11,485.43	$11,485.43	100%
Tire Derived Products	$0	$0	0%
Tires	$432.80	$432.80	100%

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 5.5: Commodities categories with the greatest Potential to Green

Commodity	2020 Total Spend ($)	2020 Percent EPP Spend (%)	EPP Target (%)
Paper Products	$2,637.50	100%	100%
Plastic Products	$3,978.35	100%	100%
Printing and Writing Paper	$14,732.30	100%	100%
Metal Products	$11,485.43	100%	100%
Tires	$432.80	100%	100%

Sustainability Development and Education

Other than taking the EPP training and being mindful of CalRecycle postconsumer content requirements, CDT buyers have limited control over purchase requestor needs. CDT buyers guide requestors toward sustainable products whenever possible. Three CDT buyers are tasked with non-IT goods/services purchasing. These three buyers are fully abreast of SABRC/CalRecycle requirements.

Total Number of Employees Assigned as Buyers: **30**

Table 5.6: Buyers who have completed EPP Training

CalHR Classification	Total Number of Buyers	Percent Completing EPP Training
IT Associate	10	50%
IT Specialist I	13	23%
IT Supervisor II	4	25%
IT Manager I	2	50%
IT Manager II	1	100%

All acquisition specialists are required to complete DGS California Procurement and Contracting Academy (Cal-PCA) Basic Acquisitions Certification Program. In addition, DGS offers free development courses and seminars to the State's procurement staff to improve their state contracting knowledge. Acquisition specialists are encouraged to take other workshops and courses provided by DGS when such courses are relevant to the analyst's workload.

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 Jan 1 2017.

Facility Services is the group in CDT who is responsible for overseeing location efficiency and making necessary changes. Since 2020, the Department has vacated the White Rock Road location and also moved our headquarters to the Ziggurat Building in West Sacramento, which boosts departmental average. Smart Location Scores can be found at https://www.slc.gsa.gov/slc/

Table 5.7: Smart Location Score for new Leases

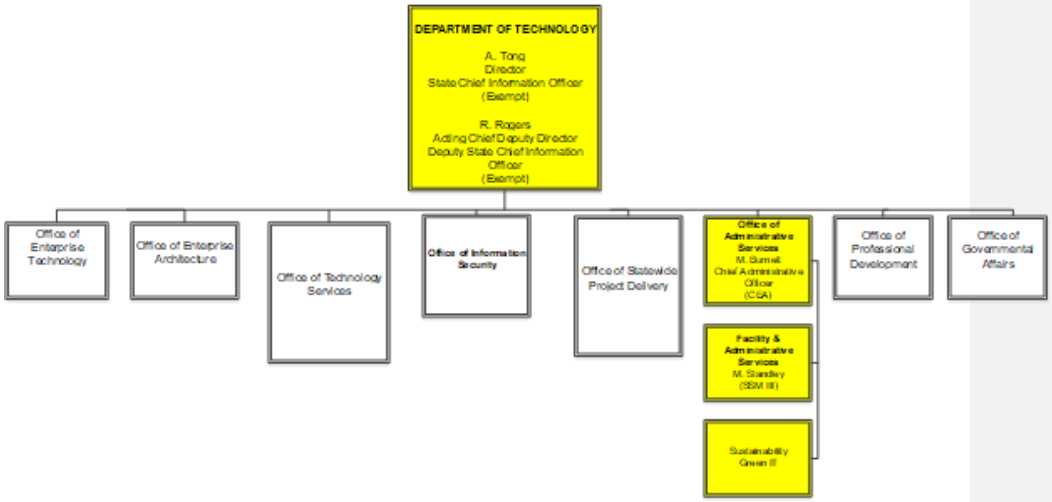
Facility name	Smart Location Calculator Score
10860 Gold Center Drive	67
10911 White Rock Road	67
10173 Croydon Way	80
1325 J Street	91
Average	76.25
Baseline	67
% change from Baseline	12%

Note for Table 5.9: List 5-10 of the lowest scoring leases in your department's portfolio.

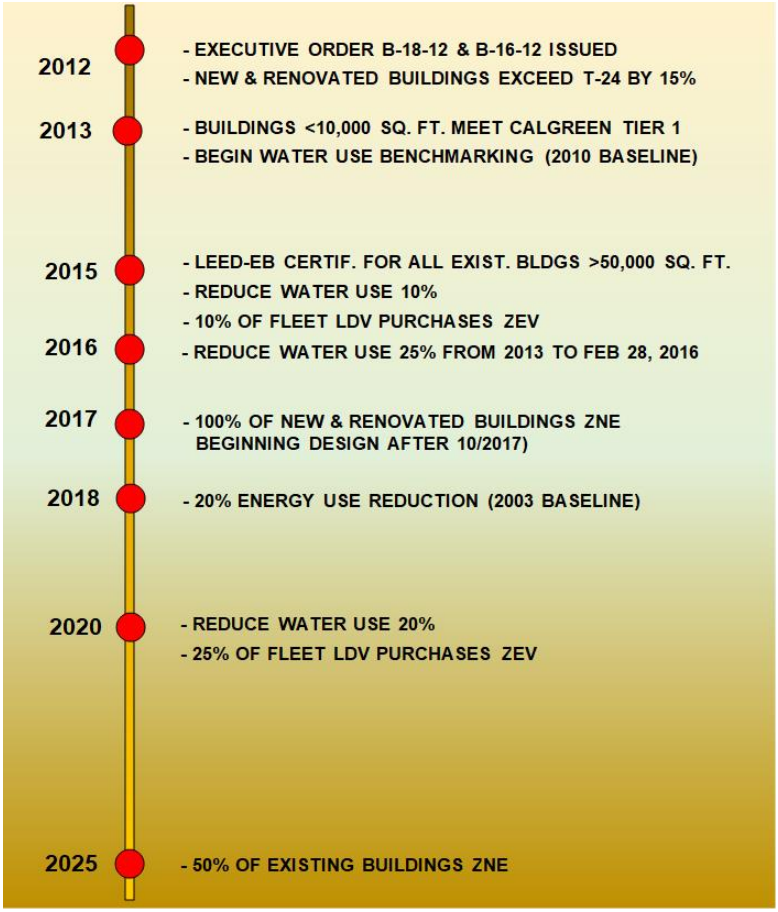
Table 5.8: Lowest Smart Location Score Leases

Facility name	Smart Location Calculator Score
10860 Gold Center Drive	67
10911 White Rock Road	67
10173 Croydon Way	80

Appendix A – Sustainability Leadership 2020



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	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Understanding Climate Risk at Planned Facilities	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Integrating Climate Change into Department Planning and Funding Programs	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Measuring and Tracking Progress	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services

	Ian Noumov, Information Technology Specialist I, Building Engineering

Zero Emission Vehicles

Incorporating ZEVs Into the Department Fleet	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Telematics	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Robert Raffaelli, Staff Services Manager I, Program Services Sara List, Associate Governmental Program Analyst, Program Services

Public Safety Exemption	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Robert Raffaelli, Staff Services Manager I, Program Services Sara List, Associate Governmental Program Analyst, Program Services

Outside Funding Sources for ZEV Infrastructure	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Hydrogen Fueling Infrastructure	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Comprehensive Facility Site and Infrastructure Assessments	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

EVSE Construction Plan	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

EVSE Operation	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Energy

Zero Net Energy (ZNE)	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

New Construction Exceeds Title 24 by 15%	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Reduce Grid-Based Energy Purchased by 20% by 2018	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Server Room Energy Use	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Demand Response	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Renewable Energy	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Monitoring Based Commissioning (MBCx)	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Financing	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Water Efficiency and Conservation

Indoor Water Efficiency Projects In Progress First initiative	
Office of Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Boilers and Cooling Systems Projects In Progress	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

Landscaping Hardware Water Efficiency Projects In Progress	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Living Landscaping Water Efficiency Projects In Progress	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Buildings with Urban Water Shortage Contingency Plans In Progress	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Green Operations

Greenhouse Gas Emissions	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Alfredo Reyes, Information Tech Associate, Building Engineering

Building Design and Construction	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer,

	Mark Standley, Staff Services Manager III, Facility and Administrative Services Ian Noumov, Information Technology Specialist I, Building Engineering

LEED for Existing Buildings Operations and Maintenance	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Indoor Environmental Quality	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Integrated Pest Management	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Tracy Player, Staff Service Manager II, Facility and Administrative Services Shon Gates, Business Services Officer II, Facility Services

Waste Management and Recycling	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Robert Raffaelli, Staff Services Manager I, Program Services Sara List, Associate Governmental Program Analyst, Program Services

Environmentally Preferable Purchasing	
Acquisitions & IT Program Management	Miles Burnett, Chief Administrative Officer, Jennifer Herrera, Information Technology Manager II, Acquistion/IT Program Management Marisa Duarte-Lott, Information Technology Supervisor II, Acquistion/IT Program Management

Location Efficiency	
Facility and Administrative Services	Miles Burnett, Chief Administrative Officer, Mark Standley, Staff Services Manager III, Facility and Administrative Services Robert Raffaelli, Staff Services Manager I, Program Services Sara List, Associate Governmental Program Analyst, Program Services

Appendix G – Sustainability Requirements & Goals

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

Climate change adaptation

Zero-emission vehicles

Energy

Water efficiency and conservation

Green operations

These general sustainability initiatives include the following:

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

Appendix H – Sustainability Background References

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

Executive Orders

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

- **Executive Order B-16-12**
  EO B-16-12 directs state agencies to integrate zero-emission vehicles (ZEVs) into the state vehicle fleet. It also directs state agencies to develop the infrastructure to support increased public and private sector use of ZEVs. Specifically, it directs state agencies replacing fleet vehicles to replace at least 10 percent with ZEVs, and by 2020 to ensure at least 25 percent of replacement fleet vehicles are ZEVs.
- **Executive Order B-18-12**
  EO B-18-12 and the companion *Green Building Action Plan* require state agencies to reduce the environmental impacts of state operations by reducing greenhouse gas emissions, managing energy and water use, improving indoor air quality, generating on-site renewable energy when feasible, implementing environmentally preferable purchasing, and developing the infrastructure for electric vehicle charging stations at state facilities. The Green Building Action Plan also established two oversight groups – the staff-level Sustainability Working Group and the executive-level Sustainability Task Force – to ensure these measures are met. Agencies annually report current energy and water use into the Energy Star Portfolio Manager (ESPM).
- **Executive Order B-29-15**
  EO B-29-15 directs state agencies to take actions in response to the ongoing drought and to the state of emergency due to severe drought conditions proclaimed on January 17, 2014. Governor Brown directed numerous state agencies to develop new programs and regulations to mitigate the effects of the drought, and required increased enforcement of water waste statewide. Agencies were instructed to reduce potable urban water use by 25 percent between 2013 and February 28, 2016.
- **Executive Order B-30-15**

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

- **Executive Order B-37-16**

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

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

State Administrative Manual & Management Memos

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

- **SAM Chapter 1800**: Energy and Sustainability
- **MM 14-02:** Water Efficiency and Conservation

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

Legislative Actions

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

- **Assembly Bill (AB) 1482** (Gordon, 2015): Requires that the California Natural Resources Agency (CNRA) update the state's adaptation strategy safeguarding California every three years. Directs state agencies to promote climate adaptation in planning decisions and ensure that state investments consider climate change impacts, as well as the use of natural systems and natural infrastructure. (Public Resources Code Section 71153)
- **Senate Bill (SB) 246** (Wieckowski, 2015): Established the Integrated Climate Adaptation and Resiliency Program within the Governor's Office of Planning and Research to coordinate regional and local efforts with state climate adaptation strategies to adapt to the impacts of climate change. (Public Resources Code Section 71354)
- **AB 2800** (Quirk, 2016): Requires state agencies to take the current and future impacts of climate change into planning, designing, building, operating, maintaining and investing in state infrastructure. CNRA will establish a Climate-Safe Infrastructure Working Group to determine how to integrate climate change impacts into state infrastructure engineering. (Public Resources Code Section 71155)
- **Assembly Bill (AB) 4**: Passed in 1989. The State Agency Buy Recycled Campaign (SABRC) statutes are in Public Contract Code Section 12153-12217. The intent of SABRC is to stimulate markets for materials diverted by California local government and agencies. It requires state agencies to purchase enough recycled-content products to meet annual targets, report on purchases of recycled and nonrecycled products, and submit plans for meeting the annual goals for purchasing recycled-content products.

- **AB 32 Scoping Plan**: The scoping plan assumes widespread electrification of the transportation sector as a critical component of every scenario that leads to the mandated 40 percent reduction in GHG by 2030 and 80 percent reduction by 2015.

- **AB 2583** (Blumenfield 2012) **Public Resources Code §25722.8**: Statute requires reducing consumption of petroleum products by the state fleet compared to a 2003 baseline. Mandates a 10 percent reduction or

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

- **AB 75** – Implement an integrated waste management program and achieve 50 percent disposal reduction target. State Agencies report annually on waste management program

- **SB 1106** – Have at least one designated waste management coordinator. Report annually on how your designated waste and recycling coordinator meets the requirement.

- **AB 2812** - Provide adequate receptacles, signage, education, staffing, and arrange for recycling services. Report annually on how each of these is being implemented

- **AB 341** – Implement mandatory commercial recycling program (if meet threshold). Report annually on recycling program

- **AB 1826** – Implement mandatory commercial organics recycling program (if meet threshold). Report annually on organics recycling program

- **SB 1383** - 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020, a 75 percent reduction by 2025, and 20 percent of currently disposed edible food is recovered for human consumption by 2025.
    - Agencies already in compliance with AB 1826 may need to further expand their organic waste recycling service to comply with the new requirements
    - Jan. 1, 2024, Tier 2 Commercial Edible food Generators will be required to donate edible food to a recovery organization.

- **SB 1335** - requires food service facilities located in a state-owned facility, a concessionaire on state-owned property, or under contract to dispense prepared food using reusable, recyclable, or compostable. food service packaging

Action Plan

- **2016 Zero-Emission Vehicle Action Plan**

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

State Resources and Guidance Documents

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

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

Table G-1: Background References and Applicable Roadmap Chapters

	Climate Adaptation	ZEV	Energy	Water	Green Operation
Executive Orders:					
EO B-16-12		X			X
EO B-18-12		X	X	X	X
EO B-29-15				X	
EO B-30-15	X	X	X		X
EO B-37-16				X	
Management Memos					
MM 14-02				X	
MM 14-05			X		X
MM 14-07			X		X
MM 14-09			X		
MM 15-03		X	X		
MM 15-04			X		X
MM 15-06			X	X	X
MM 15-07		X			
MM 16-07		X			
MM 17-04			X		
Legislative Actions					
SB 246	X				
SB 2800	X				

SB 1106					X
SB 1383					X
AB 4					X
AB 32		X			X
AB 75					X
AB 341					X
AB 1826					X
AB 2812					X
AB 1482	X				
Action Plans					
2016 ZEV Action Plan		X			
State Resources and Guidance Documents					
Cal-Adapt	X				
California's Climate Change Assessments	X				
Public Resources Code §25722.8		X			
Planning and Investing for a Resilient California	X				
Safeguarding California	X				
Safeguarding CA Implementation Action Plan	X				
Sustainable Groundwater Management Act of 2014				X	

Appendix I - List of Tables & Graphs