

COUNTY OF SAN DIEGO FACILITY OPERATIONS ELECTRIC VEHICLE ROADMAP

1. Executive Summary

Background

The County of San Diego has an enterprise-wide goal in its strategic plan to enhance the quality of the environment by focusing on sustainability, pollution prevention and strategic planning. The County Board of Supervisors approved the 2015-2020 Strategic Energy Plan (SEP) in October 2015 which included two specific goals related to the installation of electric vehicle (EV) charging infrastructure: 1) Install EV charging stations for public use at additional County facilities and 2) Replace County owned vehicles with alternate fuel models such as EV. Since that time, more specific goals have been enacted through the County's Green Fleet Action Plan and Climate Action Plan as detailed below.

Goals

Performance Metric	Timeframe	Reference
Reduce County Fleet GHG emissions by 10%	2020	2015-2020 Strategic Energy Plan; Green Fleet Action Plan (GFAP)
Place 50-125 EV in service to meet goal of 2-5% of light duty fleet (2,500) * being EV	2020	GFAP – Implementation Strategy Goal #1
Place 250 EV in service to meet goal of 10% of light duty fleet (2,500) * being EV	2025	GFAP – Implementation Strategy Goal #1
Reduce County Fleet GHG emissions by 20%	2030	Climate Action Plan T-3.2 & T-3.4
*Does not include patrol vehicles, trucks, motorcycles, large SUVs or full-size vans		

Existing Conditions

The County Fleet (Fleet) consists of approximately 4,530 vehicles. The majority 73%, or 3,307, is classified as light duty vehicles like patrol vehicles, sedans, full-size and mini-vans, sport utility vehicles, pickups, trucks and motorcycles. The remaining 27%, or 1,223, is comprised of trailers & towed equipment, medium/heavy duty vans & trucks, construction & industrial equipment, fire apparatus, grounds keeping vehicles & equipment, all-terrain & off-road vehicles, street sweeping equipment and large transportation buses.

The County currently has 35 EV in service. These include 21 Plug-In Hybrid Vehicles (PHEV) and 14 pure EV. The Department of General Services (DGS) has 15 additional PHEVs on order which will ensure the County meets its minimum goal of 2% or 50 of the light duty fleet transitioning to EV by 2020. The County Fleet EV network includes a total of 84 charging stations. 70 were installed via a partnership with SDG&E under their Power Your Drive (PYD) program plus another 12 stations installed with one-time funds. A portable solar power charger with an additional two ports provides free electricity for charging. Due to 4 of the existing EVs being charged outside the existing County Fleet EV charging system, currently there is infrastructure in place to support 38 more EV conversions.¹

A total of 37 public charging stations were installed at ten County locations through a grant from the California Energy Commission for EV infrastructure.² These stations were located at key County sites to provide regional charging opportunities, as well as serve specific public and county staff demand

¹ Exhibit 2-2

² Exhibit 2-1 List of Public EVSE Sites

anticipated at each site. Sites include the County Administration and Operations Centers, County Regional Centers and several libraries.

County owned stations at both fleet and public locations are managed through an existing contract with ChargePoint, an EV Charging management company. PYD sites are also managed by ChargePoint through an existing contract they have with SDG&E.

The County has been tracking usage at its public and fleet EV sites which continue to show strong growth over time. For the public network, there was 66% utilization across the portfolio as of June 2019. The results for the fleet sites are equally impressive, with the County Operations Center (COC) Power Your Drive site showing 62% utilization; the highest utilization of any of SDG&Es fleet PYD sites.

The County has been an area leader in implementing EV into its Fleet. County staff contacted several local agencies to identify their current status with EV integration which is shown below. The County is doing well in comparison, but there is still more to do.

Number of EV in Fleet as of June 2019			
Agency	Fleet Size (approx.)	Number of EV in Fleet	Percentage of Fleet
County of San Diego	4,530	35*	.8%
Chula Vista	600	15*	2.5%
UCSD	1050	63	6%
City of San Diego	4,400	6*	%0.1
City of Oceanside	550	2	%0.3

*Additional EVs on order but not in service at time of report

The County of San Diego is well positioned to meet its goal of at least 50 fleet EV in service by 2020. In order to meet its 2025 goal of 250 fleet EV in service, significant investment in the installation of necessary infrastructure and purchase of EVs is needed. This EV Roadmap also identifies opportunities to stretch these goals even further and attain up to 10% conversion of the County fleet over the next 5-7 years.

Roadmap Assumptions

This report makes the following assumptions:

- County Leadership will support the EV Roadmap recommendations and help communicate the importance of its implementation across the enterprise
- EV infrastructure will be built at economically viable County sites with six or more County vehicles eligible for EV conversion
- County departments will convert a minimum of 80% of vehicles identified for EV replacement over the next five years
 - Vehicles targeted for fleet reduction due to underutilization, and County sites with fewer than four vehicles are not considered for EV conversion in the near- or mid-term
 - First responder vehicles, buses, fire apparatus, construction equipment, medium and heavy-duty trucks, large SUVs and 4-wheel drive vehicles are not eligible until new technology and vehicles become available on the market
- This EV Roadmap projects full costs for County implementation
- Fleet vehicles eligible for conversion to EV or PHEV are sedans, mini-vans and mid-sized SUVs³
- One EV is assigned one charging port

³ Paragraph 2.2 EV Capable Defined

- Current cost projections include replacement of vehicles that are not yet fully depreciated
- Costs are based on existing market conditions; future costs will be influenced by infrastructure construction escalation, and consumer demand lowering the price per EV. Annual projections will be refined with current data
- New EV charging equipment will be managed via the existing County contract with Charge Point
- County departments will decrease the number of underutilized vehicles to reduce GHG emissions and initially fund new EV purchases
- DGS and DPC will deliver all EV orders in the same fiscal year as requested
- Vehicle purchases will follow infrastructure installation at each site
- A charging management plan may be developed at a future point in time to maximize EV charging spots
- The County’s public EV network for existing facilities is built out; however, several new County facilities recently built or in the design process can accommodate public charging

Findings

The team identified the following key findings:

- The purchase premium of converting a single fully depreciated existing vehicle to EV or PHEV is between \$9,500 and \$14,800⁴
- There is a total of 38 non-EV Fleet vehicles at 7 sites with existing Electric Vehicle Service Equipment (EVSE) identified for Near-Term conversion, 7 new county facilities under design or recently completed and ready for installation of EVSE for public use, and a total of 413 vehicles at 19 County sites identified for Mid-Term and Mid-Term Stretch conversion⁵
- Existing Board policies do not provide DGS with sufficient authorization to require new vehicles to be electric⁶
- County Policy does not require new facilities to include fully operational EV infrastructure; although new facilities are stubbed out for EV in accordance with current State Building Code

Recommendations

Near-Term: (\$760,000)

1. Adopt amended Board of Supervisors policies to provide DGS with more EV purchasing authority; require General Manager sign-off for EV vehicle replacement exceptions; and require fully operational EV infrastructure in all new County facilities
 - a. H-1 Fleet Management Internal Service Fund
 - b. H-2 Fleet Vehicle and Mobile Equipment Acquisition Policy
 - c. G-15 Design Standards for County Facilities and Property
2. For Capital Improvements Needs Assessment (CINA) budgeted and current projects, provide funding or amend CINA budget projections to include fully operational public EV charging infrastructure
3. Fleet ISF will finance the immediate purchase of 38 EV for the sites at which infrastructure is already available with the agreement affected departments will turn in their underutilized vehicles to capture the depreciation and auction proceeds to reimburse Fleet ISF within the same Fiscal Year for these EV conversions

⁴ Exhibit 3-1 Cost Differentials

⁵ Paragraph 4.1 Phased Approach, Exhibit 3-2 Fleet Conversion to EV Flow Diagram

⁶ Paragraph 2.4 Existing Board Policies

4. Identify funding and authorize implementation of Near-Term equipment installation and existing project budget augmentation (\$760,000)

Mid-Term: (\$7.95M)

1. Identify funding and authorize implementation of phase 1 of Mid-Term EV installation plan (\$1.85M)
2. Authorize funding and implementation for phases 2-3 Mid-Term EV installation plan through future budget or CINA process
3. Implement Fleet EV conversions for Mid-Term phases, including 166 vehicles
4. Identify gap funding to bridge the variance between vehicle replacement depreciation and the EV premium for departments to convert to EV and/or coordinate with impacted departments to turn in their underutilized vehicles to capture the depreciation and auction proceeds to help cover these costs

Mid-Term Stretch: (\$12.20M)

1. Authorize funding and implementation for Phase 1-4 of Mid-Term Stretch EV installation plan through future budget or CINA process (\$12.20M)
2. Implement Fleet EV conversion for Mid-Term Stretch Phases, including 201 vehicles
3. Identify gap funding to bridge the variance between vehicle replacement depreciation, auction proceeds and the EV premium for departments to convert to EV and/or coordinate with impacted departments to turn in their underutilized vehicles to capture the depreciation and auction proceeds to help cover these costs

Long-Term

1. Convert first responder vehicles, buses, fire apparatus, construction equipment, medium and heavy-duty trucks, large SUVs and 4-wheel drive vehicles when new technology and vehicles become available on the market
2. Evaluate strategies to improve the economic viability of low-density sites and electrify vehicles in the Home Assigned Program
3. Engage owners of leased sites in discussions to implement EV charging infrastructure

2. EV Roadmap Background

2.1 County Fleet Composition

The County operates a very diverse fleet consisting of approximately 4,530 (as of May 2019) vehicles and motorized equipment that is tasked with supporting nearly every department and function within the County's areas of responsibility. The size of the County's Fleet is dynamic and constantly fluctuating with vehicles being purchased and sold from service daily. The majority of this fleet, approximately 73%, is classified as light duty vehicles like sedans, vans, sport utility vehicles, pick-up trucks, and motorcycles. The remaining 27% is comprised of trailers & towed equipment, medium/heavy duty vans & trucks, construction & industrial equipment, fire apparatus, grounds keeping vehicles & equipment, all-terrain & off-road vehicles, street sweeping equipment, and finally, large transportation buses. Vehicle Acquisition and Replacement

County vehicle acquisition, outfitting, repairs and maintenance is performed by the Department of General Services (DGS). The current acquisition practice allows purchasing decisions to be made by individual departments (not by DGS). This also includes determining the type of vehicle to purchase and deciding when older or underutilized vehicles will be replaced.

County vehicles are grouped into two categories regarding the mechanism for funding replacements.

Department of General Services (DGS) owned vehicles: The majority of the Fleet (73%) is owned by the Department of General Services. DGS established an ISF to provide capital funding for vehicle replacements. Departments pay a monthly ISF fee per vehicle based on their existing vehicle's purchase cost, depreciated across that vehicle's expected useful life. These monthly ISF fees accumulate and fund the future replacement vehicle.

Department owned vehicles: Some departments operate their own Internal Service Fund (ISF) to provide funding for future vehicle replacements. Examples are special district vehicles owned and operated by Air Pollution Control District, as well as the Department of Public Works. These vehicles make up approximately 27% of the entire Fleet, and only 13% of the identified light duty EV capable defined pool (1,515).

In August of each Fiscal Year, departments order replacement vehicles. DGS Fleet Management verifies the order and provides departments with the total accumulated ISF funds available to offset the cost for the new vehicle. Estimates for cost premiums associated with market inflation or vehicle upgrades (e.g. conventional Internal Combustion Engines to PHEV or EV vehicles) are also provided.

2.2 Existing Fleet Board Policies

General Services Fleet Management follows three existing board policies to control the acquisition, disposal, inventory, regulatory compliance, maintenance and fueling of all County vehicles and equipment. These policies direct the administration of the Fleet Management Internal Service Fund (BOS H-1), the acquisition of Fleet Vehicles and Mobile Equipment (BOS H-2), and the assignment and use of County-Owned Vehicles and Mobile Equipment (BOS H-10). The policies address vehicle underutilization, the process for removal from active service, and the targeting of vehicles for conversion to alternative fueled vehicles via the Green Vehicle Replacement Standard in accordance with the Green Fleet Action Plan and Implementation Strategy.

2.3 Previous Electric Vehicle Supply Equipment Implementation Efforts

In order to increase the spread of EV ownership countywide, DGS placed electric vehicle supply equipment (EVSE) at County sites for public, employee, and Fleet use since 2014. This Roadmap explores the potential to expand that existing network in order to support a more aggressive rollout of EV replacement vehicles.

2.3.1 Public Charging Ports

Starting in 2014, the County began developing an EV charging network for both County staff and the general public visiting County facilities. In order to identify the most viable County sites for EVSE installation, the Center for Sustainable Energy (CSE) was hired to analyze major county employment locations and high public use site. A total of 10 top sites were identified as most viable. After site construction evaluations were completed, two of these sites recommended at the South Bay Regional Center were combined and one additional location at the Cedar Kettner Parking Structure was added.

To cover costs for the installation of the EV infrastructure, County staff applied for and obtained a grant in 2015 from the California Energy Commission for \$500,000. At the same time, County staff completed a competitive procurement to partner with a charging management service provider to provide and manage the planned EV charging stations. ChargePoint was the successful vendor.

A total of 37 charging stations were installed at 10 County locations and have been in operation since 2016 (See list below in Exhibit 2-1).

Public Sites				
EVSE Sites		Site Address	# EVSE Ports	
			L2	DCFC
1	County Administrative Center	1600 Pacific Hwy, San Diego, 92101	4	2
2	County Operations Complex	5515 Overland Avenue, San Diego, 92123	10	0
3	South Bay ARCC	590 Third Avenue, Chula Vista, 91910	4	0
4	Cedar Kettner parking structure	735 West Cedar Street, San Diego 92101	4	0
5	Fallbrook Library	124 South Mission Road, Fallbrook, 92028	2	0
6	Ramona Library	1275 Main Street, Ramona, 92065	2	0
7	APCD	10124 Old Grove Road, San Diego, 92131	1	0
8	Health Service Complex	3851 Rosecrans Street, San Diego, 92110	2	0
9	4S Ranch Community Center	16118 4S Ranch Pkwy, San Diego, 92127	2	0
10	North County Regional Center	325 South Melrose Drive, Vista, 92083	4	0
Total Installed Ports			35	2

Exhibit 2-1 – List of Public EVSE Sites

2.3.2 Fleet Charging Ports

The County of San Diego continued to provide EV charging infrastructure by partnering with San Diego Gas and Electric (SDGE) on the Power Your Drive initiative to install 3,500 EVSE in SDGE territory. Through the SDGE partnership, the County installed 70 chargers. Using County one-time funds, an additional 12 EV stations were installed and a portable solar powered charger with two ports was purchased. The Fleet currently has 84 EV charging stations. These stations are located at 8 county facilities as shown below. Use of these stations is tracked remotely, and reporting generated for consumption, use and costs. To date 46 of these 84 charging spaces are reserved for use by active vehicles, and vehicles ordered by departments that are pending delivery from manufacturers; leaving 38 unassigned charging spaces available for additional Fleet EVs. See **Exhibit 2-2** below.

Fleet Sites					
EVSE Sites		Site Address	# EVSE Ports		Description
			L2	DCFC	
1	South Bay Regional Center	500 Third Avenue, Chula Vista, 91910	12	0	PYD
2	North County Regional Center	325 S Melrose Dr, Vista, 92081	10	0	PYD
3	Juvenile Justice Complex	2901 Meadowlark, San Diego, 92123	10	0	PYD
4a	COC Medical Examiner	5570 Overland Ave, San Diego, 92123	10	0	PYD
4b	COC DGS Fleet Garage	5610 Overland Ave, San Diego, 92123	12	0	Fleet Owned
5	COC Mobile Solar	9301 Hazard Way, San Diego, 92123	2	0	Mobile Solar
6	Health Services	3851 Rosecrans st, San Diego, 92110	10	0	PYD
7	APCD	10124 Old Grove Rd, San Diego, 92131	10	0	PYD
8	Sheriff Headquarters	9621 Ridgehaven Ct	8	0	PYD
Total Installed Ports			84	0	

Exhibit 2-2 – List of Fleet EVSE Sites

2.3.3 Portable PV to EV Charging Units

Fleet purchased one solar powered portable station with two ports in 2018 to serve EVs at the COC site from a local San Diego company which supplies these units globally. This charging station includes a battery which allows for the system to operate day or night. During the day the solar array provides the majority of power production to directly charge vehicles and also stores excess energy in the battery for use at night. Models with capacity for 4 vehicles are also available. This solution is ideal for locations with the following characteristics: few (ideally four or fewer) vehicles, potential to change (such as leased sites), insufficient capacity with existing electrical gear. Additionally, these units do not require any infrastructure placement or project management and can be implemented in a much shorter timeframe – simply purchase and move onto the site. See photograph of current installation at COC in **Exhibit 2-3**.

3. Analysis for Roadmap

3.1 Vehicle Analysis

3.1.1 “EV Capable” Defined

When the term EV is used herein, it means either fully Electric or Plug-in Hybrid Electric. EV Capable is a new term describing a subset of vehicles contained within the County of San Diego’s Fleet which have been determined to meet the needs and be able to perform all required departmental duties as an electric or plug-in hybrid vehicle. Of the entire fleet, approximately 33% (1,515 vehicles) are considered EV Capable - could potentially be converted to all electric (EV) or plug-in hybrid electric (PHEV) based on their vehicle type and current market availability. Vehicles currently in this category are sedans, mini-vans, and mid-sized SUVs. Specifically, **not** included in this group are first responder vehicles, medium and heavy-duty trucks, large SUVs, buses, construction equipment, motorcycles, full sized vans and/or 4-wheel drive vehicles until such time that new technology and vehicles become available in the market. If this EV Roadmap is implemented, DGS will begin to maintain a list of EV Capable County fleet vehicles, which will be updated annually.



Exhibit 2-3: PV to EV Unit at COC

It should be noted that approximately 35% of the vehicles considered “EV Capable” are at present mid-sized SUVs that currently have no reasonable EV market option available. However, EV versions of these vehicles should be available for purchase in 12-18 months.

3.1.2 Strategic Vehicle Acquisition

DGS Fleet holds annual vehicle utilization review meetings and acquisition planning sessions with client departments. During these meetings EV Capable vehicles are identified in a summary report. If EV charging infrastructure is available at the site, that vehicle will be included in the annual list for EV vehicle replacements.

For sites currently without EV charging infrastructure, DGS Fleet will propose that EVs for a site are ordered at the start of site construction to ensure EVs are placed into service as soon as possible when the site is energized.

DGS currently does not have authority to specify which vehicles will be purchased for departments. Those decisions are made by department vehicle coordinators and their management. Several departments have been resistant to ordering EVs, due to common concerns regarding costs, range limitations and operational issues.

Since 2016, DGS Fleet staff started meeting regularly with County departments to provide planning and outreach for the integration of EV vehicles into their fleets. As part of this effort, a series of available EV product brochures were created and continues to expand as additional EVs become available for purchase, and a series of trainings have been held, including test driving events to educate County staff of the capabilities of currently available EVs.

In order to accelerate the transition to EV, it is recommended that EV Capable vehicles are replaced with EVs where charging equipment is available. In order to effectively convert existing EV Capable County Fleet vehicles a change in Board Policy is recommended as discussed below.

3.1.3 Proposed Board Policy Changes

In order to ensure recommendation contained herein are achieved, it is necessary to amend several Board Policies, including H-1, H-2 and G-15. As a result of these recommended changes, DGS will be empowered to require EV conversions where appropriate and include fully operational EV charging in new County projects:

Board Policy H-1 which details the process for tracking fleet ISF vehicle utilization and replacing underutilized vehicles will be amended to reflect that all EV Capable vehicles will be identified and if EV charging infrastructure is available at the site where an EV Capable vehicle is stationed, that vehicle will be included in the annual list for vehicle replacements.

Board Policy H-2 which establishes County vehicle purchase procedures will be amended to reflect that all vehicles purchased will meet the criteria of the County definition of EV Capable when available, practical, fair and reasonably priced for the class/type of vehicles needed for specific assignments.

Board Policy G-15 which provides guidelines for County construction will be amended to require EV charging infrastructure is installed in all new County facilities. Projects will consider both public and fleet EV and include these costs in their budget as appropriate.

3.1.4 Purchase Cost Differential for EV/PHEV

The Fleet Vehicle Replacement ISF accumulates depreciation monthly towards the purchase of new vehicles. This depreciation is based on the purchase price of a new vehicle and depreciated over its expected lifespan using a straight-line method. This provides departments with a continuous funding mechanism for future vehicle replacements.

The purchase premium of converting existing County of San Diego internal combustion engine (ICE) vehicles to Plug-In Hybrid (PHEV) or all Electric (EV) vehicles is substantial. The average depreciation accumulated for light duty sedans is currently between \$20,000 and \$22,000. The average cost of a new internal combustion engine vehicle is currently between \$23,000 and

\$24,000. However, the average cost of a new PHEV and EV vehicle is approximately \$31,500 and \$34,800 respectively after applying California Clean Vehicle Rebate incentives.⁷ This leaves an estimated purchase premium of converting a single existing vehicle to PHEV or EV between \$9,500 and \$14,800 dependent on availability of incentives/rebates and the replacement vehicle type, as illustrated in **Exhibit 3-1** below.

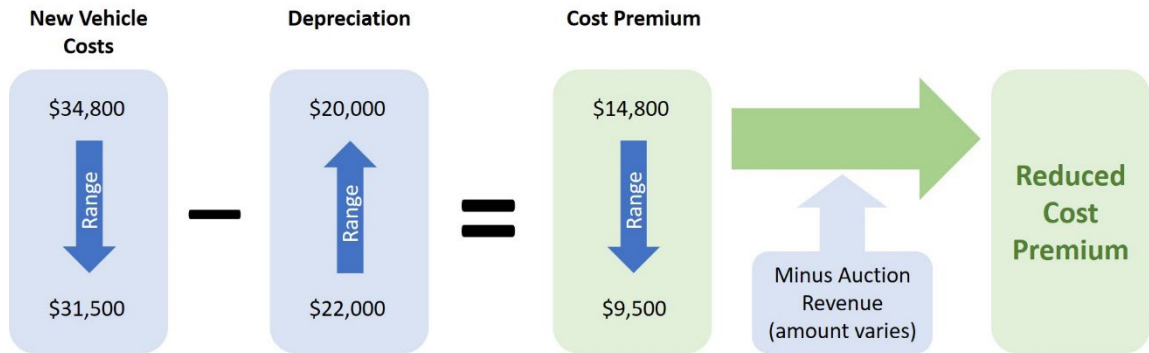


Exhibit 3-1 - Cost Differentials

Cost Premiums will vary from these assumptions and are dependent on the specific vehicles identified for conversion and their current balance of accumulated depreciation at time of site assessment. Cost Premiums may further be affected by revenue received from the sale of replaced vehicles at auction. Additionally, many ICE vehicles converted to EV may not be fully depreciated at the time of conversion. This out of cycle replacement will result in additional costs and a higher than anticipated Cost Premium which is determined on a case by case basis. Near -Term recommendations as referenced in section 4.1 of this report are utilizing Cost Premium calculations that are inclusive of all known and reliable site/vehicle specific information to ensure Near-Term cost calculations are as accurate as possible. Mid-Term recommendations as referenced in section 4.1 of this report utilize ROM Cost Premium calculations that are site specific to the quantity of targeted vehicles and current balances of targeted vehicle accumulated depreciation, however it does not include as detailed an estimate as Near-Term recommendations given that vehicle costs and accumulated depreciation and auction revenue estimates fluctuate monthly.

3.1.5 Lease versus Purchase

The County of San Diego currently uses a well-established and sustainable practice of accumulating depreciation towards future vehicle replacements via the use of the Fleet Vehicle Replacement Internal Service Fund. This practice eliminates budget deficit impacts on the availability of capital funding for vehicle replacements and allows for greater budgetary planning towards future vehicle replacements. The County of San Diego currently does not use lease contracts to acquire new vehicles. The advantages and disadvantages to vehicle leasing decisions are discussed below.

The decision to procure new vehicles with an outright purchase contract over a leasing option must be evaluated to ensure cost effective use of available funds. It should be noted that leasing

⁷ California Clean Vehicle Rebate incentives are subject to limitations and restrictions for government agencies and are limited to no more than 30 vehicle rebates per calendar year.

options for government fleet agencies differ from conventional leasing options for general consumers. The most notable difference readily identified by consumers, especially in the realm of PHEV & EV technology, is that federal tax incentives (\$7,500 currently) are substantial enough to support a marked reduction in monthly payments. However, the federal tax incentive for leasing options is limited in that the vehicle manufacturer receives the credit directly and does not have to pass on this savings to the lessor. In reviewing available leasing options DGS confirmed that the federal tax incentive is not available to reduce vehicle purchasing costs.

The sole advantage in government fleet leasing options remains the elimination of any upfront purchase costs needed in procuring new vehicles. This becomes a large advantage to government fleets who may not have substantial enough funding to replace their aging fleets, or who are impacted by budget deficits that impact an annual vehicle replacement budget.

The County of San Diego's sustainable practice of accumulating depreciation towards the purchase of future vehicle replacements via the Fleet Vehicle Replacement ISF reduces the need to consider leasing options over vehicle purchases outright since funds are readily available and accumulating on a monthly basis

The remaining factor of a leasing decision is predicated on the capital costs necessary for the conversion cost premium of upgrading existing County of San Diego internal combustion engine (ICE) vehicles to Plug-In Hybrid or all Electric vehicles as referenced in section 3.1.4 above Since the Fleet Vehicle Replacement ISF depreciates the cost of an existing vehicle towards its future replacement and does not include a funding mechanism to allow for the depreciation of any anticipated cost premiums, a funding gap remains in converting existing ICE vehicles to PHEV or EV vehicle.

If a leasing decision is made in order to assist in capital cost financing for PHEV and EV vehicles, new vehicle leasing contracts would need to be established and cost advantages of any awarded lease agreements would be subject to successful negotiations. The regular maintenance and asset management of any leased vehicles would remain the responsibility of DGS Fleet management in adherence with Board Policy and Administrative Code 398.10. Any leased vehicles would also be subject to the Governmental Accounting Standards Board (GASB) Statement No.87 which establishes new reporting and accounting requirements for leased capital assets.

It should be noted that additional staffing would be required to effectively manage these lease contract(s), their taxable reporting requirements in accordance with GASB 87, and to monitor vehicle utilization & replacement strategy to ensure adherence to any lease terms applicable to the contract(s) awarded. Recommendations contain in this EV Roadmap assume new EVs will be purchased and not leased.

3.1.6 Analysis of EV Capable Vehicles

DGS performed an in-depth analysis of each EV Capable vehicle's identified parking location and assignment within its department. After an analysis of market and technology availability, a subset (or 850 vehicles) of the 1,515 EV Capable light duty vehicles cannot be considered for conversion, due to functional conditions.

- 560 vehicles were identified as Home Assigned vehicles; meaning they do not park overnight at a county facility and therefore cannot be charged overnight at a County facility.

- 122 vehicles were identified that have already been targeted for fleet reduction based on an annually performed vehicle utilization review provided for each department that encourages vehicles to be removed from active service unless they meet specific utilization requirements as identified in BOS Policy H-10. These vehicles were removed from targeted conversion as it does not make sense to invest in charging infrastructure and EV conversion for vehicles that are not sufficiently utilized.
- Infrastructure cost analyses determine that it is not cost effective to undertake construction to provide charging equipment for parking locations with five or fewer fleet vehicles. However, providing solar charging for sites with 4-5 vehicles is a cost-effective option. Sites with 3 or fewer vehicles are currently impractical for EVSE investment. There is a total of 168 vehicles at such sites. These sites will be evaluated for feasibility of alternative EV charging methods in the long-term roadmap efforts.

This further analysis rendered a smaller grouping of EV Capable vehicles that are functionally ready for conversion, a total of 665. This grouping of vehicles is defined as “EV Ready”. The next step taken was to analyze the sites where these 665 vehicles are located to determine if it is feasible to install EV infrastructure.

3.2 Infrastructure Analysis

3.2.1 EVSE Placement Methodology

Planning efforts related to development of an Enterprise-wide fleet EV conversion program are based on the premise that we must first build appropriate charging infrastructure before we are able to convert vehicles to EV. The placement of EVSE infrastructure is a labor and time intensive endeavor. The availability of funding and coordination to support the rollout of this plan will be the limiting factor in any Fleet transition strategy.

In order to develop a long-range plan for converting EV Capable fleet vehicles, DGS utilized the following approach. The top priority for EV conversion is the installation of EV charging infrastructure at the location where EV Capable fleet vehicles are parked each night. It makes sense to build EV infrastructure at County locations which house County Fleet vehicles, since these County Fleet vehicles can then park and re-charge overnight using County provided EV charging equipment, ready for County use each day. This analysis also makes the initial assumption and we will install one charging port for one EV. This way each County Fleet EV will have a designated parking space where it can recharge each night after being used for County business during the workday. The analysis focused on targeting sites with the most vehicles available for conversion.

3.2.2 Site Analysis Strategy

The determining factors for a successful “make-ready” implementation include electrical capacity (meter, transformer, panel, etc.); impacts and length of trenching for utility extension; and availability and convenience of parking/charging location. The intent of this effort is to identify and prioritize the best sites for investment in infrastructure serving the most vehicles. This assessment indicates the best candidates to be developed.

According to the strategy outlined above, the DGS EV transition analysis identified a total of 68 existing County properties where the 665 eligible vehicles are housed. The list of sites housing EV Capable vehicles was evaluated according to the greatest opportunities.

The cost and difficulty of installing charging equipment to support one vehicle is almost the same as for 6 vehicles, making an installation for 6 most affordable and for only one quite expensive.

A balance between cost, efficacy, and grouping makes a case for drawing a distinction between sites with six or more and sites with five or fewer. Using this methodology, all sites with six or more vehicles were analyzed for infrastructure construction. Sites with five or fewer eligible vehicles could be provided with electricity supply from one of several potential options: Install portable PV to EV equipment (also known as portable solar canopies); install level 1 charger outside electrical room; piggyback Fleet charging with public charging infrastructure; use nearby public charger.

3.2.3 Land Tenure

Land tenure (land ownership) of sites where fleet vehicles are located includes owned, leased, or managed by a third party (such as a partner city). Land tenure is an important consideration because only owned sites will allow full control over modification to existing infrastructure and placement of permanent equipment, therefore only owned sites were considered in this site assessment. Fewer than half of these sites are owned by the County but, fortunately, 70% of eligible vehicles are located at County owned sites.

Strategies for providing charging capacity at leased and third-party sites, where the County has little to no control over site modifications, include the following options. For sites with four to five vehicles, install portable PV to EV equipment. For sites with three or fewer, it is more economical to use nearby non-county public chargers or to encourage lessors to install EVSE for public users and piggyback Fleet charging on those.

3.2.4 Site Assessment Activities

Site assessments were conducted at 16 high-opportunity sites, those owned sites with 6 or more EV Ready vehicles, by gathering data about existing electrical equipment and usage, and then analyzing spare capacity that could be given over to vehicle charging at each site. Additionally, site assessments looked at location of proposed charging spaces. In some cases, optimal charging spots for Fleet vehicles might not be located close enough to electrical equipment to justify the expense of placing the infrastructure.

Of the high opportunity owned sites, four of the largest (which tend to also be sites with complicated electrical distribution systems) were evaluated by a consultant team of engineers and cost estimators. The information gleaned from this professional investigation was then extrapolated to the remaining high-opportunity sites.

This analysis further eliminated sites that were infeasible, either due to inordinate cost or to physical infeasibility. The breakdown of the County fleet identifying the number of vehicles that are both EV Ready and located at County owned sites that are recommended to receive charging equipment is shown in **Exhibit 3-2** below.

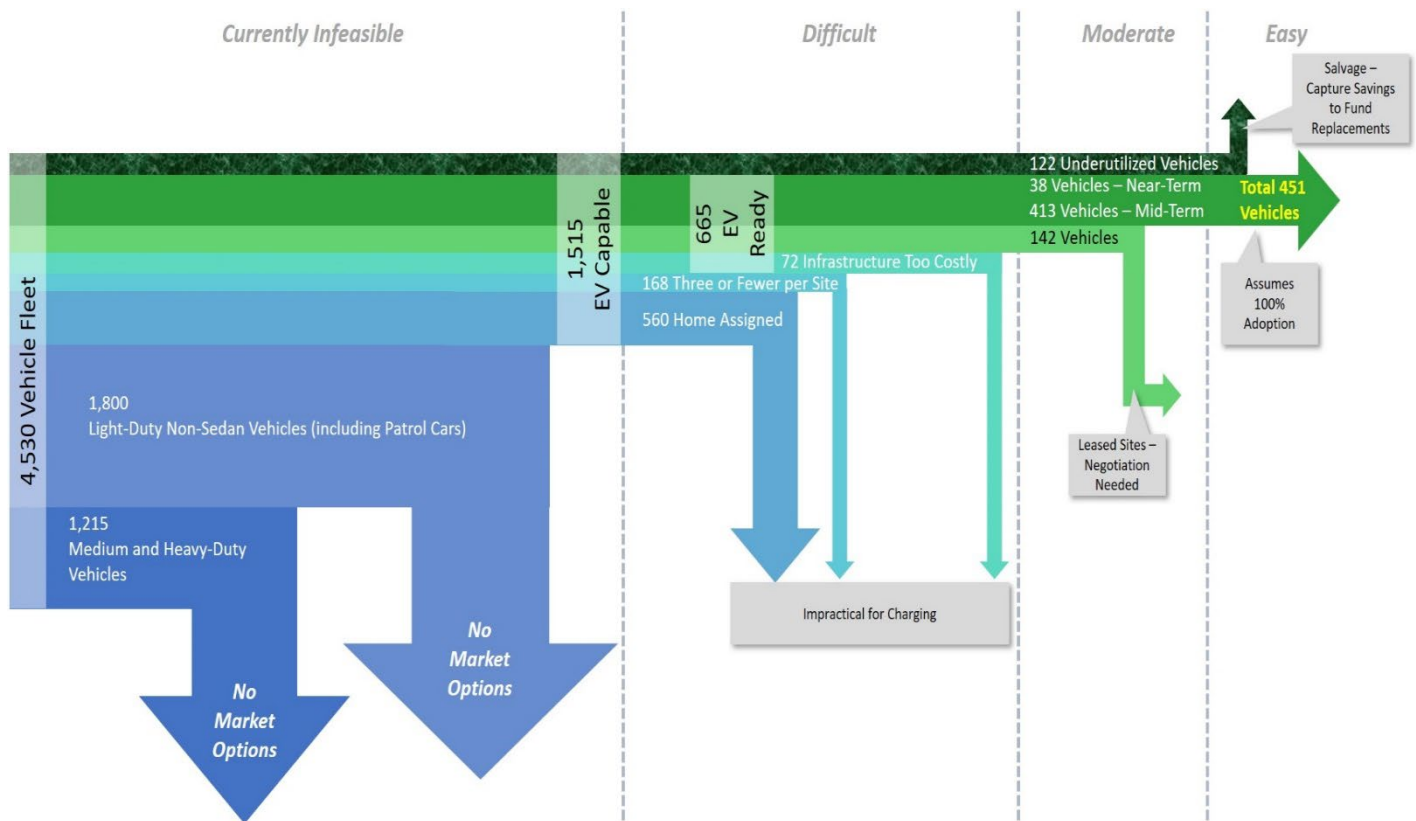


Exhibit 3-2 – Fleet Conversion to EV Flow Diagram

3.2.5 Existing Leased Sites

The feasibility for leased sites has not been studied for this Roadmap since negotiations with landlords is a critical first step. However, costs for installation are included in the analysis and are based on similar owned sites, to establish rough order of magnitude cost. Additionally, because there are only 3 sites included in the list of EV Ready sites with more than 3 but fewer than 6 vehicles, they were identified as opportunities to install mobile PV to EV charging units in the mid-term rollout since no construction is required for placement of these units.

3.2.6 Future New Construction Sites

This Roadmap recommends that Board Policy G-15 be updated so that all new County facilities should include fully operational EV charging infrastructure both for the public/County staff personal use and for Fleet use where feasible. For CINA projects budgeted and projects which are already underway, funding will be needed to augment existing capital budgets in order to accommodate the installation EV charging and potential EV conversions.

3.3 Cost Analysis

The costs included in this document are based on existing conditions and known market-available vehicles. Cost data for infrastructure placement at noted sites were estimated based on high-level planning information by the professional team of engineers and cost estimators. Cost data are conservative, in that they are based on the high end of a range of variables. Future costs will be

influenced by the following factors: infrastructure construction escalation, inflation, further amortization of existing fleet vehicles, and greater consumer demand putting downward pressure on the cost of electric vehicles.

Grant opportunities for infrastructure funding have been available and may continue to be so in the future. It is possible that some of the planned installation work may be augmented by a future SDG&E Power Your Drive Phase; however, this program is currently complete and there is no known date for its extension, which will be subject to approval by the CPUC. Further, prior efforts in the initial Phase of the Power Your Drive Program resulted in several County sites not being eligible for participation due to higher costs for installation. If these program requirements remain in place for future phases, it is likely many County sites identified in this plan may not qualify. Additionally, while several grant opportunities are available to support EV purchase and installation, most of these will not be available until 2020 or later, are competitive statewide grants or provide only limited funds. While all options will be pursued to offset costs identified herein, there is currently no known funding options outside of County funding for vehicle purchases or for charging equipment installation at this time.

4. Recommendations

4.1 Phased Approach

DGS recommends a Near-Term, Mid-Term, Mid-Term Stretch and Long-Term, and options to implementation of the solutions for transitioning the Fleet to EVs and increasing public EVSE.

Near-Term:

1. Adopt amended Board of Supervisors policies to provide DGS with more EV purchasing authority; require General Manager sign-off for EV vehicle replacement exceptions; and require fully operational EV infrastructure in all new County facilities
 - a. H-1 Fleet Management Internal Service Fund
 - b. H-2 Fleet Vehicle and Mobile Equipment Acquisition Policy
 - c. G-15 Design Standards for County Facilities and Property
2. For CINA budgeted and current projects, provide funding or amend CINA budget projections to include fully operational public and fleet EV charging infrastructure as appropriate
3. Fleet ISF will finance the immediate purchase of 38 EV (\$600,000) for the sites at which infrastructure is already available, with the agreement affected departments will turn in their underutilized vehicles to capture the depreciation and auction proceeds to reimburse Fleet ISF within the same Fiscal Year for these EV conversions
4. Identify funding and authorize implementation of Near-Term equipment installation and existing project budget augmentation (\$760,000)

Recommendations for Near-Term Rollout			
Name of Site	Public Vehicles Accommodated	ROM* EVSE Cost (\$M)	Vehicle Premium Cost (\$M)
Sites for Installation of Equipment Only			
North Coastal Live Well Center	5	\$0.06	NA
Borrego Springs Library	2	\$0.02	NA
East County ARCC	9	\$0.11	NA
Sites in Solicitation (Augment Budget)			
Ohio Street Probation Office	4	\$0.05	NA
Juvenile Justice Campus Redev	15	\$0.18	NA
Lakeside Library	4	\$0.05	NA
SE Live Well Center	24	\$0.29	NA
Subtotal - New Sites (public/staff)	63	\$0.76	NA
Total Sites	7		
Name of Site	# EV Ready Vehicles Accommodated	ROM* EVSE Cost (\$M)	Vehicle Premium Cost (\$M)
South Bay Regional Center	11	NA	\$0.16
County Operations Center - PS B	10	NA	\$0.17
North County Regional Center	3	NA	\$0.05
Sheriff HQ	8	NA	\$0.10
County Operations Center - PYD	3	NA	\$0.03
Air Pollution Control District	2	NA	\$0.06
Health Services Complex	1	NA	\$0.03
Subtotal - Existing EVSE	38	NA	\$0.60
Total Sites	7		
Total Costs		\$0.76	\$0.60
Total Cost for Near Term Rollout		\$1.36	

LEGEND
Recent Sites with rough-in (public/staff) - EVSE costs only
Owned Sites with vehicle costs only (existing EVSE)

*ROM - rough order of magnitude

Exhibit 4-1 – Near-Term Rollout

Mid-Term: (\$7.95M)

1. Identify funding and authorize implementation of phase 1 of Mid-Term EV installation plan (\$1.85M)
2. Authorize funding and implementation for phases 2-3 Mid-Term EV installation plan through future budget or CINA process
3. Implement Fleet EV conversions for Mid-Term phases, including 166 vehicles
4. Identify gap funding to bridge the variance between vehicle replacement depreciation and the EV premium for departments to convert to EV and/or coordinate with impacted departments to

turn in their underutilized vehicles to capture the depreciation and auction proceeds to help cover these costs

Recommendations for Mid-Term Rollout Fulfill CAP and Green Fleet Goals			
Name of Site	# EV Ready Vehicles Accommodated	ROM* EVSE Cost (\$M)	Vehicle Premium Cost (\$M)**
Phase 1			
County Operations Center - PS A	35	\$0.93	\$0.92
Subtotal Costs		\$1.85	
Phase 2			
County Operations Center - PS A	84	\$1.84	\$2.21
Subtotal Costs		\$4.05	
Phase 3			
County Operations Center - PS B1	43	\$0.91	\$1.14
Subtotal Costs		\$2.05	
Total Vehicles	162		
Total Sites	3		
Total Cost for Mid-Term Rollout		\$7.95	

LEGEND
Owned Sites with vehicle and infrastructure costs

*ROM - rough order of magnitude

** Based on 2019 costs without escalation

Exhibit 4-2 – Mid-Term Rollout

Mid-Term Stretch:

1. Authorize funding and implementation for Phase 1-4 of Mid-Term Stretch EV installation plan through future budget or CINA process (\$12.20M)
2. Implement Fleet EV conversion for Mid-Term Stretch Phases, including 201 vehicles
3. Identify gap funding to bridge the variance between vehicle replacement depreciation, auction proceeds and the EV premium for departments to convert to EV and/or coordinate with impacted departments to turn in their underutilized vehicles to capture the depreciation and auction proceeds to help cover these costs

Recommendations for Long-Term Rollout Balance of EV Ready Implementation

Name of Site	# EV Ready Vehicles Accommodated	ROM* EVSE Cost (\$M)	Vehicle Premium Cost (\$M)**
Phase 1			
County Operations Center - PS B2	28	\$0.59	\$0.74
County Operations Center - 5530	67	\$1.29	\$1.77
Subtotal Phase 1	95	\$1.88	\$2.51
Phase 2			
Juvenile Justice Campus	38	\$0.93	\$0.80
County Offices San Marcos	34	\$1.00	\$0.80
Subtotal Phase 2	72	\$1.93	\$1.60
Phase 3			
Air Pollution Control District	17	\$0.48	\$0.59
George Bailey - East Mesa Detention	10	\$0.57	\$0.16
Encinitas Sheriff Station	7	\$0.32	\$0.10
Santee Sheriff Station	7	\$0.24	\$0.09
Polinsky Children's Center	6	\$0.37	\$0.13
Rancho San Diego Sheriff	6	\$0.37	\$0.10
Subtotal Phase 3	53	\$2.35	\$1.17
Phase 4			
County Offices - Ramona	5	\$0.16	\$0.09
Alpine Sheriff Substation Site	4	\$0.16	\$0.06
Las Colinas Detention & Reentry	4	\$0.16	\$0.06
Fire - Monte Vista (MVU)	4	\$0.16	\$0.09
Subtotal Phase 4 - Owned Sites	17	\$0.64	\$0.30
PSG sites, solar (3 sites)	14	\$0.56	\$0.20
Subtotal Phase 4 - Leased Sites	14	\$0.56	\$0.20
Total Vehicles	251		
Total Sites	17		

Total Cost for Long-term Rollout **\$12.20**

LEGEND

Owned Sites with vehicle and infrastructure costs

Leased Sites with vehicles and infrastructure costs

*ROM - rough order of magnitude

** Based on 2019 costs without escalation

Long-Term:

1. Convert first responder vehicles, buses, fire apparatus, construction equipment, medium and heavy-duty trucks, large SUVs and 4-wheel drive vehicles when new technology and vehicles become available on the market
2. Evaluate strategies to improve the economic viability of low-density sites and electrify vehicles in the Home Assigned Program
3. Engage owners of leased sites in discussions to implement EV charging infrastructure

Recommendations for Stretch Goals

Name of Site	# EV Ready Vehicles Accommodated
Stretch Goals	
HHSA sites, infrastructure (8)	118
PSG sites, infrastructure (2)	24
Home Assigned Vehicles	560
Total Fleet Vehicles	702

LEGEND
Home Assigned with vehicle costs only
Leased Sites with vehicles and infrastructure costs

Exhibit 4-3 – Long-Term/Stretch Rollout