

ELECTRIFYING TRANSPORTATION  
IN THE ENERGY CAPITAL

# EV FLEET INSIGHTS

ELECTRIFICATION FEASIBILITY ASSESSMENT

Harris County  
September 10, 2021



EVOLVE  
HOUSTON

POWERED BY



# Harris County: Executive Summary

EVolve Houston and eIQ Mobility evaluated the near-term opportunity to cost-effectively electrify the light-duty subset of the Harris County vehicle fleet. This assessment identifies electrification feasibility with the electric vehicle models and internet-connected charging infrastructure known to be on the market in the next 2 years; these results will improve over time as the market matures.

## Total Electrification Opportunity

Using EValuate, eIQ Mobility's proprietary fleet electrification analytics software, we analyzed 3,390 light-duty internal combustion engine (ICE) vehicles in Harris County's municipal fleet that had sufficient historical vehicle and fuel transaction data. eIQ identified 2,623 technically feasible EVs, 1,454 of which are economically feasible based on the lifetime total cost of ownership (TCO) of the vehicles. Electrifying these economically feasible vehicles alone could generate \$10.5M in lifetime total cost of ownership (TCO) savings.

## Technically Feasible EVs: 2,623 vehicles can be electrified by 2023

We considered the electrification potential of the Harris County fleet by considering all known EV models through 2023 which have substantial publicly available specifications. The EV selected most frequently was the Tesla Model 3, with a range of 263 miles and a starting price of \$36,990.

Electrifying these 2,623 vehicles would reduce CO2 emissions by 15,000 metric tons annually, a 60% reduction equivalent to the annual electricity emissions of 3,200 homes. The 767 vehicles that were not technically feasible were disqualified for the following reasons:

- 0 vehicles did not have an EV of the right vehicle type and weight class.
- 505 vehicles did not have an EV that could cover the vehicle's daily range requirements.
- 196 vehicles were not able to fully charge in the available time at the vehicle depot.

## Cost-Effective EVs: 1,400+ vehicles can be electrified cost-effectively

In addition, we determined that **Harris County can electrify over 40% of its light-duty vehicles while reducing TCO by \$10.5M.** This savings value includes charger hardware and installation costs and corresponds to an average lifetime TCO reduction of \$7,200 per EV. Electrifying these 1,454 vehicles would reduce CO2 emissions by 8,514 metric tons annually, a 60% reduction for selected vehicles, equivalent to eliminating the CO2 footprint from powering 1,769 average U.S. homes.

In the following table, we show the TCO impact of electrifying these 1,454 EVs at all locations. To demonstrate the total electrification potential of Harris County's fleet, the following report highlights the impact by location, with a deep dive into the electrification opportunity of the 5 depots with the highest number of EVs.

## Economic Impact of Electrifying 1,454 Economically Feasible EVs

	EV Costs (NPV)	ICE Costs (NPV)	EV - ICE Costs (NPV)
Capex Vehicle	\$70.6M	\$51.6M	\$19.0M
Vehicle Incentives	\$0	N/A	\$0
Capex Infrastructure	\$5.0M	N/A	\$5.0M
Infrastructure Incentives	\$0	N/A	\$0
Fuel	\$8.6M	\$24.0M	-\$15.4M
Maintenance	\$15.3M	\$28.5M	-\$13.2M
Vehicle Resale Value	-\$13.6M	-\$7.7M	-\$5.9M
<b>Net Costs</b>	<b>\$85.9M</b>	<b>\$96.4M</b>	<b>-\$10.5M</b>

EV TCO will continue to decrease in the coming years as OEMs continue to scale production of electric vehicles. We expect these results to be indicative of the feasibility and economic impact of replacing Harris County's fleet with EVs, as OEMs continue to release more models.

### Cost-Effective EVs: Department Breakdown

Economically feasible EVs were identified within 29 Harris County departments. The following table shows the number of EV candidates for the five departments with the highest number of EV candidates.

Department	Number of EVs
Patrol & Administration	503
Constable, Precinct 1	174
Constable, Precinct 5	142
Toll Road	102
Constable, Precinct 4	80

### Incentives

For the preliminary Harris County analysis, we did not include EV grants or incentives in order to provide a conservative estimate of fleet electrification potential. Any additional grants or incentives that Harris County is eligible for will improve the economic feasibility of replacing ICE vehicles with EVs.

### Model Assumptions

We applied a conservative model to identify vehicles that could address existing fleet vehicle operational requirements:

- Financials – We assumed vehicles are owned for 8 years and used a 2.5% discount rate for future cash flows.

- Maintenance – We utilized maintenance cost data provided by Harris County and assume that EVs will reduce vehicle maintenance costs by 50%.<sup>1</sup> In addition, we have included the estimated costs of replacing the EV battery if required, based on the expected degradation of the battery and the range requirements of the vehicle. In our analysis, **battery replacement is required for 78 Harris County EVs within the 8-year ownership period**. However, the majority of new EVs offer an 8-year, 100,000-mile battery warranty.
- Range – Each feasible EV, charged overnight with a dedicated charger at the specified vehicle depot or employee residence, will be able to cover the vehicle’s daily range requirements at least 90% of the time. For the remaining up to 10% of trips, we assumed Harris County employees can utilize available public charging.
- Charging time – Each recommended EV can charge outside the design operational hours for each fleet vehicle.
- Vehicle Capex – We compared the provided purchase price of each Harris County vehicle to the capex of new EVs tracked by eIQ Mobility. Additional business incentives will only increase the number of economically feasible EVs and savings from electrification.
- Charger Capex – We recommend the least-cost charger models that meet the power requirements of each vehicle. In this assessment, Enel X JuiceBox Pro chargers were selected. We have only considered networked chargers that are internet-connected and can share charging data with Harris County and with the local utility as part of EV charging or demand response programs. Additional site upgrade costs, such as a new electric panel, will vary by location, and are not included in this cost analysis. Charger maintenance costs are also not included, as these costs will vary depending on the warranty structure of the selected chargers.

## Next Steps

The following list highlights our recommended next steps for Harris County fleet leaders to pursue. The action items are based on Harris County’s unique fleet characteristics and insights from past clients who have embarked on their electrification journey.

- Work with EVOlve Houston to build an employee survey to gauge interest in electric vehicles and identify departments that are ideal candidates for initial deployments.
- Work with EVOlve Houston to identify potential EV and charger grants and incentives, with specific emphasis on capturing a portion of the \$7,500 federal EV tax credit.
- Begin familiarizing drivers with electric vehicles. EV “ride and drive” events have proven useful for increasing awareness in and accelerating the adoption of EVs.
- Identify subset of electrifiable ICE vehicles that are approaching retirement and coordinate with procurement and fleet managers to select EVs that meet technical, economic, and operational requirements.
- Work with OEMs such as Ford and Tesla to pilot EVs in Harris County’s patrol vehicle fleet.

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<sup>1</sup> According to a Sept. 2020 [analysis by Consumer Reports](#), light-duty EV owners save an average of 50% on maintenance and repair. [Studies](#) of electric transit buses have reported maintenance savings of 64%, and our school bus fleet partners have reported maintenance savings of 60%.

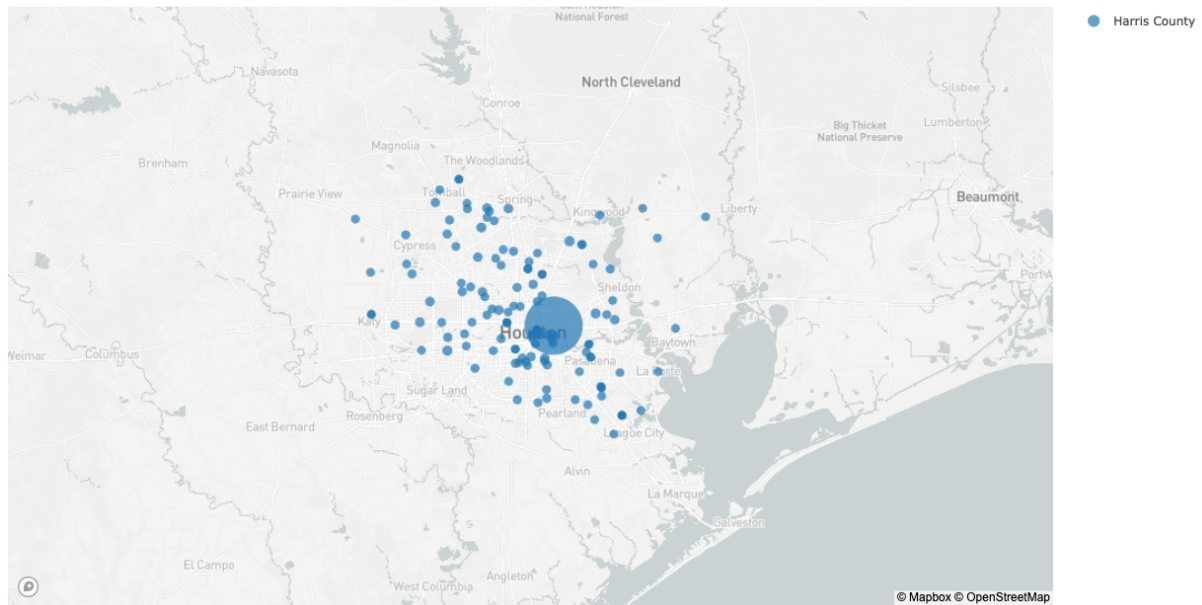
- Study the operational feasibility of replacing large SUVs with EV pickup trucks or smaller EV SUVs that will be readily available at more affordable price points.
- Partner with an OEM, an EV charger company, or other third party to develop a strategy for deploying EV smart chargers at employee homes. Key considerations include home ownership, electrical capacity, employee charging reimbursement, and local utility coordination.

### **Electrification Assessment**

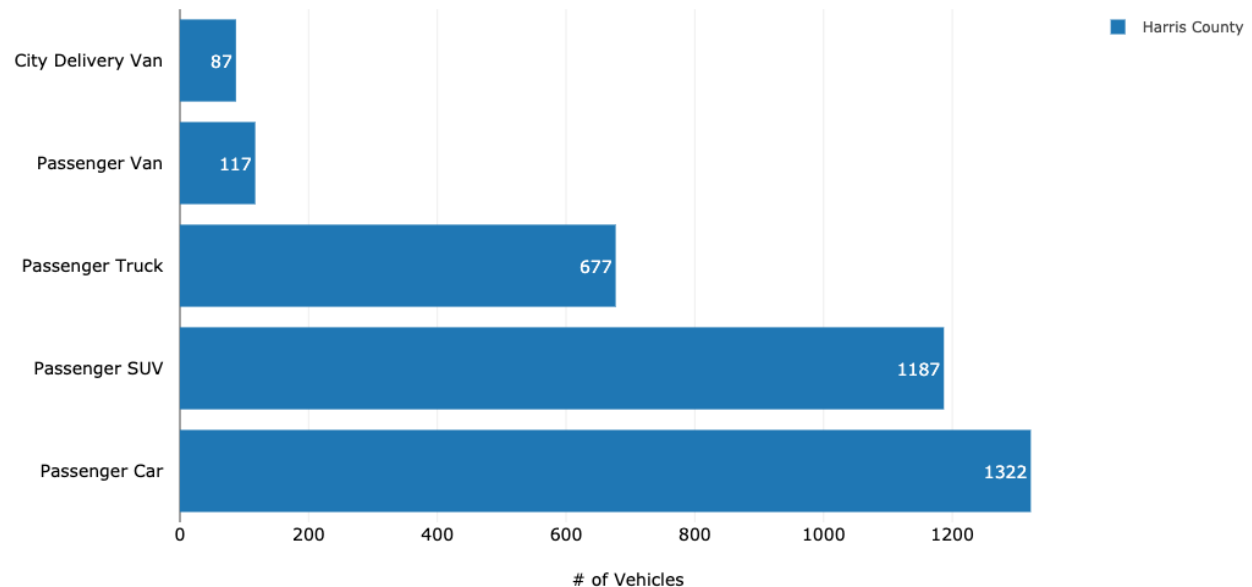
The following report focuses on the top 5 locations for electrification based on the number of EVs; these 5 locations represent 72% of all economically feasible EVs in the fleet. For each location, a table shows details for the top EVs by NPV savings. For the purposes of this section, take-home vehicles are bundled as a single location, and details are shown for the top 36 take-home EVs. Additionally, a separate data file will be provided which shares details for all 1,454 economically feasible EVs.

## Your Fleet: How We See It

This report analyzes 3390 vehicles across 133 locations:



### Number of Vehicles by Vehicle Type



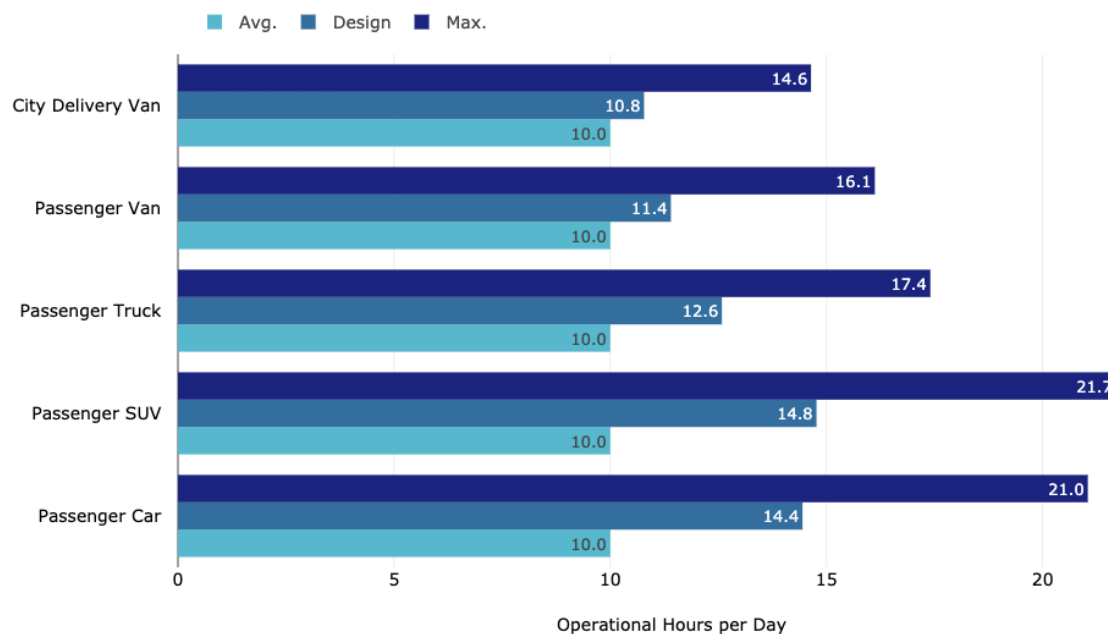
## Recommended EVs: Ensuring EVs Meet Your Fleet's Operational Requirements

We choose the least-cost EV candidates that meet the following operational requirements:

1. **Vehicle type:** EV matches the vehicle type and weight class for existing fleet vehicle
2. **Range:** EV range is sufficient to support the fleet vehicle's daily range requirement, accounting for reduced EV range in extreme climates
3. **Charging:** EV, with recommended charger, can fully charge to meet the daily range requirement during non-operating hours

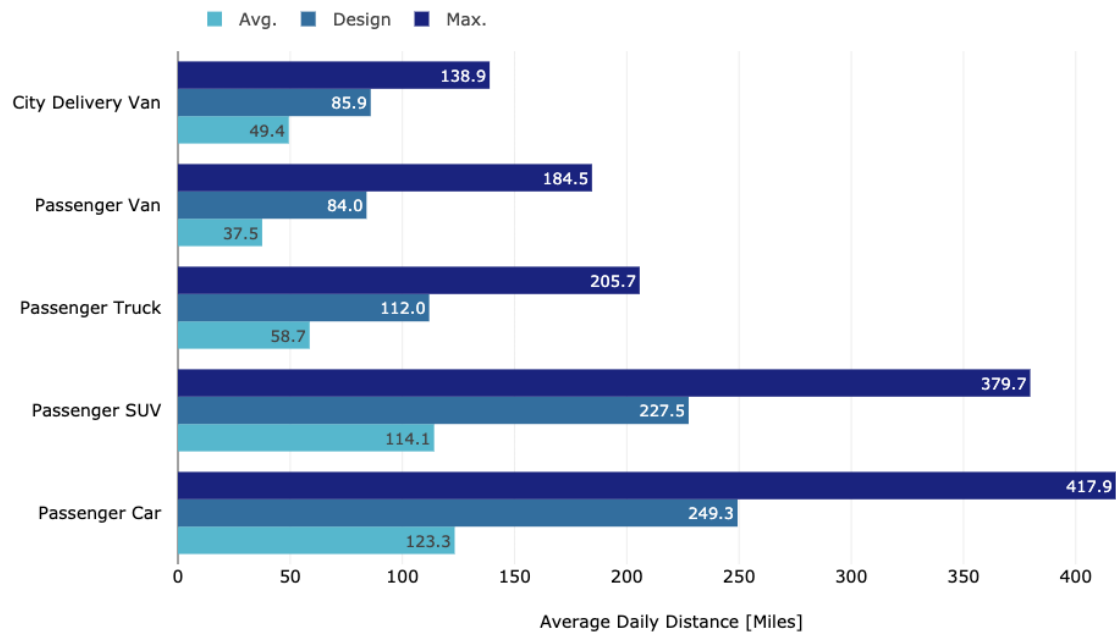
The operating hours for your fleet vehicles are assumed to be the [design](#) operational hours: EVs must be able to fully charge each day outside these operating hours.

### Operational Hours by Vehicle Type



The minimum EV range requirement for your fleet vehicles is based on **design** mileage: EVs, charged outside operational hours, cover **90%** of each vehicle's daily miles traveled.

### Daily Distance by Vehicle Type

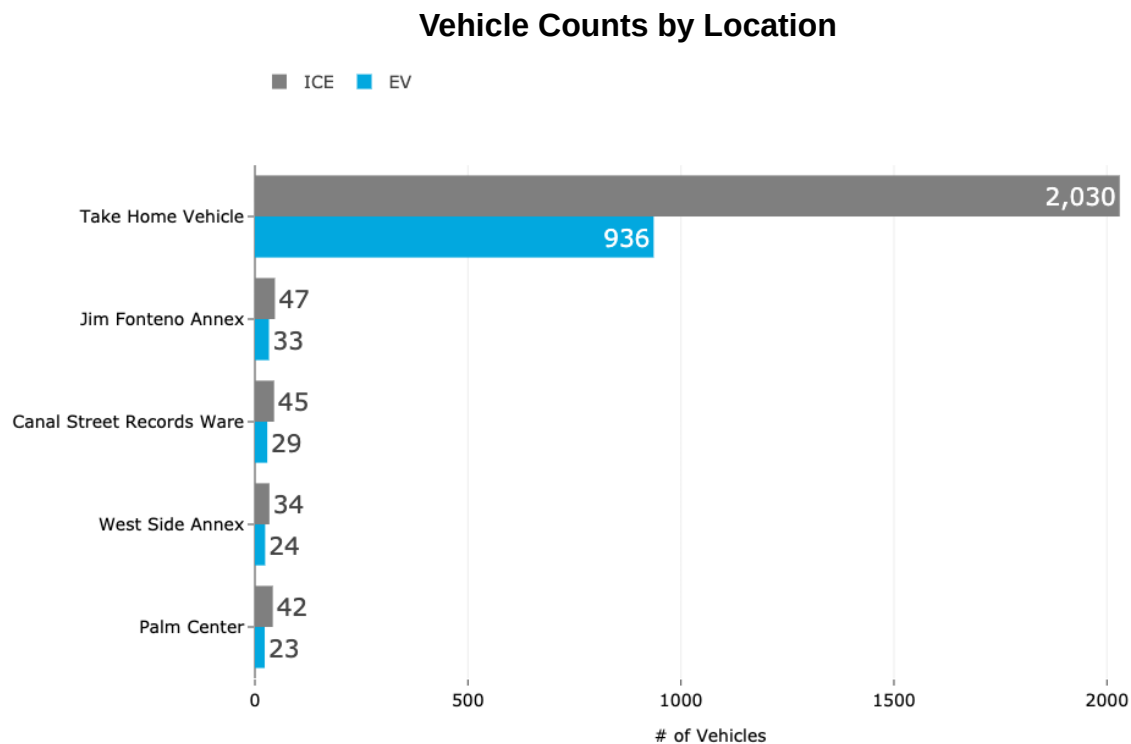


## Your Fleet: Electrification Opportunity

This report recommends all **economically feasible** EVs, where the EV total cost of ownership (TCO) is estimated to be less than **100%** of the TCO of a new internal combustion engine (ICE) vehicle.

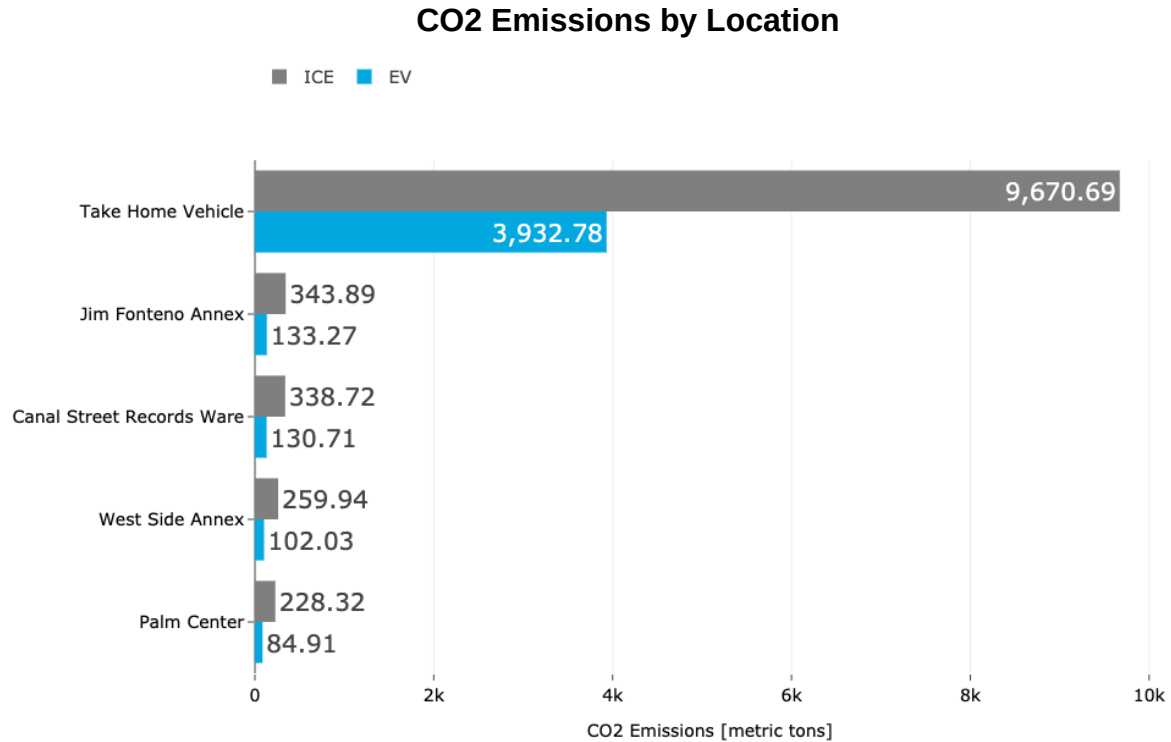
### Recommended vehicles to replace with EVs

Of the **5** locations analyzed, **1,045** out of **2,198** ICE vehicles have a feasible EV model:



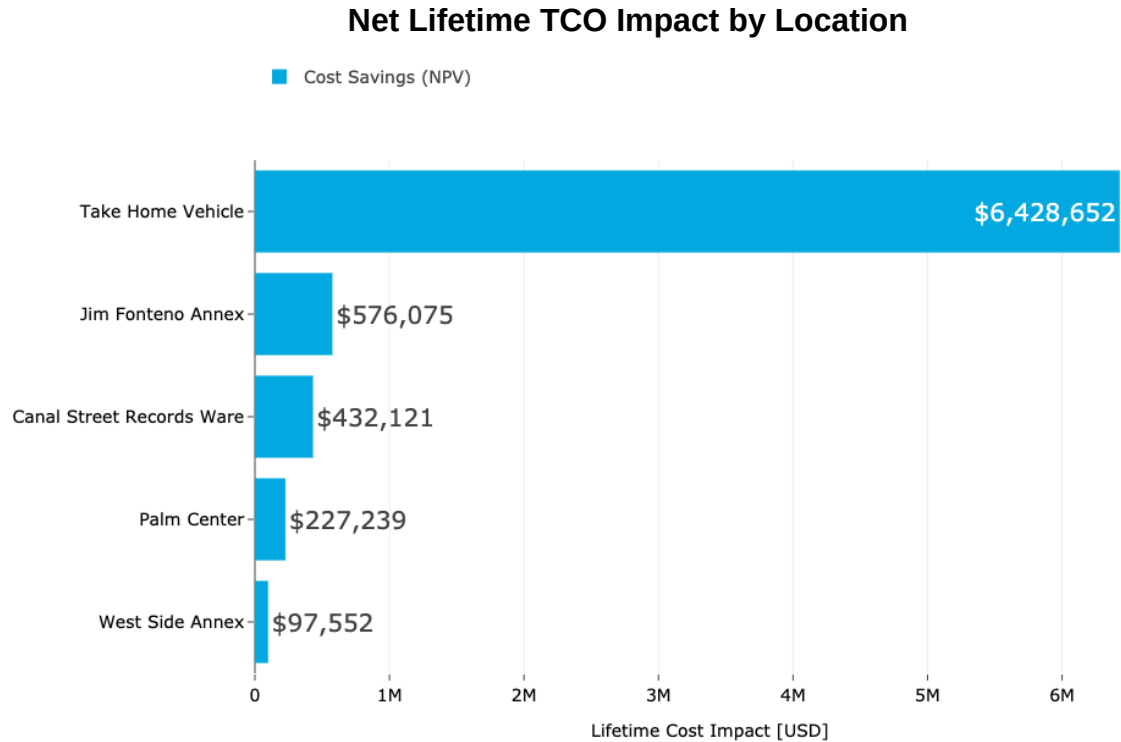
## Sustainability impact of electrifying feasible vehicles

Procuring these recommended EVs would decrease CO2 by 6457.86 metric tons (60%) annually:



## Economic impact of electrifying all feasible vehicles

Procuring these recommended EVs would reduce costs by **\$7,761,638** over **8** years, on a net present value (NPV) basis:

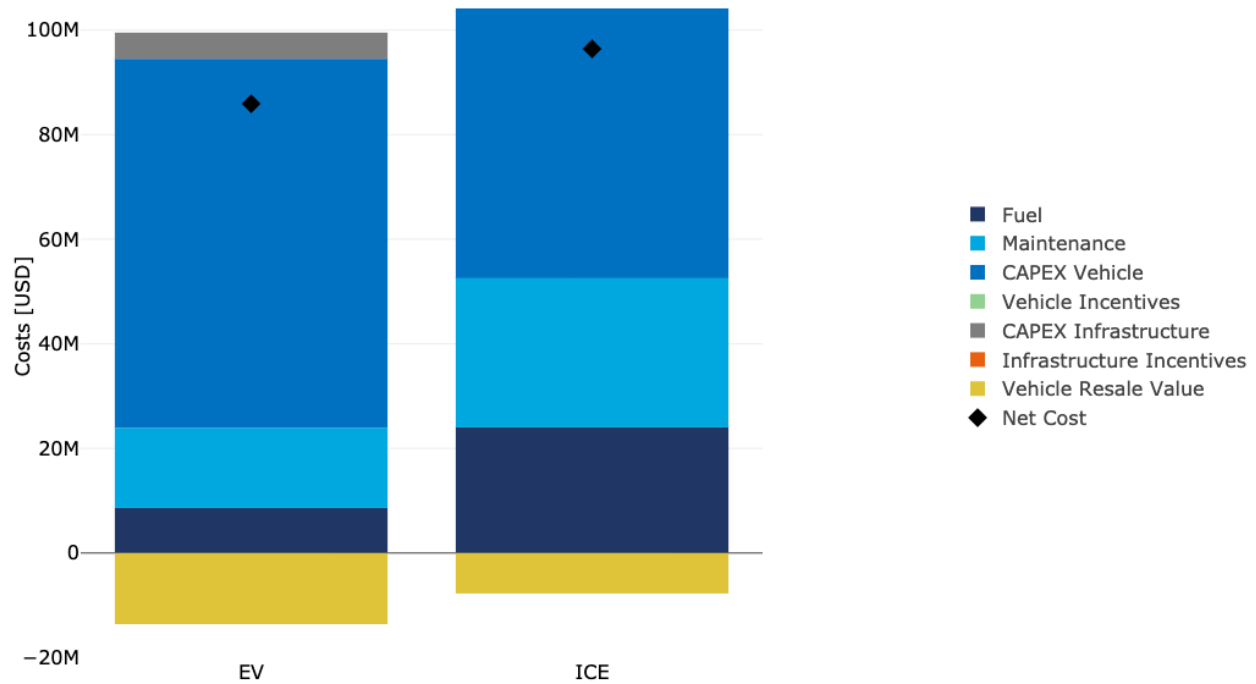


## Overall EV vs. ICE Cost Analysis

The estimated TCO for new EVs is compared to the TCO of new equivalent ICE vehicles. The TCO is calculated on a net present value (NPV) basis, assuming vehicles are owned for 8 years:

### Overall EV vs. ICE Cost (NPV)

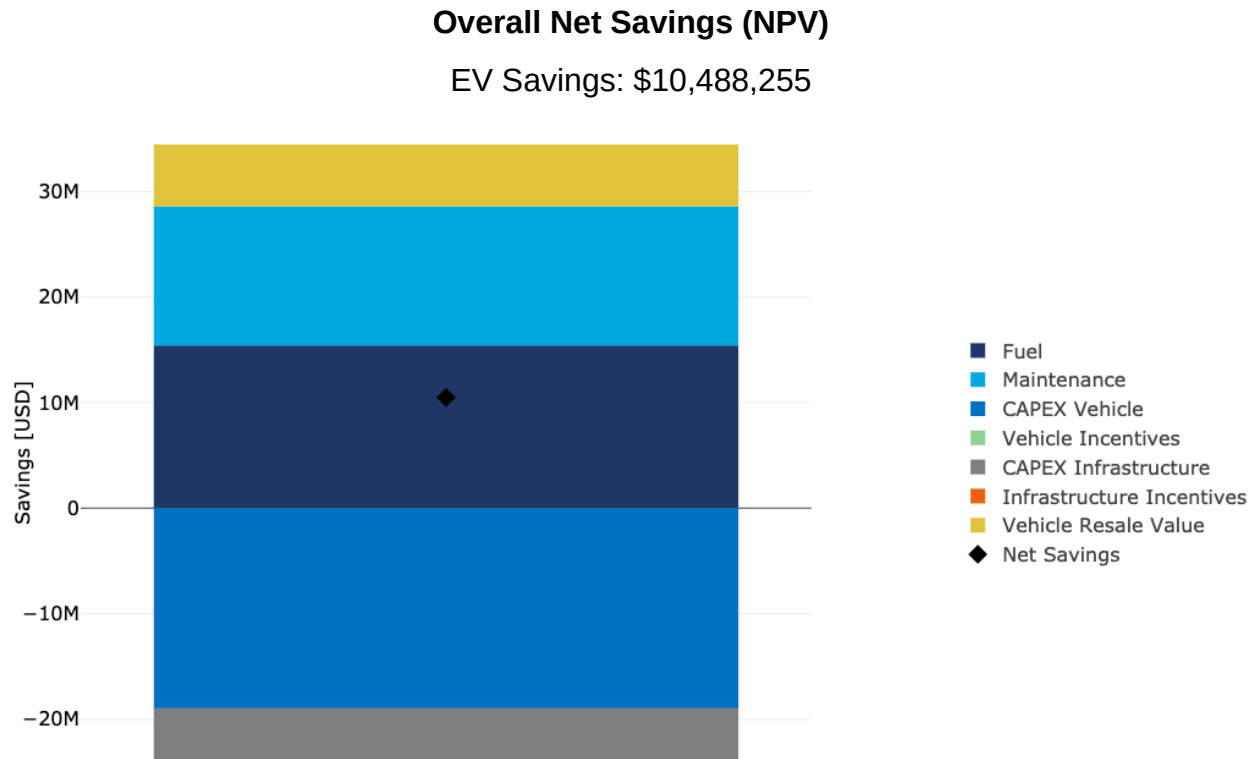
EV Net Cost: \$85,899,728, ICE Net Cost: \$96,387,983



	EV Cost (NPV)	ICE Cost (NPV)
Fuel	\$8,603,888	\$24,025,036
Maintenance	\$15,322,752	\$28,504,197
CAPEX Vehicle	\$70,572,534	\$51,595,378
Vehicle Incentives	\$0	\$0
CAPEX Infrastructure	\$4,997,166	\$0
Infrastructure Incentives	\$0	\$0
Vehicle Resale Value	-\$13,596,612	-\$7,736,628
<b>Net Cost</b>	<b>\$85,899,728</b>	<b>\$96,387,983</b>

## Overall Net Savings Analysis

In the following figure, cost reductions are shown as positive, and cost increases from electrification are shown as negative.

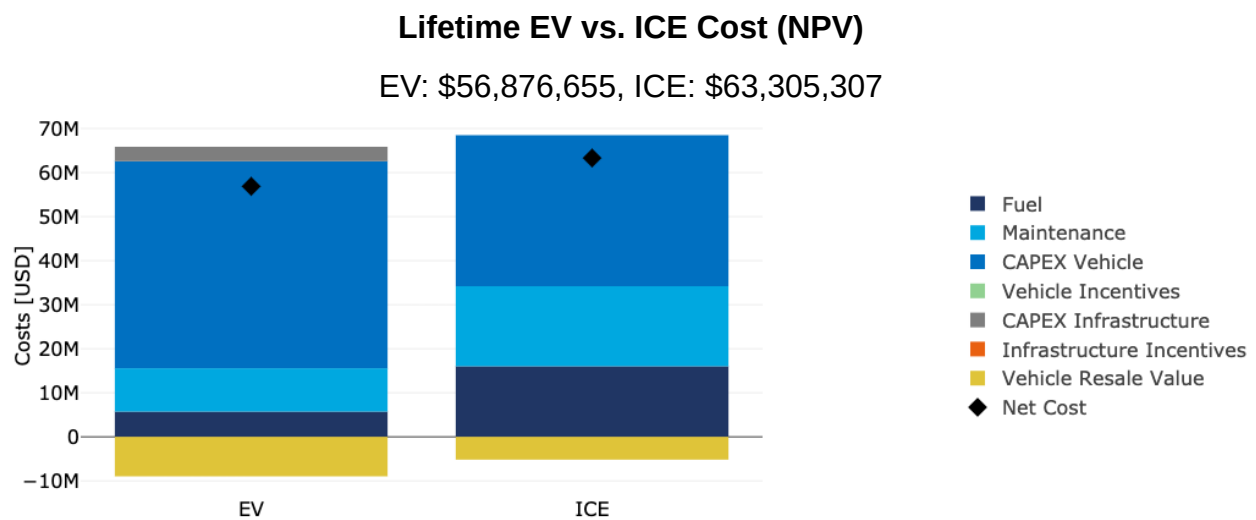


	Savings (NPV)
Fuel	\$15,421,148
Maintenance	\$13,181,445
CAPEX Vehicle	-\$18,977,156
Vehicle Incentives	\$0
CAPEX Infrastructure	-\$4,997,166
Infrastructure Incentives	\$0
Vehicle Resale Value	\$5,859,985
<b>Net Savings</b>	<b>\$10,488,255</b>

## Electrification Opportunity: Take Home Vehicle

936	2030	5737.91	936
EV Candidates	Existing Vehicles	Metric Tons of CO2 Saved per Year	Enel X JuiceBox Pro 80 Chargers

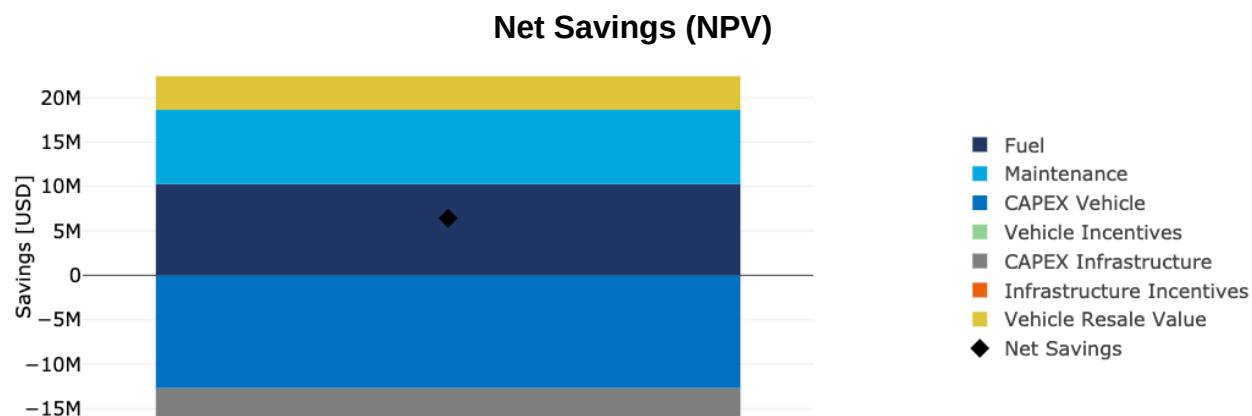
The estimated TCO for new EVs is compared to the TCO of new equivalent ICE vehicles. The TCO is calculated on a net present value (NPV) basis, assuming vehicles are owned for 8 years:



	EV Cost (NPV)	ICE Cost (NPV)
Fuel	\$5,738,632	\$16,030,605
Maintenance	\$9,826,855	\$18,167,111
CAPEX Vehicle	\$47,011,000	\$34,289,720
Vehicle Incentives	\$0	\$0
CAPEX Infrastructure	\$3,275,064	\$0
Infrastructure Incentives	\$0	\$0
Vehicle Resale Value	-\$8,974,896	-\$5,182,129
<b>Net Cost</b>	<b>\$56,876,655</b>	<b>\$63,305,307</b>

EVs are estimated to reduce maintenance costs by 46% and fuel costs by 64%. Procuring EVs instead of procuring new ICE vehicles would reduce overall TCO by \$6,428,652 (10%).

In the following figure, cost reductions are shown as positive, and cost increases from electrification are shown as negative.



	Savings (NPV)
Fuel	\$10,291,973
Maintenance	\$8,340,256
CAPEX Vehicle	-\$12,721,280
Vehicle Incentives	\$0
CAPEX Infrastructure	-\$3,275,064
Infrastructure Incentives	\$0
Vehicle Resale Value	\$3,792,767
Net Savings	\$6,428,652

## Recommended EVs: Take Home Vehicle

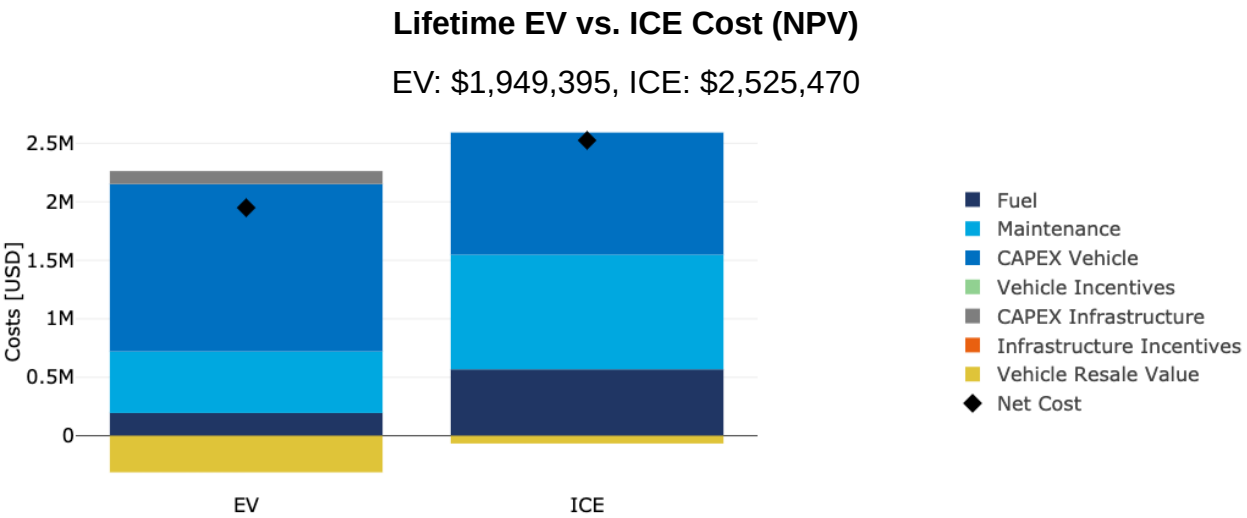
Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0031807	FORD F150 CREW CAB 2WD	FORD F-150 LIGHTNING EXTENDED RANGE	197	300	\$82,894
ID: 0034641	CHEVROLET TAHOE PPV	TESLA MODEL X LONG RANGE	258	371	\$72,501
ID: H005674	CHEVROLET SILVERADO 2500 EXT 2WD	FORD F-150 LIGHTNING EXTENDED RANGE	210	300	\$68,881
ID: 0032149	CHEVROLET TAHOE PPV	CADILLAC LYRIQ	175	300	\$65,792
ID: 0029493	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	172	300	\$57,575
ID: 0032786	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	226	353	\$51,790
ID: 0035072	CHEVROLET TAHOE PPV	CADILLAC LYRIQ	190	300	\$51,065
ID: 0023530	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	220	300	\$51,027
ID: H006114	CHEVROLET CAMARO SS	TESLA MODEL 3 LONG RANGE	258	353	\$50,040
ID: 0033025	CHEVROLET MALIBU	TESLA MODEL 3	117	263	\$49,119
ID: 0027169	FORD EXPLORER 2WD	CADILLAC LYRIQ	47	300	\$48,751
ID: 0030572	FORD EXPEDITION 2WD	FORD F-150 LIGHTNING	103	230	\$47,654
ID: 0020066	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	256	371	\$47,476
ID: 0032834	FORD TAURUS INTERCEPTOR AWD	TESLA MODEL 3 LONG RANGE	238	353	\$46,378
ID: 0027909	CHEVROLET CAPRICE	TESLA MODEL 3 LONG RANGE	241	353	\$44,360
ID: 0025995	CHEVROLET CAPRICE	TESLA MODEL 3	187	263	\$43,482
ID: 0029492	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	248	371	\$43,267
ID: 0028896	CHEVROLET CAPRICE	TESLA MODEL 3 LONG RANGE	270	353	\$42,133

Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0026119	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	134	300	\$40,155
ID: 0025658	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	272	371	\$40,132
ID: H005447	NISSAN TITAN XD 4DR 4WD	FORD F-150 LIGHTNING	86	230	\$39,666
ID: H006112	CHEVROLET CAMARO SS	TESLA MODEL 3 LONG RANGE	217	353	\$39,496
ID: 0028537	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	248	353	\$39,191
ID: 0034703	FORD F250 CREW CAB 4WD	FORD F-150 LIGHTNING	104	230	\$38,732
ID: H006113	CHEVROLET CAMARO SS	TESLA MODEL 3 LONG RANGE	203	353	\$37,532
ID: 0026950	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	269	353	\$37,378
ID: H005628	CHEVROLET TAHOE PPV	CADILLAC LYRIQ	162	300	\$36,695
ID: 0028007	FORD EXPLORER INTERCEPTOR	TESLA MODEL X LONG RANGE	272	371	\$36,070
ID: 0028370	FORD EXPEDITION 2WD	FORD F-150 LIGHTNING	124	230	\$35,952
ID: 0033729	CHEVROLET TAHOE PPV	TESLA MODEL X LONG RANGE	266	371	\$35,707
ID: 0029339	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	254	371	\$35,541
ID: 0028173	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	164	300	\$34,476
ID: 0034659	CHEVROLET TAHOE PPV	CADILLAC LYRIQ	172	300	\$32,897
ID: H005584	CHEVROLET CAMARO SS	TESLA MODEL 3 LONG RANGE	267	353	\$32,070
ID: 0027805	FORD EXPEDITION 2WD	FORD F-150 LIGHTNING	91	230	\$31,833
ID: 0019727	CHEVROLET SUBURBAN	CADILLAC LYRIQ	201	300	\$31,755

# Electrification Opportunity: Jim Fonteno Annex

33	47	210.62	33
EV Candidates	Existing Vehicles	Metric Tons of CO2 Saved per Year	Enel X JuiceBox Pro 48 Chargers

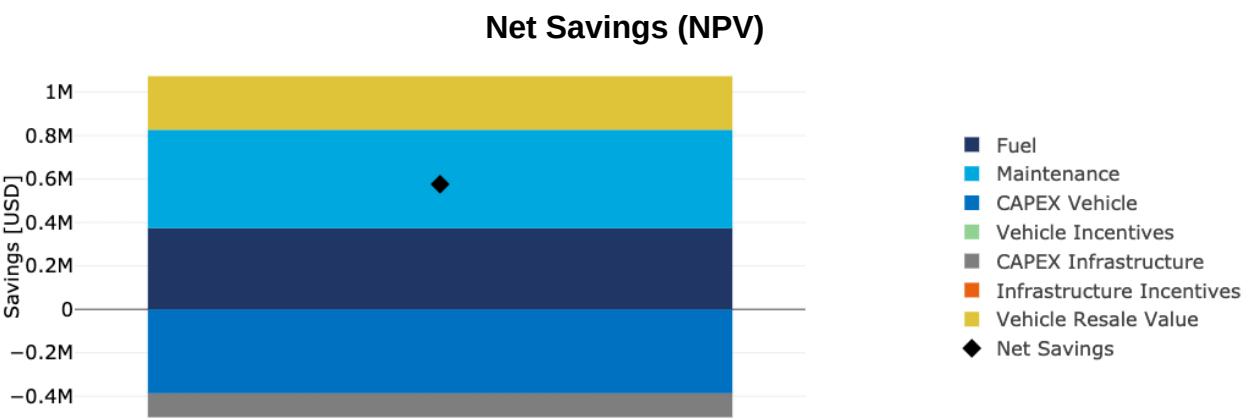
The estimated TCO for new EVs is compared to the TCO of new equivalent ICE vehicles. The TCO is calculated on a net present value (NPV) basis, assuming vehicles are owned for 8 years:



	EV Cost (NPV)	ICE Cost (NPV)
Fuel	\$194,465	\$567,915
Maintenance	\$526,118	\$979,587
CAPEX Vehicle	\$1,431,626	\$1,044,723
Vehicle Incentives	\$0	\$0
CAPEX Infrastructure	\$110,517	\$0
Infrastructure Incentives	\$0	\$0
Vehicle Resale Value	-\$313,331	-\$66,756
Net Cost	\$1,949,395	\$2,525,470

EVs are estimated to reduce maintenance costs by 46% and fuel costs by 66%. Procuring EVs instead of procuring new ICE vehicles would reduce overall TCO by \$576,075 (23%).

In the following figure, cost reductions are shown as positive, and cost increases from electrification are shown as negative.



	Savings (NPV)
Fuel	\$373,451
Maintenance	\$453,470
CAPEX Vehicle	-\$386,903
Vehicle Incentives	\$0
CAPEX Infrastructure	-\$110,517
Infrastructure Incentives	\$0
Vehicle Resale Value	\$246,575
Net Savings	\$576,075

## Recommended EVs: Jim Fonteno Annex

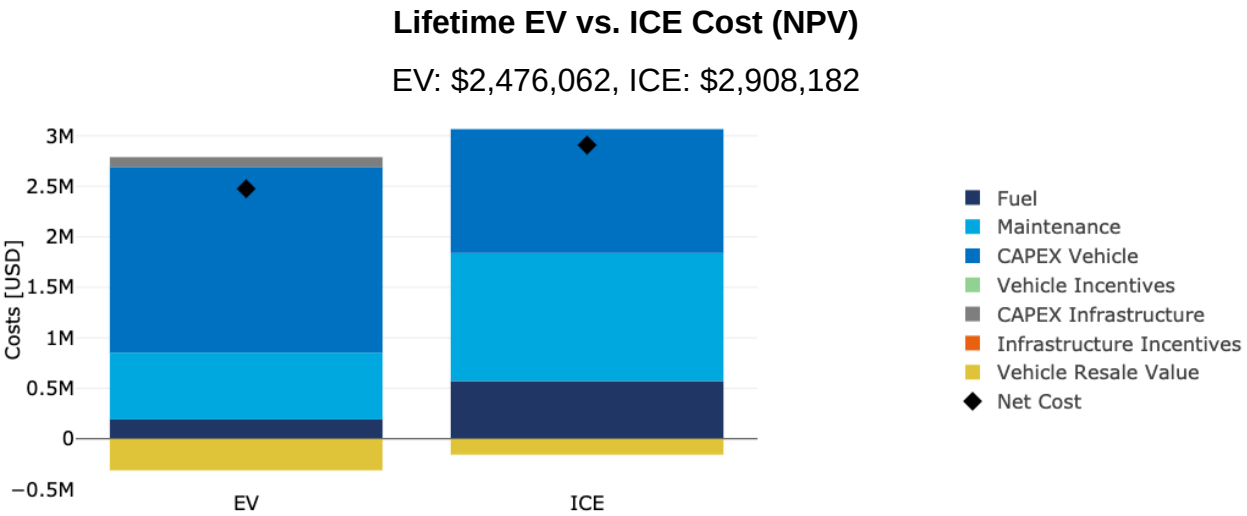
Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0025406	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	277	353	\$48,233
ID: 0027951	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	219	353	\$45,629
ID: 0021236	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	199	300	\$39,494
ID: 0025402	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	248	353	\$39,227
ID: 0024698	DODGE CHARGER	TESLA MODEL 3	189	263	\$33,647
ID: 0024700	DODGE CHARGER	TESLA MODEL 3	180	263	\$30,094
ID: 0025555	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	247	353	\$29,851
ID: 0029166	DODGE CHARGER	TESLA MODEL 3	157	263	\$27,432
ID: 0027891	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	265	353	\$26,144
ID: 0029343	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	259	353	\$24,820
ID: 0025405	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	214	353	\$24,620
ID: 0029180	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	253	353	\$24,330
ID: 0031800	DODGE RAM 1500 CREW CAB 4X4	FORD F-150 LIGHTNING	147	230	\$20,616
ID: 0029362	CHEVROLET SILVERADO 1500 CREW CAB 2WD	FORD F-150 LIGHTNING	134	230	\$20,567
ID: 0024692	DODGE CHARGER	TESLA MODEL 3	161	263	\$19,450
ID: 0025409	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	238	353	\$18,880
ID: 0024696	DODGE CHARGER	TESLA MODEL 3	140	263	\$18,871
ID: 0025400	DODGE CHARGER	TESLA MODEL 3	191	263	\$18,126

Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0027878	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	195	353	\$17,640
ID: 0031545	FORD TAURUS INTERCEPTOR	TESLA MODEL 3	177	263	\$16,344
ID: 0024714	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	228	353	\$16,056
ID: 0026350	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	199	353	\$15,844
ID: 0031546	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	247	353	\$14,592
ID: 0025557	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	243	353	\$14,526
ID: 0029173	DODGE CHARGER	TESLA MODEL 3	117	263	\$13,896
ID: 0024694	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	212	353	\$13,224
ID: 0023575	FORD F250 2WD	FORD F-150 LIGHTNING	77	230	\$12,122
ID: 0029332	CHEVROLET SILVERADO 1500 CREW CAB 2WD	FORD F-150 LIGHTNING	138	230	\$10,076
ID: 0025407	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	264	353	\$10,058
ID: 0031547	FORD TAURUS INTERCEPTOR	TESLA MODEL 3	179	263	\$9,328
ID: 0023313	CHEVROLET IMPALA	TESLA MODEL 3	53	263	\$6,178
ID: 0025547	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	196	353	\$4,101
ID: 0031361	FORD EXPLORER INTERCEPTOR	CADILLAC LYRIQ	167	300	\$2,576

# Electrification Opportunity: Canal Street Records Ware-house

29	45	208.01	29
EV Candidates	Existing Vehicles	Metric Tons of CO2 Saved per Year	Enel X JuiceBox Pro 48 Chargers

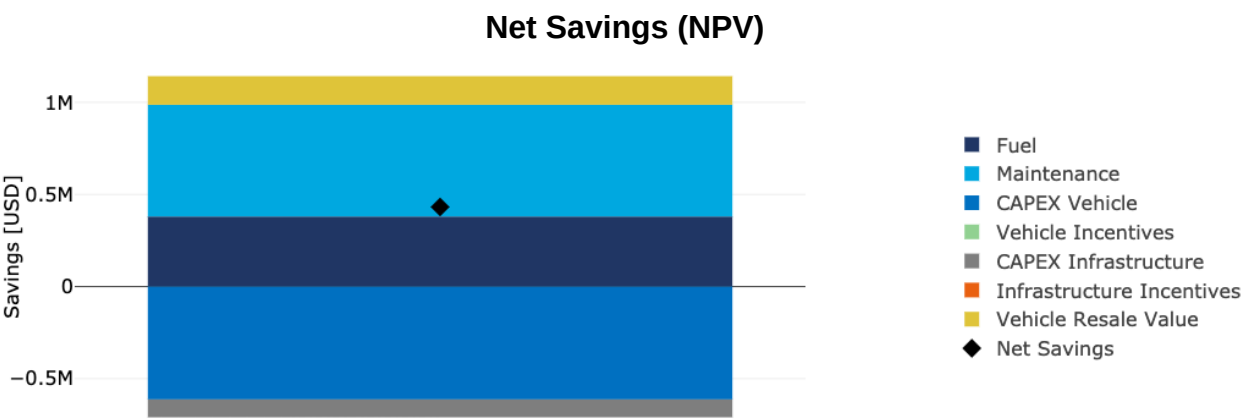
The estimated TCO for new EVs is compared to the TCO of new equivalent ICE vehicles. The TCO is calculated on a net present value (NPV) basis, assuming vehicles are owned for 8 years:



	EV Cost (NPV)	ICE Cost (NPV)
Fuel	\$190,733	\$571,208
Maintenance	\$662,012	\$1,268,246
CAPEX Vehicle	\$1,838,840	\$1,226,000
Vehicle Incentives	\$0	\$0
CAPEX Infrastructure	\$97,121	\$0
Infrastructure Incentives	\$0	\$0
Vehicle Resale Value	-\$312,644	-\$157,272
Net Cost	\$2,476,062	\$2,908,182

EVs are estimated to reduce maintenance costs by 48% and fuel costs by 67%. Procuring EVs instead of procuring new ICE vehicles would reduce overall TCO by \$432,121 (15%).

In the following figure, cost reductions are shown as positive, and cost increases from electrification are shown as negative.



	Savings (NPV)
Fuel	\$380,476
Maintenance	\$606,234
CAPEX Vehicle	-\$612,840
Vehicle Incentives	\$0
CAPEX Infrastructure	-\$97,121
Infrastructure Incentives	\$0
Vehicle Resale Value	\$155,372
Net Savings	\$432,121

## Recommended EVs: Canal Street Records Warehouse

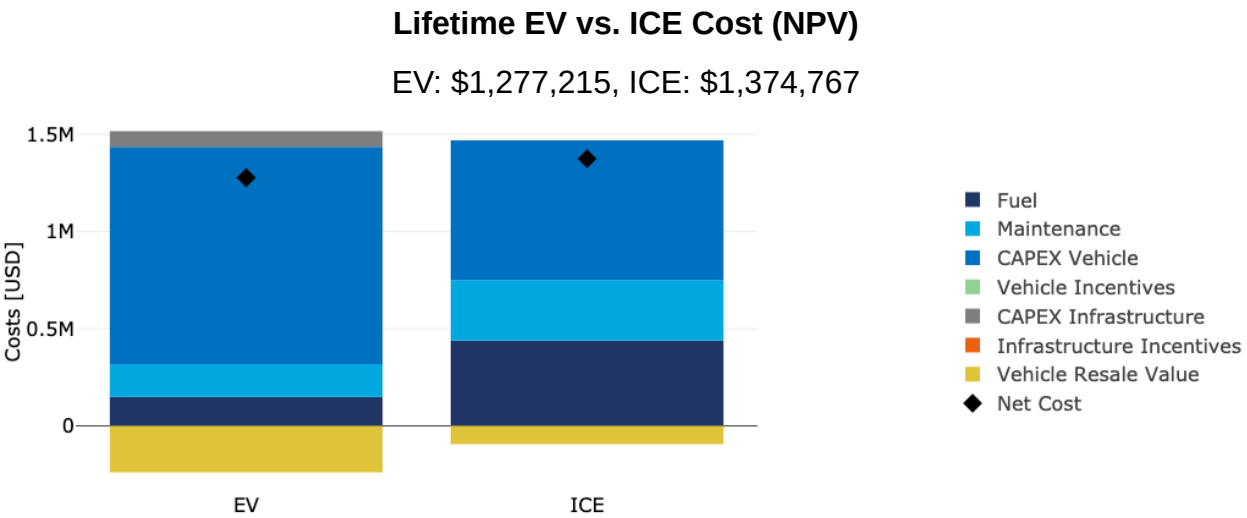
Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0027305	DODGE CHARGER	TESLA MODEL S LONG RANGE	289	412	\$54,136
ID: 0029486	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	201	300	\$42,185
ID: 0026348	DODGE CHARGER	TESLA MODEL S LONG RANGE	310	412	\$40,106
ID: 0029500	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	272	371	\$35,520
ID: 0022561	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	258	371	\$31,833
ID: 0022568	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	229	371	\$25,762
ID: 0023543	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	209	300	\$25,167
ID: 0029488	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	177	300	\$23,217
ID: 0027304	DODGE CHARGER	TESLA MODEL S LONG RANGE	291	412	\$22,652
ID: 0027302	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	266	353	\$21,054
ID: 0029497	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	245	371	\$19,895
ID: 0029498	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	205	300	\$19,024
ID: 0021243	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	139	300	\$17,773
ID: 0029487	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	244	371	\$16,938
ID: 0023542	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	214	300	\$16,631
ID: 0029489	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	274	371	\$14,631
ID: 0022555	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	135	300	\$13,603
ID: 0029494	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	226	371	\$13,310

Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0033062	FORD EXPLORER INTERCEPTOR AWD	CADILLAC LYRIQ	126	300	\$10,376
ID: 0029257	CHEVROLET IMPALA	TESLA MODEL 3	120	263	\$10,360
ID: 0031925	FORD EXPLORER INTERCEPTOR AWD	CADILLAC LYRIQ	202	300	\$9,591
ID: 0022554	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	204	300	\$9,513
ID: 0029491	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	203	300	\$6,892
ID: 0021371	FORD CROWN VICTORIA	TESLA MODEL 3 LONG RANGE	229	353	\$6,632
ID: 0022572	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	171	300	\$6,161
ID: 0029256	CHEVROLET IMPALA	TESLA MODEL 3	40	263	\$5,818
ID: 0031924	FORD EXPLORER INTERCEPTOR AWD	TESLA MODEL X LONG RANGE	269	371	\$4,076
ID: 0021391	FORD CROWN VICTORIA	TESLA MODEL 3	14	263	\$3,491
ID: 0031926	FORD EXPLORER INTERCEPTOR AWD	CADILLAC LYRIQ	182	300	\$2,898

# Electrification Opportunity: West Side Annex

24	34	157.91	24
EV Candidates	Existing Vehicles	Metric Tons of CO2 Saved per Year	Enel X JuiceBox Pro 48 Chargers

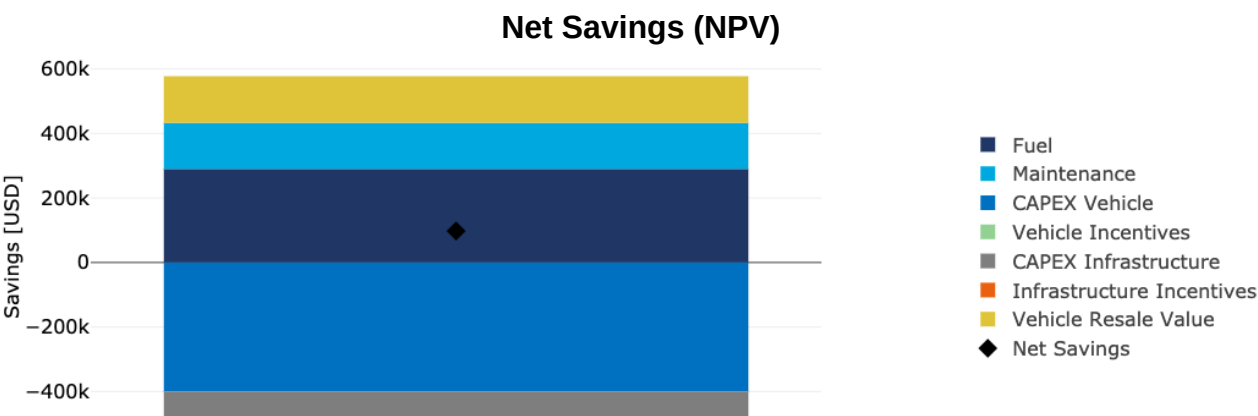
The estimated TCO for new EVs is compared to the TCO of new equivalent ICE vehicles. The TCO is calculated on a net present value (NPV) basis, assuming vehicles are owned for 8 years:



	EV Cost (NPV)	ICE Cost (NPV)
Fuel	\$148,887	\$439,003
Maintenance	\$168,394	\$311,078
CAPEX Vehicle	\$1,118,716	\$719,100
Vehicle Incentives	\$0	\$0
CAPEX Infrastructure	\$80,376	\$0
Infrastructure Incentives	\$0	\$0
Vehicle Resale Value	-\$239,158	-\$94,414
Net Cost	\$1,277,215	\$1,374,767

EVs are estimated to reduce maintenance costs by 46% and fuel costs by 66%. Procuring EVs instead of procuring new ICE vehicles would reduce overall TCO by \$97,552 (7%).

In the following figure, cost reductions are shown as positive, and cost increases from electrification are shown as negative.



	Savings (NPV)
Fuel	\$290,116
Maintenance	\$142,684
CAPEX Vehicle	-\$399,616
Vehicle Incentives	\$0
CAPEX Infrastructure	-\$80,376
Infrastructure Incentives	\$0
Vehicle Resale Value	\$144,744
Net Savings	\$97,552

## Recommended EVs: West Side Annex

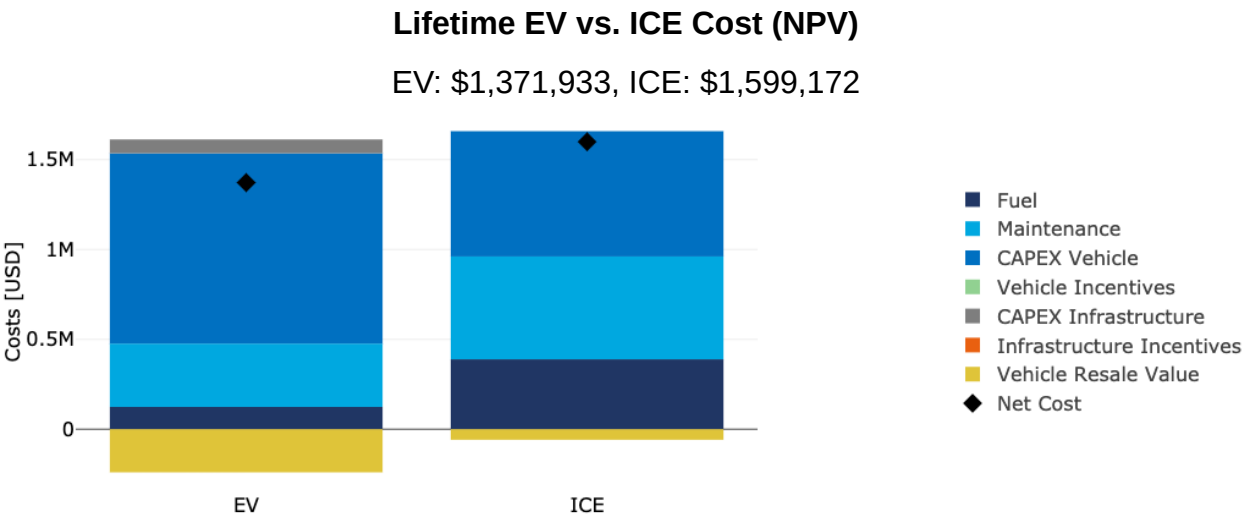
Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0028045	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	253	353	\$17,650
ID: 0026573	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	245	371	\$14,212
ID: 0028248	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	174	300	\$12,657
ID: 0028054	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	234	353	\$12,216
ID: 0028044	FORD TAURUS INTERCEPTOR	TESLA MODEL 3	169	263	\$10,813
ID: 0032343	FORD TAURUS INTERCEPTOR	TESLA MODEL 3	182	263	\$10,438
ID: 0032333	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	209	353	\$9,003
ID: 0028724	CHEVROLET 1500 EXT 4WD	FORD F-150 LIGHTNING	141	230	\$8,594
ID: 0030329	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	209	353	\$8,267
ID: 0028059	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	201	353	\$8,078
ID: 0028098	DODGE 1500 QUAD CAB 4X4	FORD F-150 LIGHTNING	102	230	\$7,815
ID: 0028058	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	251	353	\$7,806
ID: 0032331	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	202	353	\$7,183
ID: 0029469	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	204	353	\$6,801
ID: 0029464	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	204	353	\$6,639
ID: 0028260	CHEVROLET TAHOE 2WD	CADILLAC LYRIQ	185	300	\$5,262
ID: 0032334	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	209	353	\$4,449
ID: 0030319	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	281	353	\$4,110

Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0032341	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	218	353	\$3,723
ID: 0028437	CHEVROLET MALIBU	TESLA MODEL 3	83	263	\$3,719
ID: 0030657	GMC SIERRA 1500 EXT 2WD	FORD F-150 LIGHTNING	124	230	\$3,217
ID: 0028433	CHEVROLET MALIBU	TESLA MODEL 3	73	263	\$2,633
ID: 0028075	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	197	353	\$1,856
ID: 0030654	CHEVROLET 1500 EXT 4WD	FORD F-150 LIGHTNING EXTENDED RANGE	179	300	\$787

# Electrification Opportunity: Palm Center

23	42	143.41	23
EV Candidates	Existing Vehicles	Metric Tons of CO2 Saved per Year	Enel X JuiceBox Pro 48 Chargers

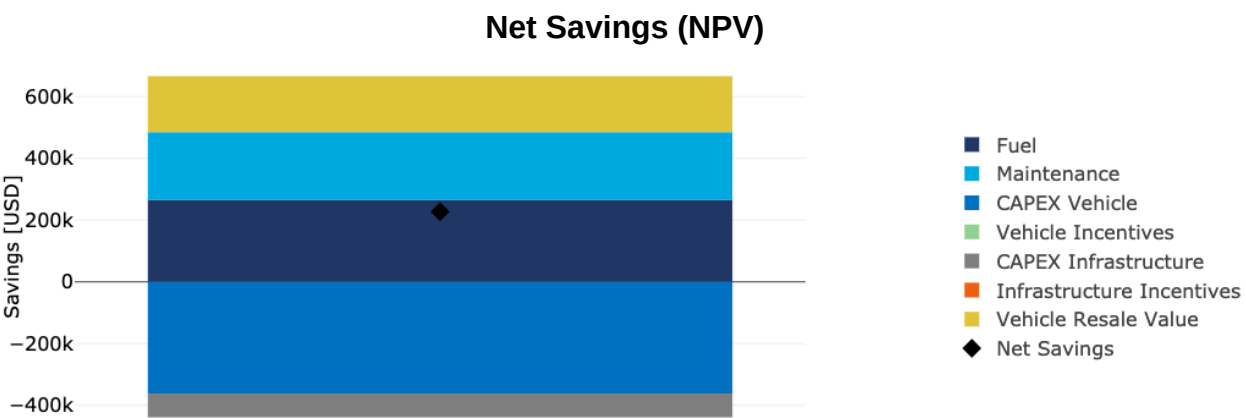
The estimated TCO for new EVs is compared to the TCO of new equivalent ICE vehicles. The TCO is calculated on a net present value (NPV) basis, assuming vehicles are owned for 8 years:



	EV Cost (NPV)	ICE Cost (NPV)
Fuel	\$123,899	\$388,858
Maintenance	\$352,425	\$572,266
CAPEX Vehicle	\$1,058,780	\$697,000
Vehicle Incentives	\$0	\$0
CAPEX Infrastructure	\$77,027	\$0
Infrastructure Incentives	\$0	\$0
Vehicle Resale Value	-\$240,198	-\$58,952
Net Cost	\$1,371,933	\$1,599,172

EVs are estimated to reduce maintenance costs by 38% and fuel costs by 68%. Procuring EVs instead of procuring new ICE vehicles would reduce overall TCO by \$227,239 (14%).

In the following figure, cost reductions are shown as positive, and cost increases from electrification are shown as negative.



	Savings (NPV)
Fuel	\$264,959
Maintenance	\$219,841
CAPEX Vehicle	-\$361,780
Vehicle Incentives	\$0
CAPEX Infrastructure	-\$77,027
Infrastructure Incentives	\$0
Vehicle Resale Value	\$181,246
Net Savings	\$227,239

## Recommended EVs: Palm Center

Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0024690	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	280	353	\$33,670
ID: 0025201	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	250	353	\$29,485
ID: 0025189	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	276	353	\$24,241
ID: 0031362	CHEVROLET TAHOE 2WD	TESLA MODEL X LONG RANGE	255	371	\$21,241
ID: 0030512	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	224	353	\$20,818
ID: 0029204	FORD TAURUS INTERCEPTOR	TESLA MODEL 3	148	263	\$19,636
ID: 0032169	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	227	353	\$16,846
ID: 0032167	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	251	353	\$16,541
ID: 0030511	FORD TAURUS INTERCEPTOR	TESLA MODEL 3	170	263	\$13,195
ID: 0029872	FORD TAURUS INTERCEPTOR	TESLA MODEL 3	168	263	\$13,186
ID: 0017998	FORD CROWN VICTORIA	TESLA MODEL 3	119	263	\$13,042
ID: 0021277	FORD CROWN VICTORIA	TESLA MODEL 3	69	263	\$12,364
ID: 0032174	DODGE CHARGER	TESLA MODEL 3 LONG RANGE	272	353	\$12,041
ID: 0021358	FORD CROWN VICTORIA	TESLA MODEL 3	182	263	\$10,837
ID: 0022273	FORD CROWN VICTORIA	TESLA MODEL 3	123	263	\$10,330
ID: 0024790	CHEVROLET IMPALA	TESLA MODEL 3	127	263	\$10,120
ID: 0030433	FORD TAURUS INTERCEPTOR	TESLA MODEL S LONG RANGE	285	412	\$8,896
ID: 0026690	FORD TAURUS INTERCEPTOR	TESLA MODEL 3	64	263	\$4,108

Vehicle ID	Fleet Vehicle	Recommended EV	Required Range (Miles)	EV Range (Miles)	Lifetime Savings (NPV)
ID: 0021523	CHEVROLET IMPALA	TESLA MODEL 3	44	263	\$4,037
ID: 0020637	FORD CROWN VICTORIA	TESLA MODEL 3	26	263	\$2,958
ID: 0034527	CHEVROLET TAHOE PPV	CADILLAC LYRIQ	110	300	\$2,603
ID: 0029871	FORD TAURUS INTERCEPTOR	TESLA MODEL 3 LONG RANGE	278	353	\$2,592
ID: 0029202	FORD TAURUS INTERCEPTOR	TESLA MODEL S LONG RANGE	316	412	\$1,475

## Model Criteria

This report used the following criteria to recommend EVs and chargers.

Basic Information	
Feasibility	Economic
Economic Feasibility Ratio	100%
Discount Rate	2.5%
Chargers	One to One Chargers
Duration	8 years
EVs	Allow Larger EVs
Limited # of Vehicles Per Location	No Limits
EV Selection Methodology	Lowest EV TCO w/o EVSE Infrastructure
Custom EVs	No Custom EVs
Constraints	
Miles Constraint	Design Miles/Day Climate Adjusted
Energy Miles Constraint	Average Miles/Day Climate Adjusted
Operation Hours	Design Operational Hours/Day
Incentives	
Federal Incentives	No Federal Incentives
State Incentives	No State Incentives
Local Incentives	No Local Incentives
Utility Incentives	No Utility Incentives
Grants	No Grants
Customer Entity	Business
LCFS Revenue	No LCFS Revenue
Charger Criteria	
Allow Level 3	False



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