

COUNTY OF SANTA BARBARA
GENERAL SERVICES

County of Santa Barbara Fleet

Electric Vehicle Analysis

March 19, 2019



GENERAL SERVICES

Prior Measures Taken to Reduce Emissions

Over the past seven years General Services Fleet Division has taken the following steps to reduce fuel use and emissions:

- ✓ 2011 - Implemented expansion of County diesel powered equipment Anti-Idling Policy to include ALL light duty vehicles.
- ✓ 2012 – First EV charging stations installed. Currently have 33 chargers at eight locations throughout the County including several fast chargers.
- ✓ 2013 - Established ECAP Fleet vehicle replacement policy directing that 5% of every annual vehicle order will be comprised of an alternatively fueled vehicle class. (Have been targeting 10% in the last few years)
- ✓ April, 2014 - Acquired four all-electric vehicles for motor-pool use.

The introduction of alternatively fueled vehicles began in 2002. To date the county has owned 48 Hybrid and five All-Electric vehicles.



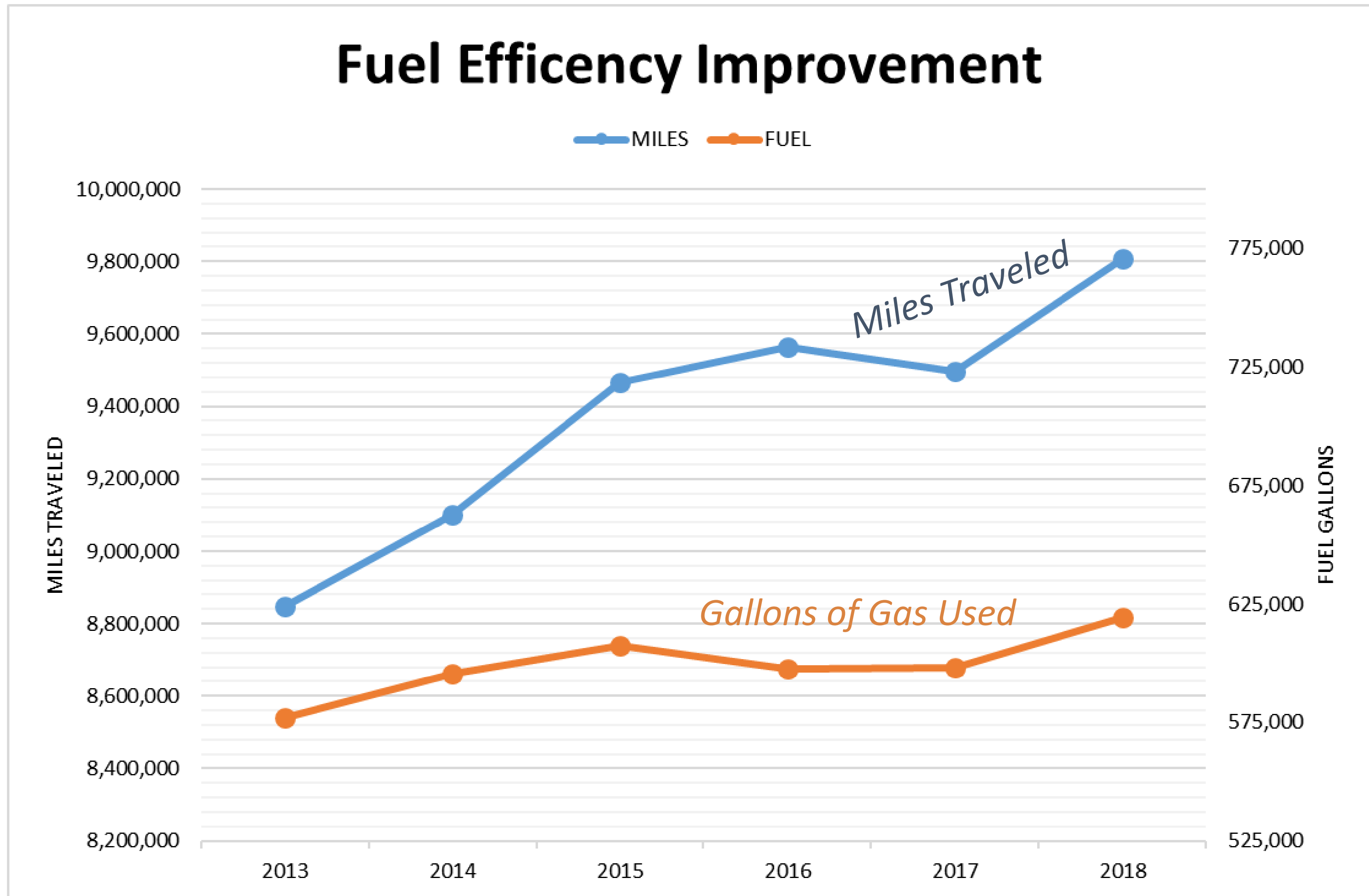
- ✓ May, 2014 - General Services transitioned 100% from petroleum based ULS Diesel fuel to Renewable Diesel fuel. Renewable Diesel meets performance standards of conventional Clear Diesel but is refined from 100% renewable raw materials.
- ✓ June, 2014 - Installed smart idle technology into the Sheriff Patrol fleet. Patrol Sedan class average MPG improvement from 10.9 to 12.1 (2018).
- ✓ January, 2015 – General Services adopts policy to ensure vehicles are “right sized”, optimize fuel efficiency, and when economically feasible, hybrid or alternatively fueled vehicles are purchased.

Since 2013 miles driven on County vehicles has increased by 10.9% while fuel usage has been limited to just a 7.3% growth.



Motor Pool + Assigned Vehicles

Miles Driven / Fuel Gallons Used



The Existing County Fleet

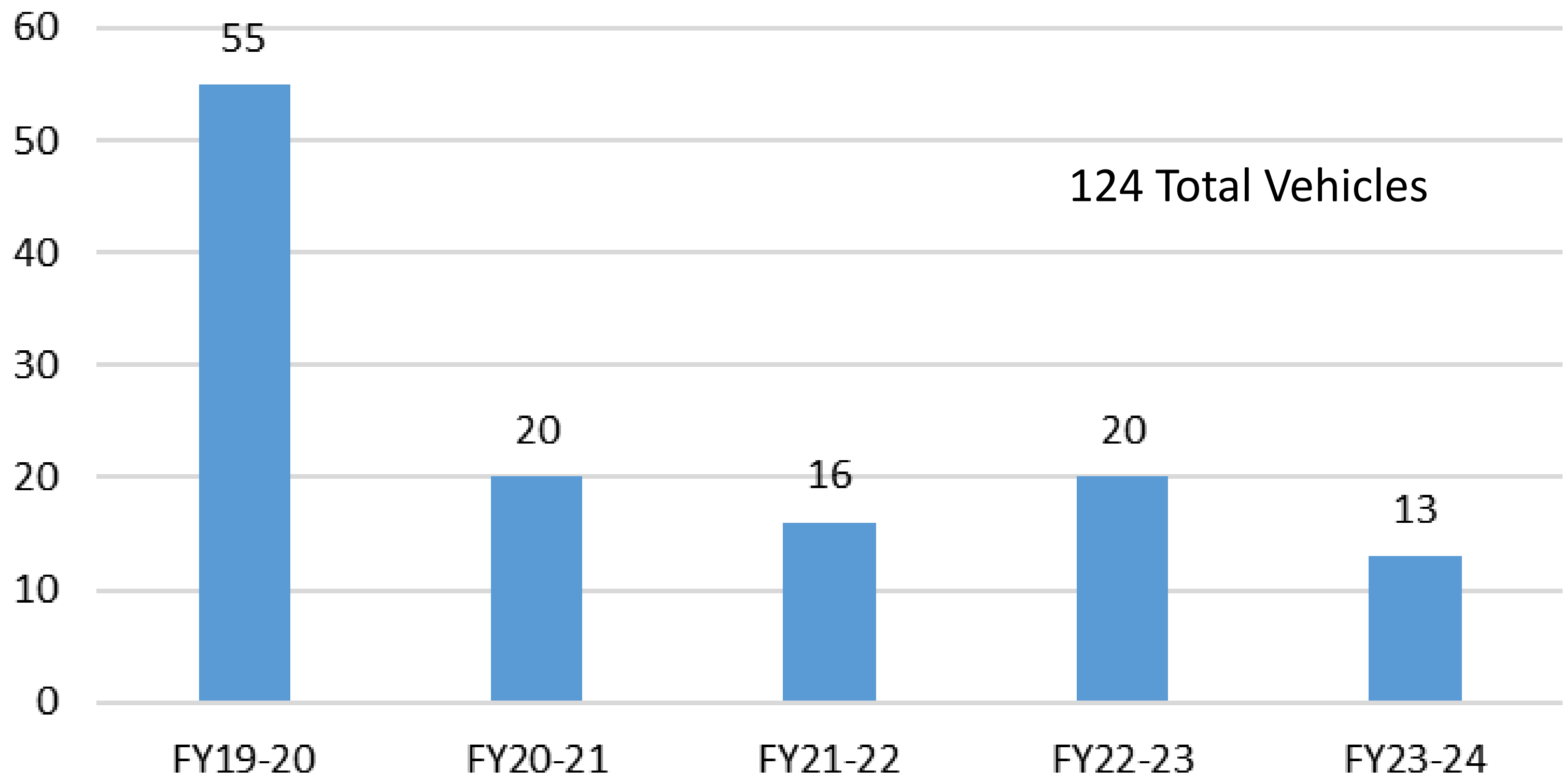
- 1449 total pieces of equipment
- 965 of those are “light duty” vehicles (includes pickups and sedans)
- 240 of those are gasoline powered passenger vehicles
- These 240 vehicles are the focus of this analysis
- Sedans only - No emergency vehicles would be replaced



Assumptions:

- Vehicles will continue to be driven as they have in the past
 - Average miles driven each year for each vehicle will remain constant with no change in driving patterns
- Existing gas vehicles would be replaced with all electric or new Hybrid models when they reach 100,000 miles
- Assumed average annual usage (annual miles driven) and projected when each vehicle will likely hit the 100,000 mile replacement threshold
- Looked at a five year window
- 124 of the 240 gas powered vehicles will reach the 100,000 mile threshold in the next five years and eligible for replacement

Vehicles Expected to be Replaced When They Reach 100,000 miles



Assumptions:

- Two classes of new EV replacement vehicles - long range of at least 200 miles per charge (Chevrolet Bolt or Hyundai Kona), and short range of 100 miles per charge (Nissan Leaf)
- Hybrid vehicles are assumed to be standard Hybrid, not a “plug-in” electric (no charger needed)
- All EV costs shown include EV charger costs. This includes installation, depreciation, and maintenance of the charger

Note that once Board direction is given, staff will endeavor to seek the best possible pricing of chargers and vehicles and will seek out all possible grants, rebates, incentives and financing options available. This includes examining the option of leasing vehicles and purchasing used EVs.



Charger Cost Assumptions

Assumed an average cost of approximately \$14,000 per charger including installation (each charger can charge 2 vehicles):

Historic Costs for Existing County Chargers

- Feb 2012 – grant of \$105,967 for 9 chargers - **average \$11,774 per charger**
- Jan 2015 – donation of \$70,500 for 3 chargers - **\$23,500 per charger**
- Sep 2015 – grant for \$35,130 for 3 chargers - **\$11,710 per charger**
- Aug 2018 – grant for \$20,000 and \$14,574 General Fund dollars for 2 chargers - **\$17,287 per charger**

Vehicle Cost Assumptions¹

Vehicle Type	New Vehicle Purch Price	Add Charger Cost	Less Vehicle Repl Fund Contribution	Less First Year Fuel Savings per Vehicle	Incremental Net Cost per Vehicle ²
Gasoline	\$20,000	\$0	(\$20,000)	\$0	\$0
Hybrid	\$24,000	\$0	(\$20,000)	(\$1,500)	\$2,500
Short Range EV	\$29,200	\$7,700	(\$20,000)	(\$2,700)	\$14,200
Long Range EV	\$33,000	\$7,700	(\$20,000)	(\$2,700)	\$18,000

- 1) Numbers shown are an average of all data over the five year forecast period
- 2) Net incremental cost is the cost over and above the cost of the gasoline vehicle it replaces, and takes into account the first year average annual fuel savings



Possible Vehicle Replacement Strategies

1. Continue current practice in accordance with the Board approved vehicle replacement policy, that 5% of every annual vehicle order will be comprised of an alternatively fueled vehicle class
2. Over the next five years, existing vehicles would be replaced with all **electric** models when they reach 100,000 miles
3. Over the next five years, existing vehicles would be replaced with standard **hybrid** models when they reach 100,000 miles
4. Over the next five years, existing vehicles could be replaced with a mix of electric and hybrid models



Strategy 2 – ALL ELECTRIC – SHORT RANGE

The approximate cost of the short range (100 miles per charge) electric vehicle purchased is assumed to be \$29,200 vs. an average of approximately \$20,000 for gas vehicles (therefore an additional \$9,000 would be needed to purchase the electric vehicle)

The approximate cost of purchasing and installing a charging station is \$7,700 per new vehicle purchased

Average fuel savings is expected to be approximately \$2,700 per vehicle

Total incremental cost of replacing a gas vehicle with a short range EV is approximately \$14,200

Strategy 2 – ALL ELECTRIC – LONG RANGE

The approximate cost of the long range (200 -250 miles per charge) electric vehicle purchased is assumed to be \$33,000 vs. an average of approximately \$20,000 for gas vehicles (therefore an additional \$13,000 would be needed to purchase the electric vehicle)

The approximate cost of purchasing and installing a charging station is \$7,700 per new vehicle purchased

Average fuel savings is expected to be approximately \$2,700 per vehicle

Total incremental cost of replacing a gas vehicle with long range EV is approximately \$18,000

Strategy 2 – ALL ELECTRIC

Over the next five years, existing gas vehicles would be replaced with all electric models when they reach the 100,000 mile threshold

Fiscal Year	# Vehs Expected to be Replaced	Net Incremental Cost of Shorter Range EVs After Fuel Savings	Net Incremental Cost of Long Range EVs After Fuel Savings	GHG ¹ Reduction Switching to EVs
FY19-20	55	\$600,271	\$792,771	245
FY20-21	20	\$253,813	\$325,913	92
FY21-22	16	\$261,569	\$320,980	61
FY22-23	20	\$350,138	\$426,629	84
FY23-24	13	\$298,656	\$349,866	42
	124	\$1,764,447	\$2,216,159	524

1) Metric tons of CO2

Strategy 3 – ALL HYBRID

The approximate cost of the standard Hybrid vehicle purchased is assumed to be \$24,000 vs. an average of approximately \$20,000 for gas vehicles (therefore an additional \$4,000 would be needed to purchase the Hybrid vehicle)

No charging station will be needed

Average fuel savings is expected to be \$1,500 per vehicle

Total incremental cost of replacing a gas vehicle with Hybrid is approximately \$2,500



Strategy 3 – ALL HYBRID

Over the next five years, existing gas vehicles would be replaced with standard hybrid models when they reach the 100,000 mile threshold

Fiscal Year	# Vehs Expected to be Replaced	Net Incremental	
		Cost of Hybrids After Fuel Savings	GHG ¹ Reduction Switching to Hybrids
FY19-20	55	\$98,814	115
FY20-21	20	\$23,710	43
FY21-22	16	\$43,701	29
FY22-23	20	\$71,616	39
FY23-24	13	\$73,531	20
	124	\$311,372	247

1) Metric tons of CO2



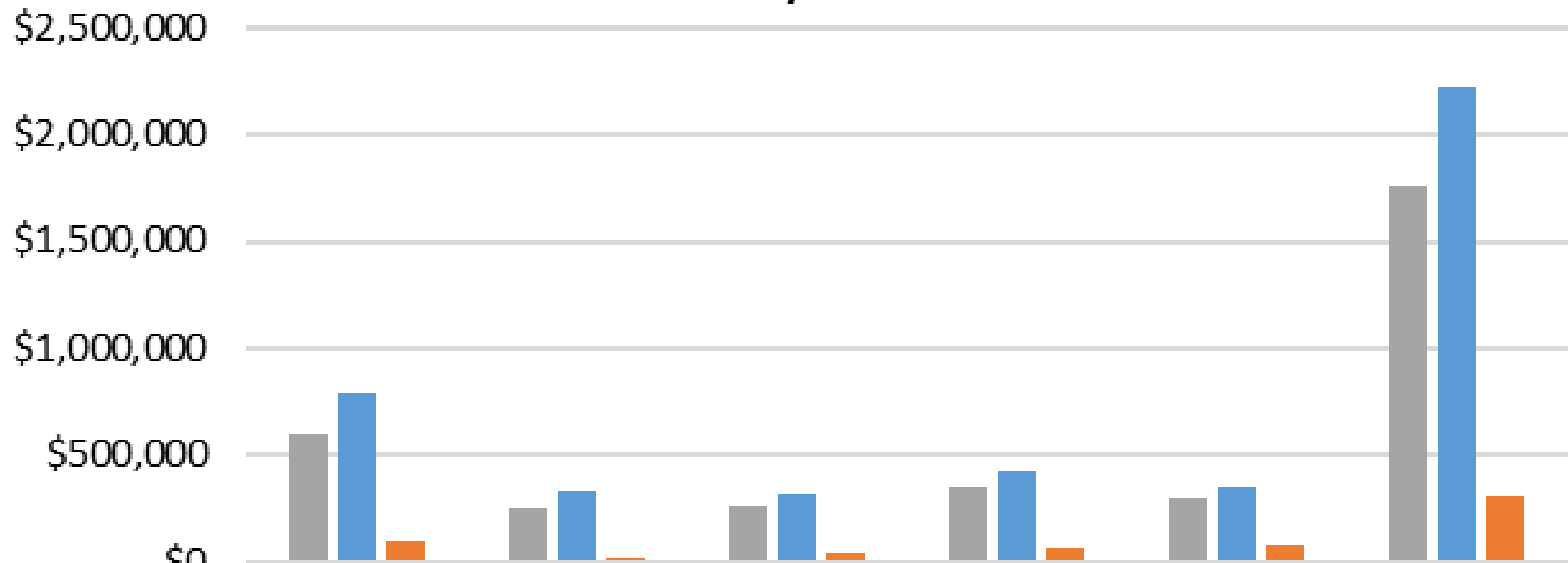
Strategy 4 – MIX OF SHORT RANGE / LONG RANGE EVs and HYBRID

Over the next five years, existing gas vehicles would be replaced with a mix of short and long range EVs and standard hybrid models when they reach the 100,000 mile threshold

Vehicle Type	Incremental Net Cost per Vehicle	% of 124 Eligible Vehicles	# Vehicles Replaced	Approximate Cost
Hybrid	\$2,500	20%	25	\$62,000
Short Range EV	\$14,200	50%	62	\$880,400
Long Range EV	\$18,000	30%	37	\$669,600
			124	\$1,612,000



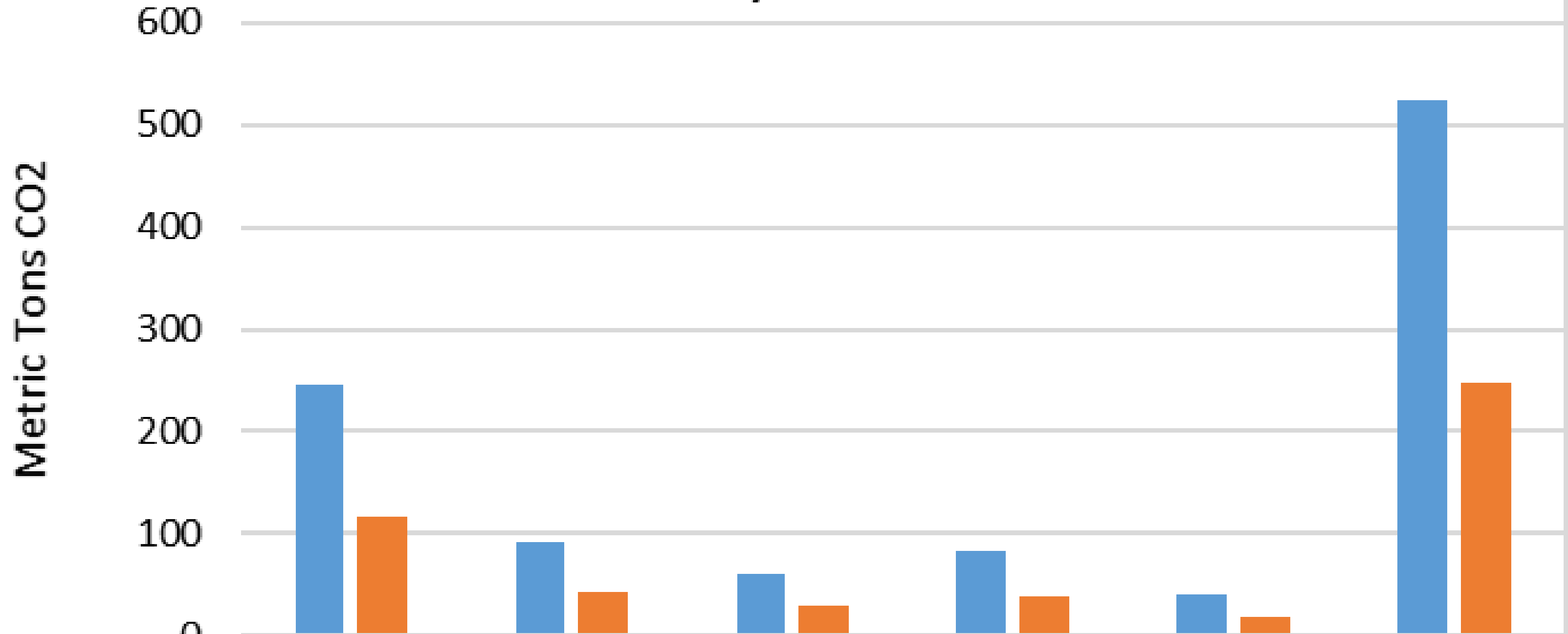
Net Incremental Cost Comparison of Replacing Gas Vehicles EVs vs Hybrids



	FY19-20	FY20-21	FY21-22	FY22-23	FY23-24	Total
■ Short Range EVs	\$600,271	\$253,813	\$261,569	\$350,138	\$298,656	\$1,764,44
■ Long Range EVs	\$792,771	\$325,913	\$320,980	\$426,629	\$349,866	\$2,216,15
■ Hybrids	\$98,814	\$23,710	\$43,701	\$71,616	\$73,531	\$311,372

Number of Vehicles Replaced	55	20	16	20	13	124
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Greenhouse Gas Reduction Comparison when Replacing Gas Vehicles EVs vs Hybrids



Long Range EVs	245	92	61	84	42	524
Hybrids	115	43	29	39	20	247

Number of Vehicles Replaced

55

20

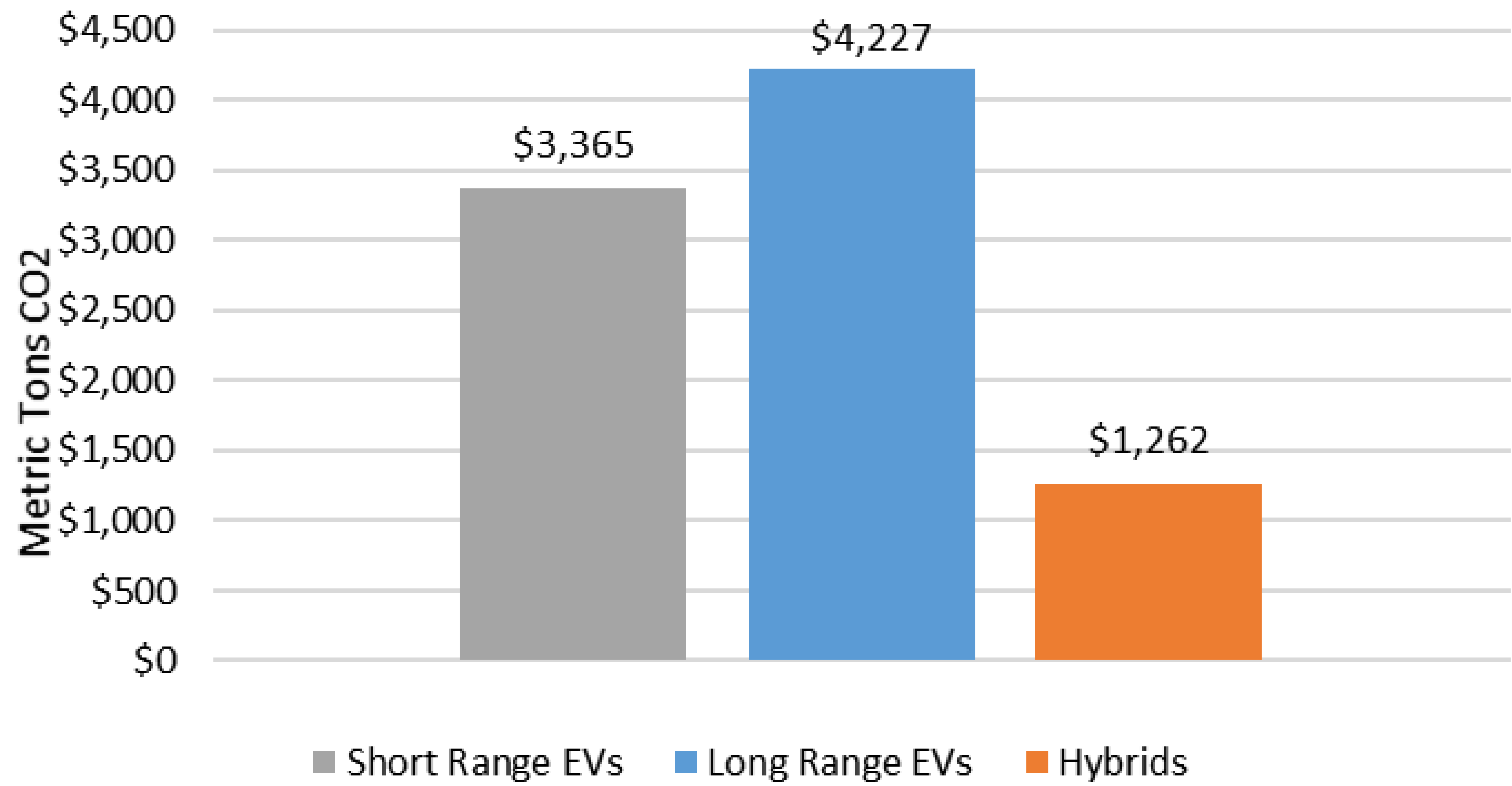
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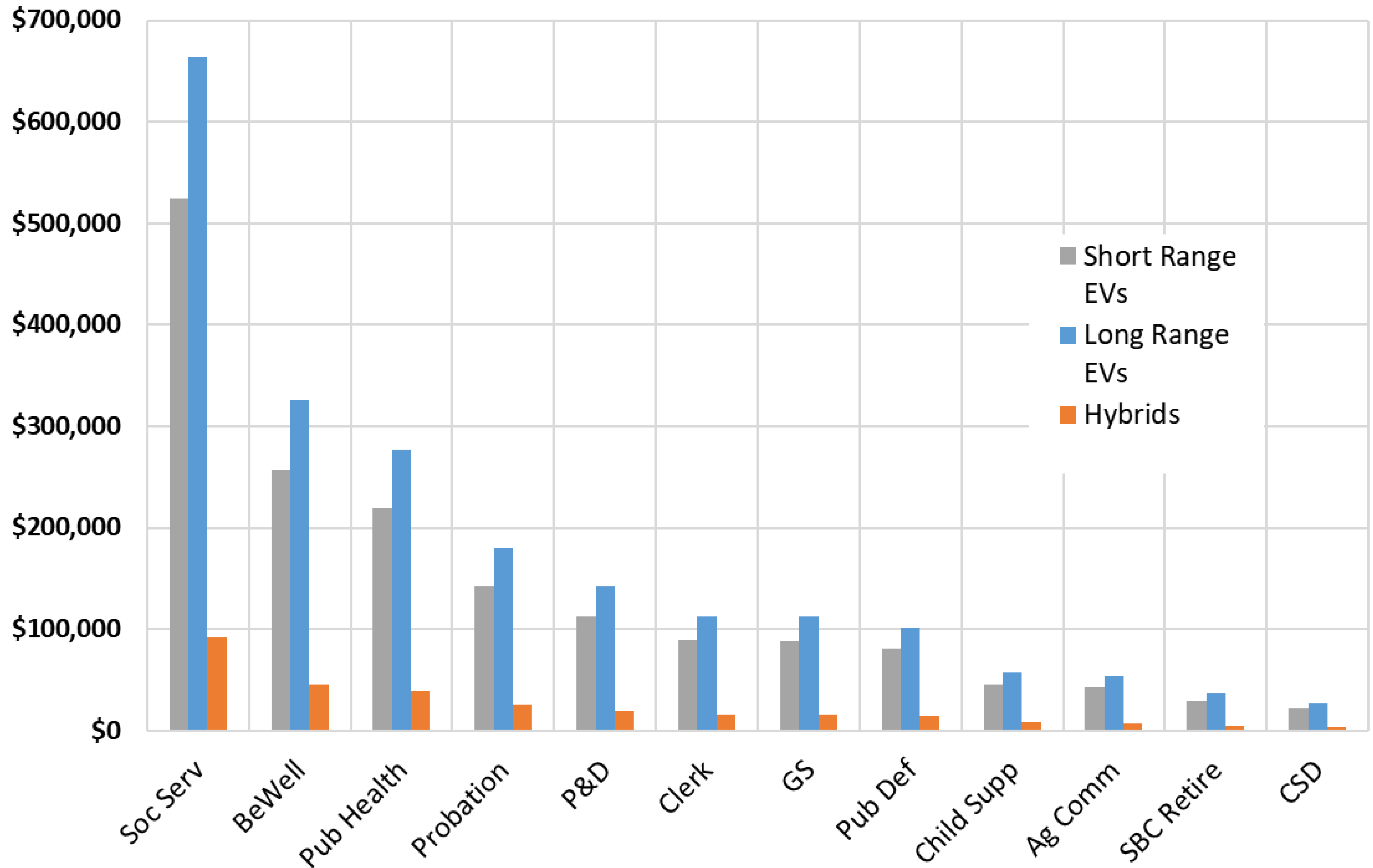
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Estimated Cost to Reduce One Ton of CO2 EVs vs Hybrids



Potential Cost Impact to Departments

Impact to Departments -
Replacing Gas Vehicles with Short or Long Range EVs, or Hybrids
(Five Year Total - Most Active Users Only)



Summary of Possible Vehicle Replacement Strategies

1. Continue current 5% replacement practice – no change from current direction
2. Replace 124 gas vehicles over the next five years with all electric models – Net cost: **\$1.7 to \$2.2 million**, ~ 520 metric tons CO2 reduced
3. Replace 124 gas vehicles over the next five years with all Hybrid models – Net cost: **\$0.31 million**, ~ 240 metric tons CO2 reduced
4. Over the next five years, existing vehicles could be replaced with a mix of electric and hybrid models – Net cost could vary

Recommend an incremental roll out regardless of strategy chosen



Recommended Actions

- a) Receive and file the Santa Barbara County Electric Vehicle Report
- b) Provide direction to staff
- c) Determine that the proposed actions are not a “project” as defined by the California Environmental Quality Act (CEQA) Guidelines



