



City of Takoma Park

Fleet Electrification Assessment



peperoSM
AN EXELON COMPANY

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LIFE, FULLY CHARGED

ICF

1/8/2025

Fleet advisory
services provided by

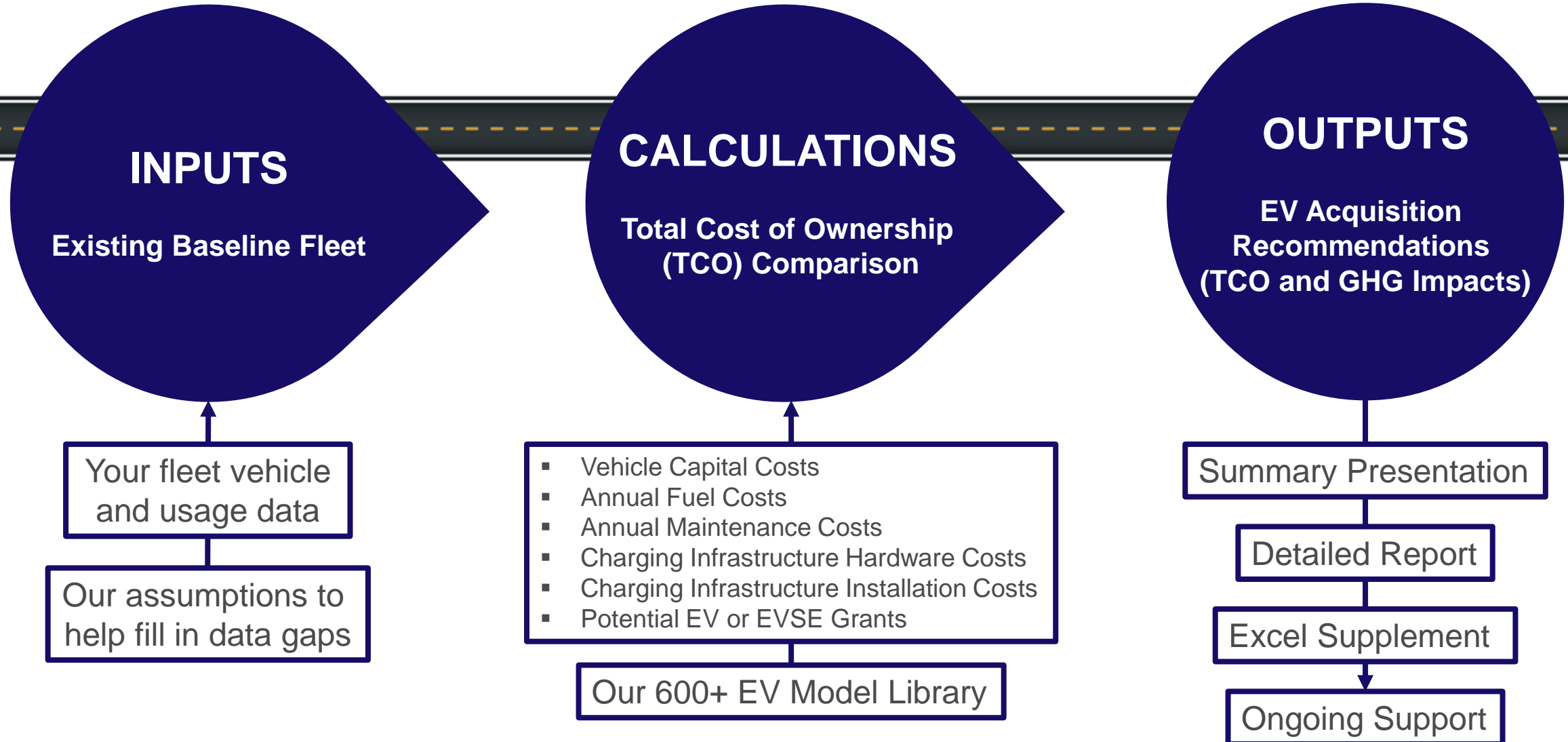


→ Agenda

- Fleet Assessment Process
- Scenario 1: Cost Effectiveness
 - Electric Vehicle (EV) Recommendations
 - Charger Recommendations
 - Total Cost of Ownership Comparison
 - Environmental Impact Analysis
- Scenario 2: 100% Electrification
 - EV Recommendations
 - Charger Recommendations
 - Total Cost of Ownership



Fleet Assessment Process

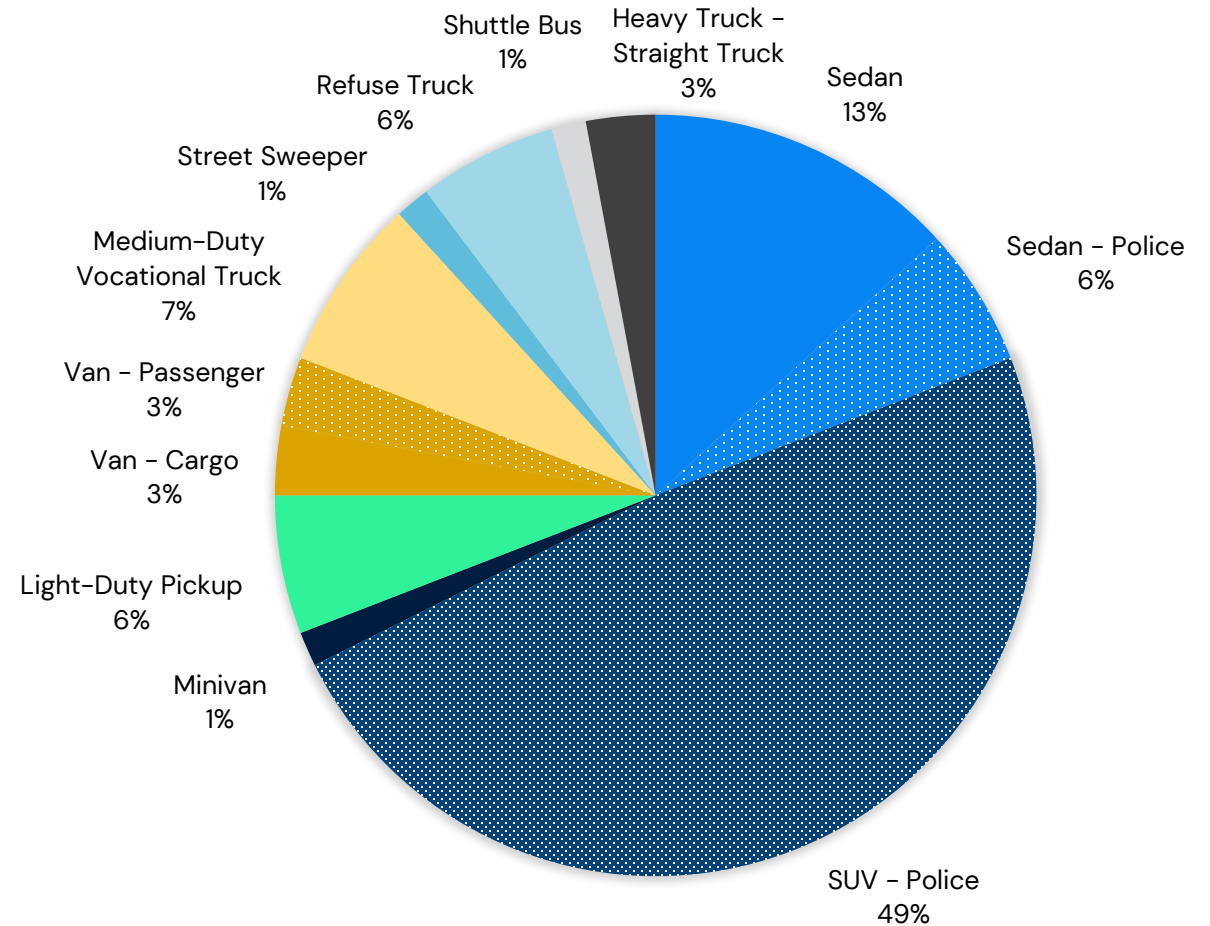


Inputs: Existing Fleet

Existing Fleet Fuel Type Distribution

Vehicle Type	Gasoline	Diesel	BEV
Sedan	6	0	7
SUV	33	0	0
Minivan	1	0	0
Light-Duty Pickup	3	2	0
Van	4	0	0
Medium-Duty Vocational Truck	1	4	0
Street Sweeper	0	0	1
Refuse Truck	0	4	0
Shuttle Bus	1	0	0
Heavy Truck	0	2	0
TOTAL	49	12	8

Existing Fleet – Vehicle Types



* Ford F-350 & F-450s classified as Medium-Duty Vocational Truck

Calculations: Key Assumptions

- **Recommendation Threshold: EV Total Cost of Ownership < ICE Total Cost of Ownership**
- **Vehicle Retirement Schedule** → Determines replacement schedule
- **Vehicle Ranges** → Impacts EV Options
 - Annual mileage
 - Average daily mileage
- **Vehicle Use** → Impacts Charging Needs
 - Time between shifts, length of shift
- **Vehicle Types** → Impacts feasibility
 - Leaf / snow removal
 - Police Vehicles
 - Industry availability

Vehicle Type Assumptions

Vehicle Type	Vehicle Lifespan
Sedan	15
Sedan (Police)	8
Minivan	15
SUV	15
SUV (Police)	8
Light-Duty Pickup	15
Medium-Duty Pickup	15
Van	15
Medium-Duty Vocational Truck	15
Bucket Truck	15
Heavy Truck	15

*Additional assumptions detailed in the report.

Outputs: Cost Effective EV Replacements

Total Fleet Vehicles:72

Active, On-Road Vehicles:69

With EV Equivalent:57

Recommended for Conversion:23

Electrification Recommendation Impacts

Based on our analysis, converting 23 vehicles to EVs is estimated to produce the following impacts:



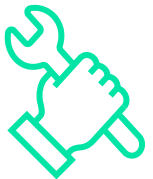
\$288,819

TCO savings over 29 years*



\$228,283

fuel cost savings over 29 years*



\$298,214

maintenance savings over 29 years



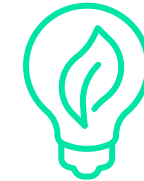
2,329

metric tons (MT) of CO2 eliminated over 29 years

Over 29 years, those estimated CO2 reductions equate to:



eliminating **268**
homes' energy use for one year, or:



switching **88,509**
incandescent lamps to LEDs, or:



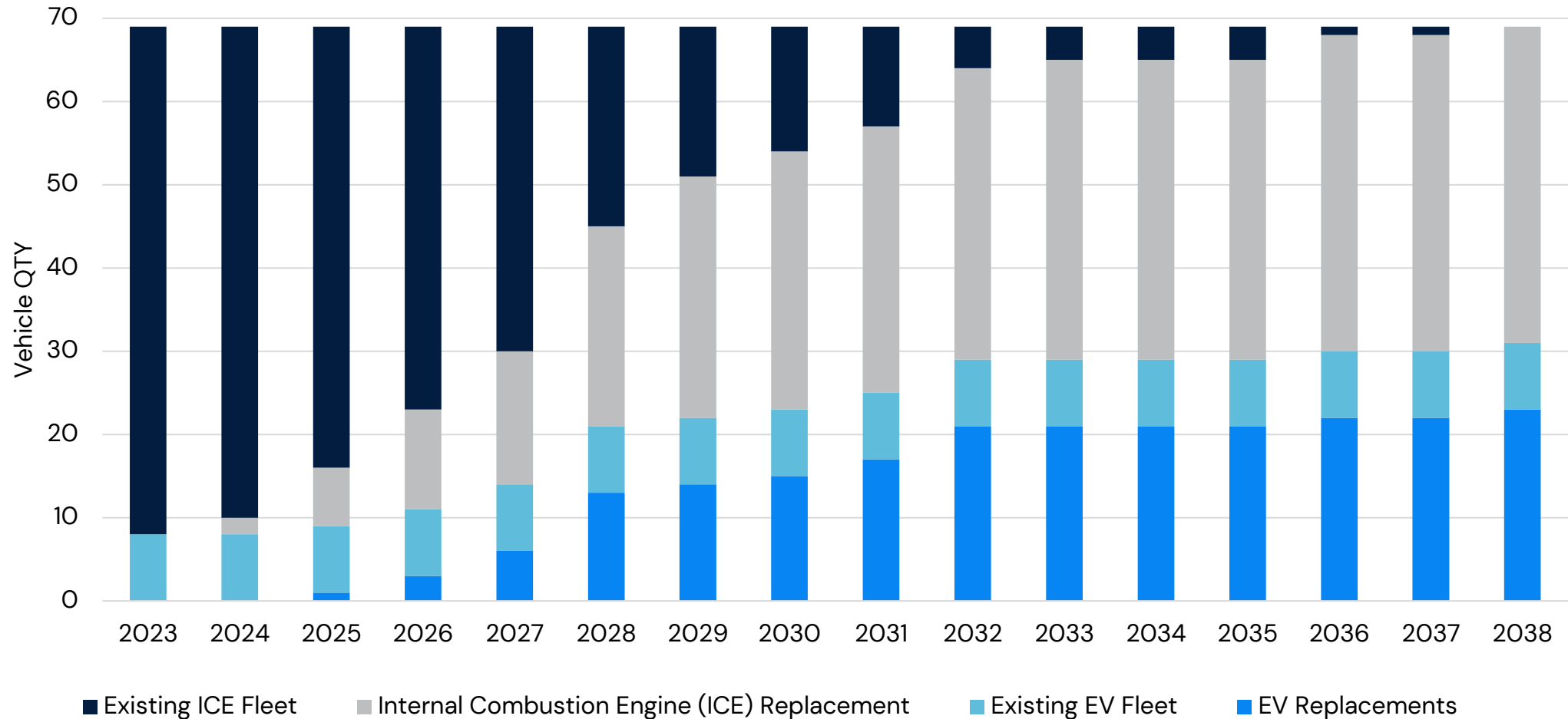
recycling **792** tons of waste
instead of landfilling it, or:



planting **38,432**
trees.

* NPV assumes a 5% discount rate.

Recommended Replacement Timeline



Replacement Timeframe: 2024 - 2038
TCO Analysis Timeframe: 2024 - 2052

Electrification Recommendations (1 of 2)

13-Year Electrification Recommendations							
Vehicle Type	Quantity Up for Retirement (in 13 Years)	Quantity Recommended to Convert to Electric	Recommended Make / Model / EV Type	Financial Savings (across 29 years)	GHG Emission Reductions (across 29 years, MT)	EVSE	
						L2	DCFC
SUVs (Police)	33	17	Ford – Mustang Mach-E Select AWD Standard Range (Police)	\$78,907	819	17	-
		1	Tesla – Model Y Long Range (Police)	\$16,808	96	1	-
Refuse Truck	4	2	Lion Electric – Lion6 Refuse	\$90,968	1,254	-	2
Light-Duty Pickups (Police)	1	1	Ford – F-150 Lightning Pro SSV SR	\$10,051	54	1	-
Minivan	1	1	Canoo – Lifestyle Vehicle AWD – Premium	\$7,375	88	1	-
Shuttle Bus	1	1	Ford – E-Transit Cutaway	\$24,710	18	1	-
Medium-Duty Vocational Trucks	5	0	N/A	-	-	-	-

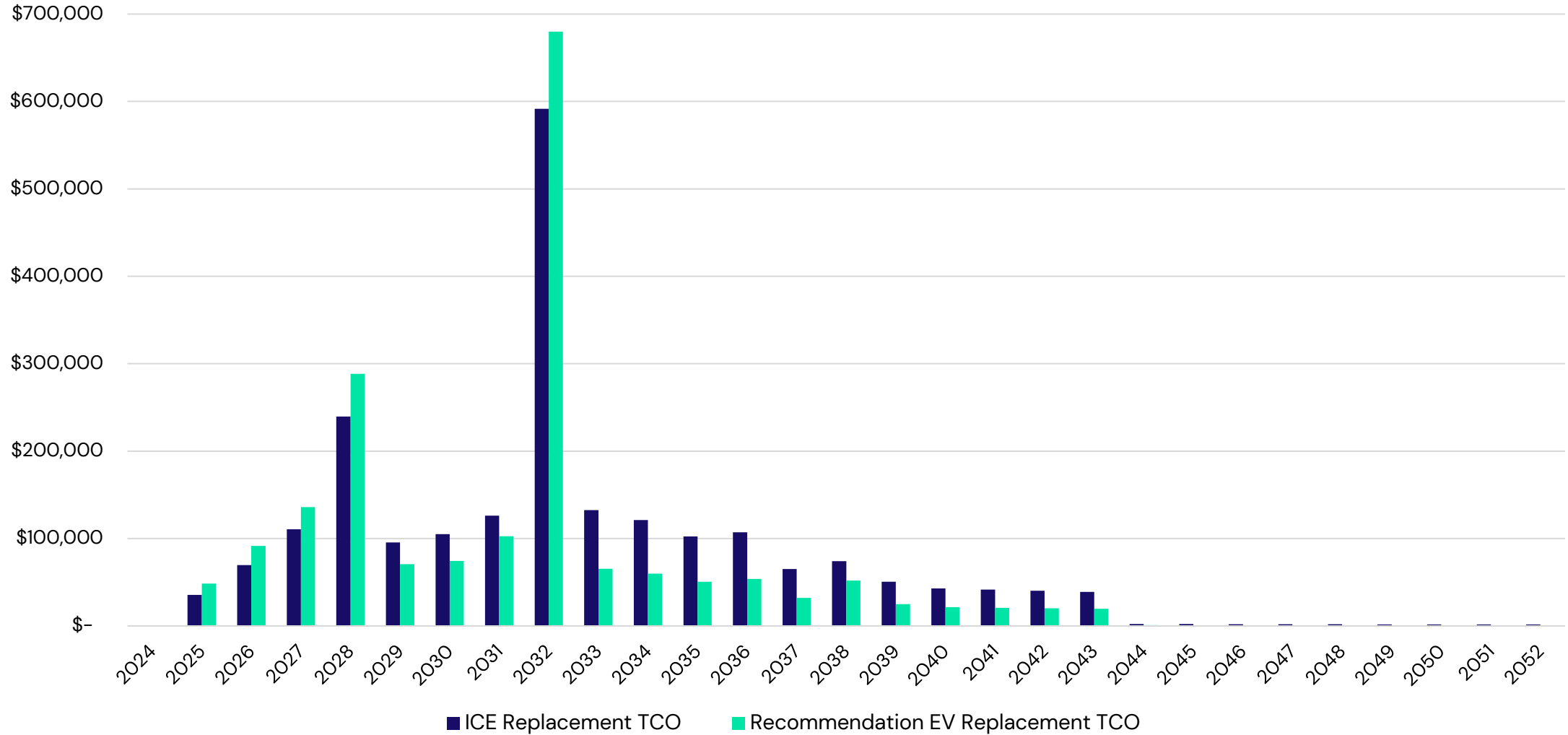
Electrification Recommendations (2 of 2)

13-Year Electrification Recommendations							
Vehicle Type	Quantity Up for Retirement (in 13 Years)	Quantity Recommended to Convert to Electric	Recommended Make / Model / EV Type	Financial Savings (across 29 years)	GHG Emission Reductions (across 27 years, MT)	EVSE	
						L2	DCFC
Sedans	9	0	N/A	-	-	-	-
Sedans (Police)	4	0	N/A	-	-	-	-
Vans - Cargo	2	0	N/A	-	-	-	-
Vans - Passenger	2	0	N/A	-	-	-	-
Light-Duty Pickups	4	0	N/A	-	-	-	-
Street Sweeper	1	0	N/A	-	-	-	-
Heavy Trucks - Straight Trucks	2	0	N/A	-	-	-	-
TOTAL	69	23	-	\$288,819	2,329	21	2

Charger Recommendations

Charging Level	Charger Nameplate Demand (kW) Range	Number Recommended	Total Equipment Cost	Total Installation Cost	Description	Typical Light-Duty Range and Charge Times
Level 2 Chargers (L2)	3-6 kW	17	\$6,420	\$44,940	Use a 208 V (commercial) or 240 V (residential) AC split phase service	10-20 miles of range per hour (4-6 hours for full charge)
	6-8 kW	3	\$2,210	\$7,737		
	12-15 kW	1	\$1,061	\$1,856		
DC Fast Chargers (DCFC)	150 kW	2	\$64,461	\$54,405	Use 208 V or 480 VAC, three-phase service connection requiring a dedicated circuit	60-80 miles in 20 minutes of charging (~0.5 hours for full charge)
Total	-	23	\$74,152	\$108,938	-	-

Total Cost of Ownership Comparison



Fleet Environmental Impact Analysis

By converting the 23 recommended vehicles to EVs:

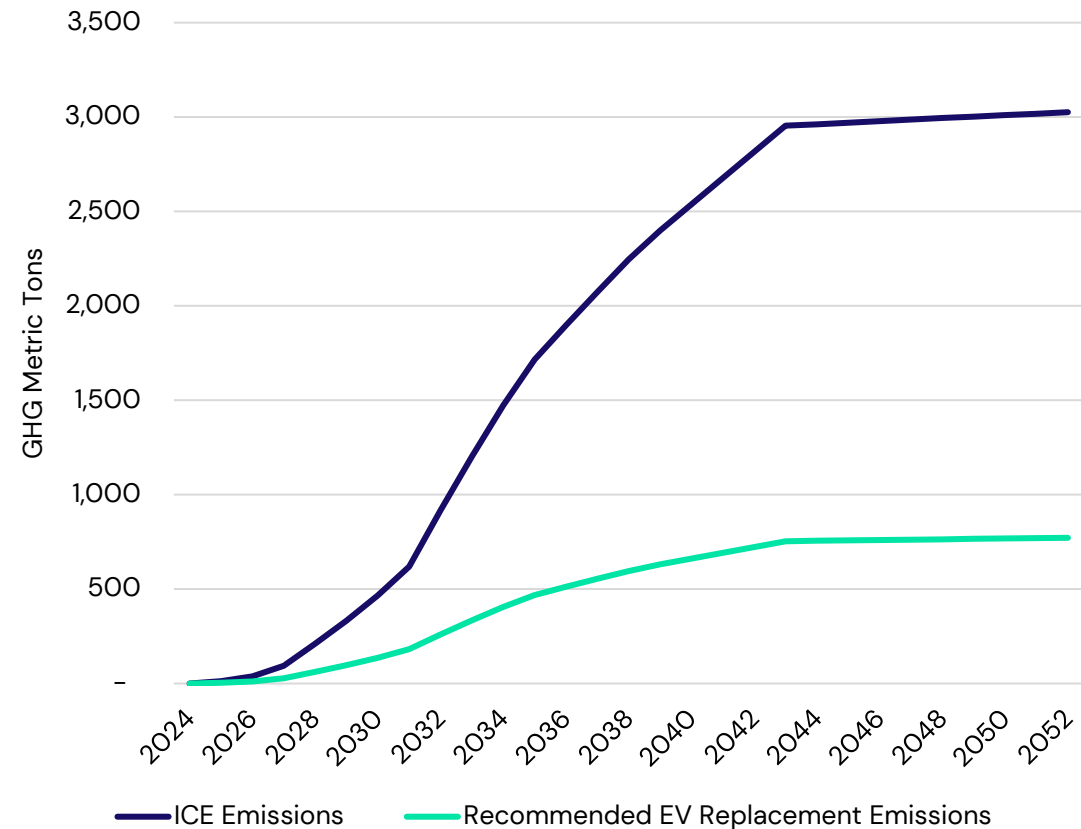
2,329 GHG Emission Reductions
(MT over 29 years)

1,428 NOx Emission Reductions
(Lbs. over 29 years)

503 Equivalent to removing
passenger vehicles from
the road for one year

38,432 Equivalent to tree seedlings
grown for 10 years

Cumulative Fleet Green House Gas Emissions



Appendix: TCO Procurement Comparison

Current recommendations only when EV TCO < ICE TCO:



23

Vehicles converted over **13** years



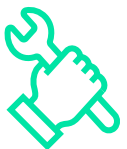
\$288,945

TCO savings over **29** years*



\$363,291

fuel cost savings over **29** years*



\$287,128

maintenance savings over **29** years*



2,254

metric tons (MT) of CO2 eliminated over **29** years

Recommendation impacts with a 100% electrification goal:



61

Vehicles converted over **13** years



\$727

TCO savings over **29** years*



\$494,824

fuel cost savings over **29** years*



\$519,389

maintenance savings over **29** years*



4,197

metric tons (MT) of CO2 eliminated over **29** years

* NPV assumes a 5% discount rate.

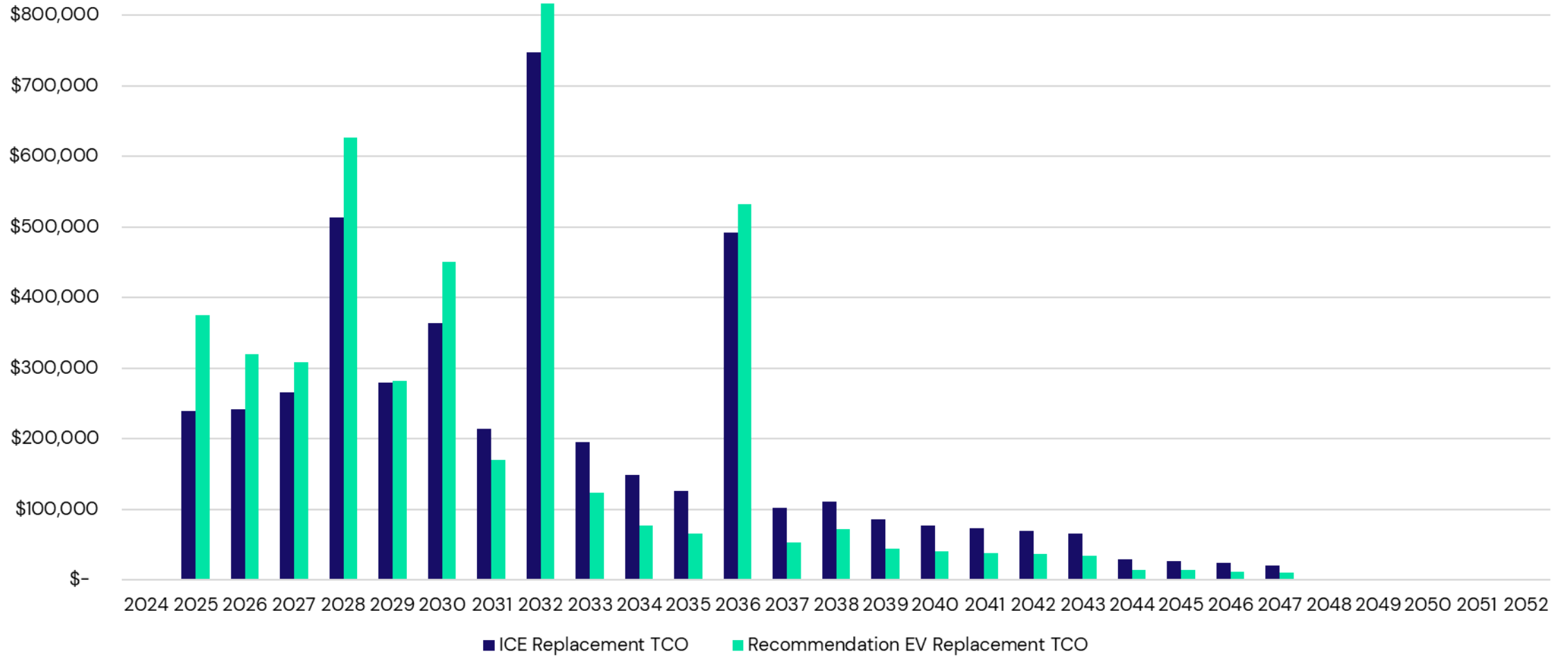
Appendix: 100% Electrification EVs

Vehicle Type	Quantity Up for Retirement (in 14 Years)	Quantity Recommended to Convert to Electric	Recommended Make/ Model/ EV Type	Financial Savings (across 29 years)	GHG Emission Reductions (across 29 years, MT)	EVSE	
						L2	DCFC
SUV - Police	33	32	Ford/Mustang Mach-E Select AWD Standard Range (Police)/BEV	\$16,762	1,237	32	-
		1	Tesla/Model Y Long Range (Police)/BEV	\$16,808	96	1	-
Refuse Truck	4	4	Lion Electric/Lion6 Refuse/BEV	\$97,629	2,040	-	4
Light-Duty Pickup	5	1	Ford/F-150 Lightning Pro SSV SR/BEV	\$10,051	55	1	-
		4	Ford/F-150 Lightning Pro (Fleet Only)/BEV	\$21,689	151	4	-
Shuttle Bus	1	1	Ford/E-Transit Cutaway/BEV	\$24,710	18	1	-
Minivan	1	1	Canoo/Lifestyle Vehicle AWD – Premium/BEV	\$7,375	88	1	-
Sedan - Police	4	3	Tesla/Model 3 Long Range AWD (Police)/BEV	\$(37,110)	82	3	-
Sedan	9	3	Nissan/Leaf S/BEV	\$(12,324)	21	3	-
Medium-Duty Vocational Truck	5	5	REE Automotive/P7-C/BEV	\$(27,838)	116	5	-
Van - Cargo	2	2	Maxwell Vehicles/ePro SR Passenger Van/BEV	\$9,955	69	2	-
Van – Passenger	2	2	Maxwell Vehicles/ePro SR Cargo Van/BEV	\$(336)	98	2	-
Heavy Truck	2	2	Peterbilt/220EV (Class 7 – 282 kW)/BEV	\$(126,644)	126	-	2
Street Sweeper	1	0	N/A	-	-	-	-
TOTAL	69	61		\$727	4,197	55	6

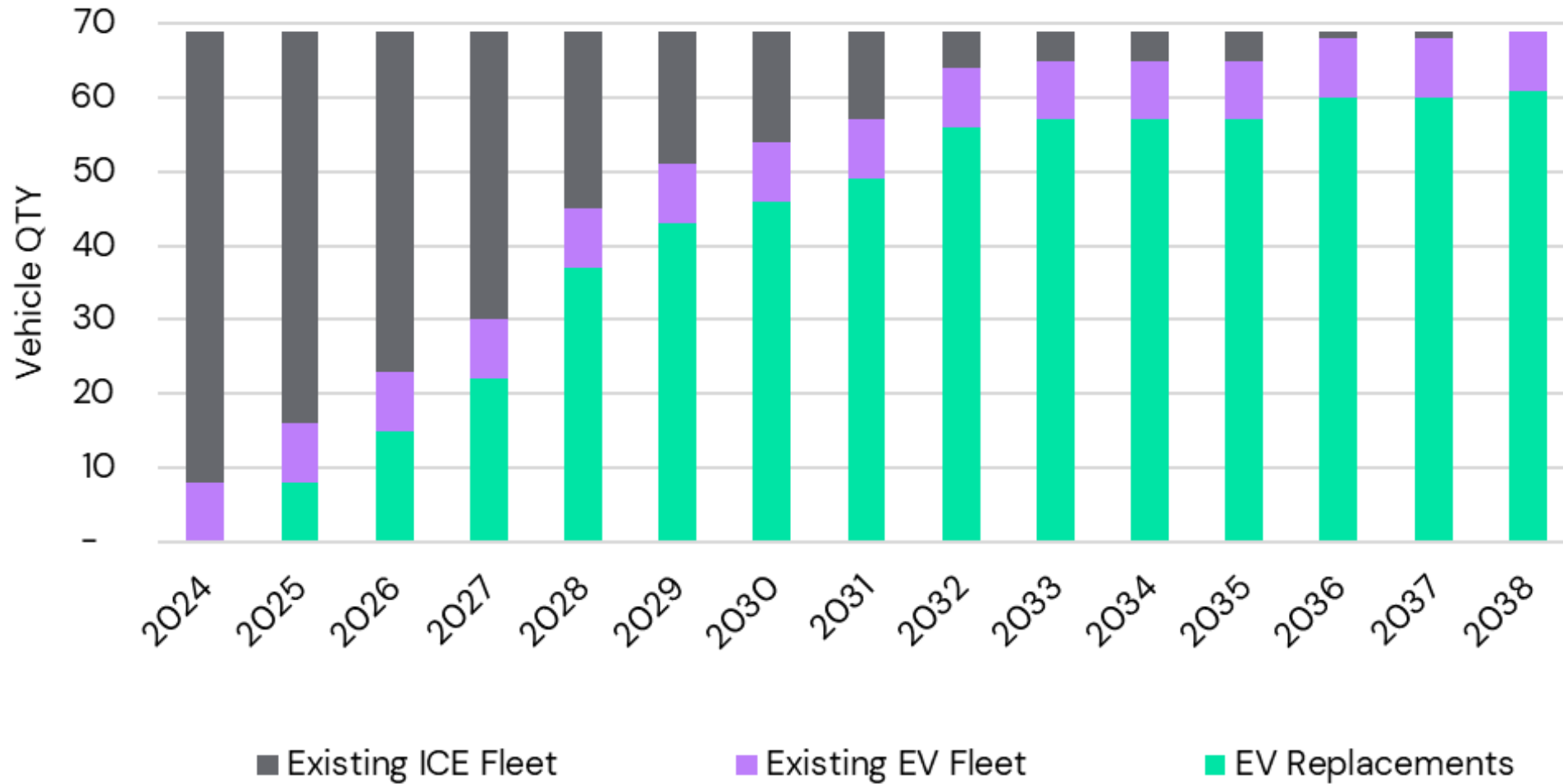
Appendix: 100% Electrification Chargers

Charging Level	Charger Nameplate Demand (kW) Range	Number Recommended	Total Equipment Cost	Total Installation Cost	Description	Typical Light-Duty Range and Charge Times
Level 2 Chargers (L2)	3-6 kW	44	\$17,608	\$123,258	Use a 208 V (commercial) or 240 V (residential) AC split phase service	10-20 miles of range per hour (4-6 hours for full charge)
	6-8 kW	3	\$2,211	\$7,738		
	8-11 kW	3	\$2,949	\$6,881		
	12-15 kW	5	\$6,976	\$12,209		
DC Fast Chargers (DCFC)	50 kW	2	\$41,220	\$39,898	Use 208 V or 480 VAC, three-phase service connection requiring a dedicated circuit	60-80 miles in 20 minutes of charging (~0.5 hours for full charge)
	150 kW	4	\$117,493	\$99,164		
Total	-	61	\$188,457	\$289,148	-	-

Appendix: 100% Electrification TCO



Appendix: 100% Electrification



→ Supporting Slides

- Electric Police Vehicles
- Incentives
- Retirement and Replacement Schedule
- Excluded Vehicles
- Site Load Impact Analysis
- Charging Cost Assumptions
- Non Road Equipment
- Next Steps

Electric Police Vehicles

- Currently, only 7 EV models, including one pickup truck, three sedans and two SUVs, are being used as police patrol vehicles in a handful of police fleets in the United States
 - Chevrolet Bolt (sedan)
 - Tesla Model 3 (sedan)
 - Tesla Model S (sedan)
 - Ford Mustang Mach-E (SUV)
 - Tesla Model Y (SUV)
 - Chevrolet Blazer EV PPV (SUV)
 - Ford F-150 Lightning Pro SSV (Light-Duty Pickup)
- Not always a cost effective option, due to the high cost of vehicle, charging infrastructure, and upgrades, but many fleets are satisfied with the conversion
- Feasibility depends on duty cycles. If there is not a 2-4 hour charging shift, then vehicle is not a good contender for EV

SUV-Police TCO Comparison

	Gasoline	BEV (Ford Mustang Mach-E)
Capital Cost	\$29,800	\$45,995
Charging Infrastructure Hardware (L2)	N/A	\$2,000
Charging Infrastructure Installation	N/A	\$3,500
Annual Fuel/Energy Costs	\$1,760	\$737
Annual Maintenance Costs	\$3,541	\$2,233
8-Year Total Costs.	\$62,643	\$68,234

Incentive and Funding Sources: **Applied**

Program	Light-Duty EVs	Medium-Duty EVs	Heavy-Duty EVs	Administrator	Vehicle Costs	EVSE Installation	EVSE Hardware	Program Offerings	Upcoming Deadlines	TCO Funding Assumptions
Commercial Clean Vehicle Credit	✓	✓	✓	IRS	✓			Tax credit amount is equal to the lesser of the following amounts: 15% (PHEV) or 30% (BEV/FCEV) of the vehicle purchase price; Incremental vehicle cost compared to equivalent internal combustion engine vehicle.	2032	Tax credit between 15%-30% dependent upon PHEV or BEV incremental cost
EVsmart EV Charger Rebate				Pepco		✓	✓	50% (60% in a DAC) of the hardware cost, warranty, and installation of eligible chargers up to \$5,000 per L2 port and \$15,000 per DCFC port. Max rebate of \$30,000 per site for eligible fleets*	70 rebates available on a first come, first serve basis.	50% (60% in a DAC) of EVSE costs up to \$5,000 per L2 port and \$15,000 per DCFC port
EVsmart Make-Ready Incentive				Pepco		✓	✓	Up to 90% (100% in a DAC) or \$15,000 of incentives for the Make-Ready infrastructure costs of eligible fleets*	70 rebates available on a first come, first serve basis.	90% (100% in a DAC) or up to \$15,000 for eligible fleet make-ready infrastructure costs

*Eligible customers include Maryland Small Businesses and Local Nonprofits with Pepco utility rate scheduling GS, MGT LV II, MGT LV III, MGT 3A II, MGT 3A III, GT LV, GT 3A, or GT3B and at least 5 EVs in their fleet. Each customer is eligible for incentives in up to two locations.

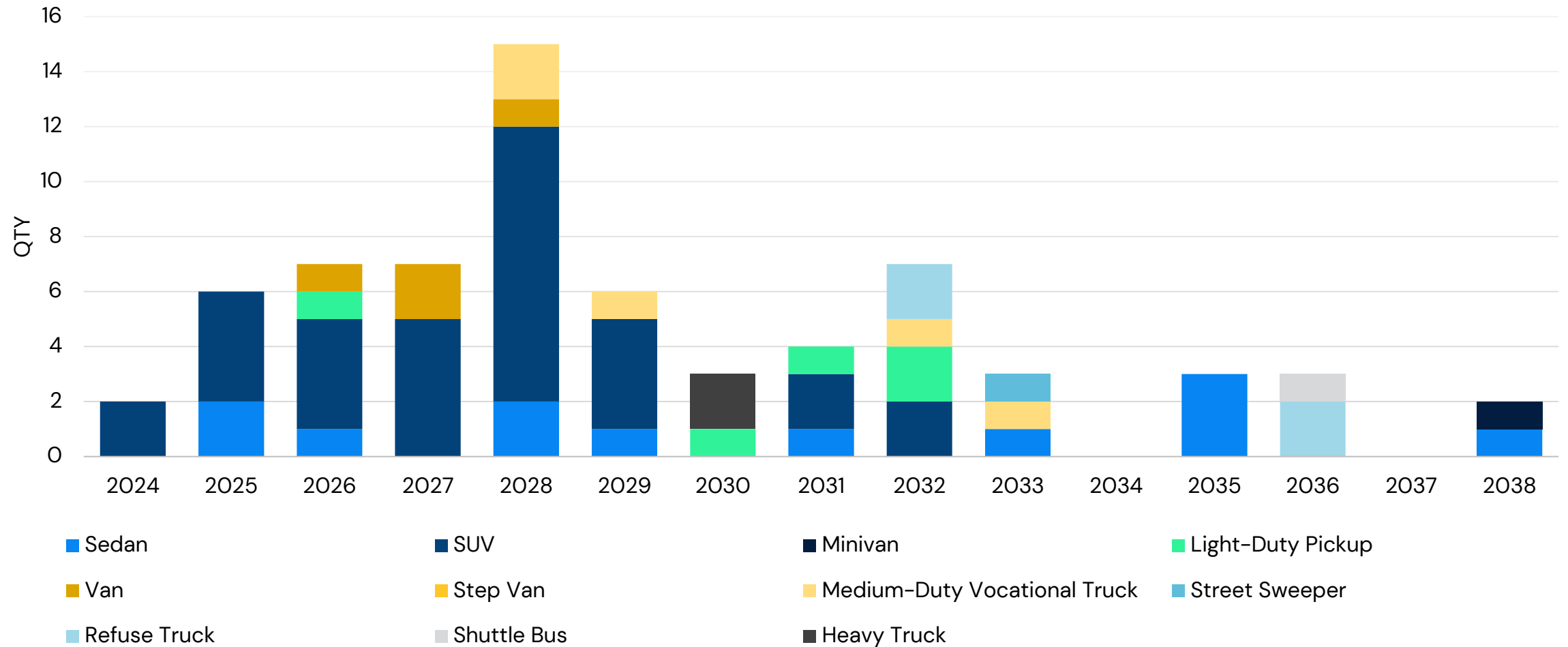
Deeper Dive: Pepco Fleet Incentive Offerings

Pepco offers incentives designed through their EVsmart program to support fleet electrification by providing EV infrastructure rebates for fleets owned by Maryland Small Businesses and Local Nonprofits with at least 5 EVs in their fleet and a Pepco rate schedule of GS, MGT LV II, MGT LV III, MGT 3A II, MGT 3A III, GT LV, GT 3A, or GT3B.

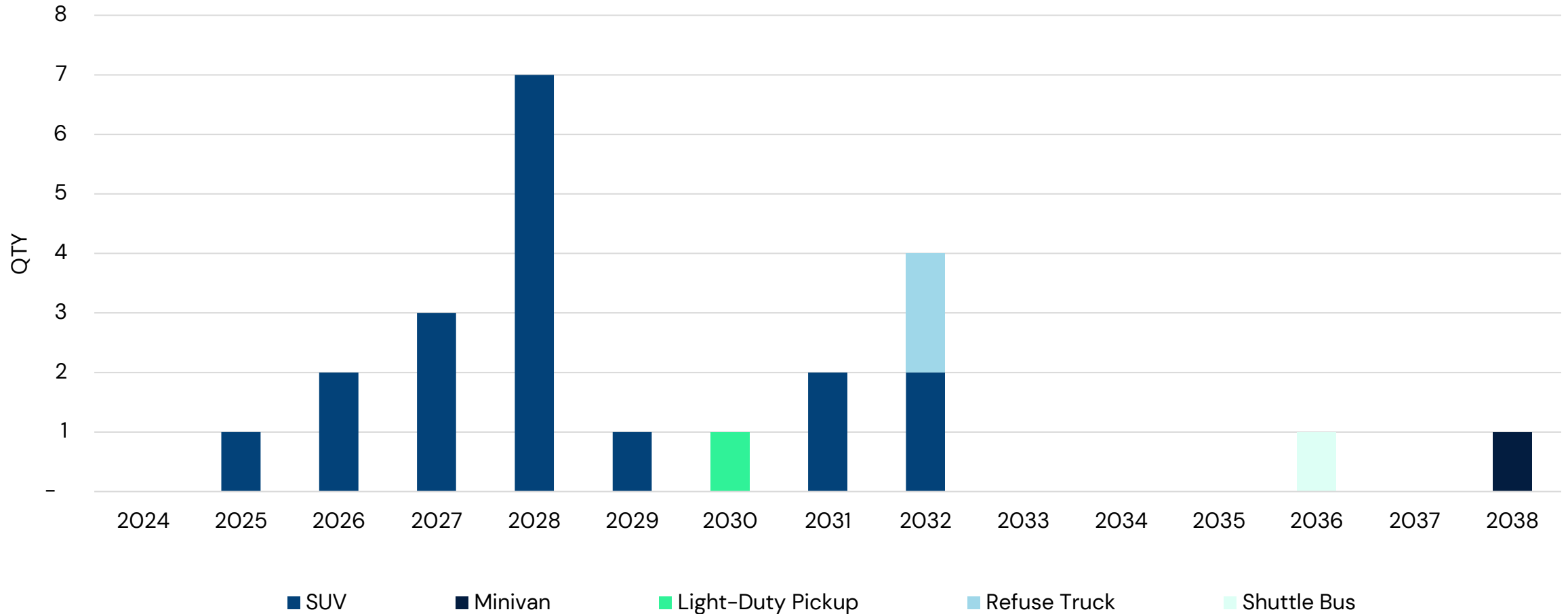
The EVsmart Fleet Incentive Program offers funding towards the purchase and installation of EV chargers whereas the Make-Ready Program offers funding for the necessary supporting infrastructure. Applications must be submitted within 30 days of hardware installation.

Customer Segment Eligibility	Type	Benefit	Funding Cap
Pepco Commercial Fleet (Rate Schedule GS, MGT LV II, MGT LV III, MGT 3A II, MGT 3A III, GT LV, GT 3A, or GT3B)	L2 Charger Rebate	50% (60% in a DAC) or up to \$5,000 for the hardware, warranty, and installation of eligible L2 EVSE	\$30,000 per site
	DCFC Charger Rebate	50% (60% in a DAC) or up to \$15,000 for the hardware, warranty, and installation of eligible DCFC EVSE	
	Make-Ready Program	90% (100% in a DAC) or up to \$15,000 upon the submission of an invoice for necessary project permits, registration documentation, and fleet planning for associated Make-Ready infrastructure costs	\$15,000 per site

Existing Fleet Retirement Schedule



Recommended EV Replacement Schedule



Excluded Vehicles

Vehicle Types Excluded from Analysis		
Vehicle Type	Quantity	Reason for Exclusion
Sedan	7	Vehicles are already Battery Electric
Street Sweeper	1	
TOTAL	8	

Site Load Impact Analysis

Site Name	Charger Type	Installed # Ports	Max Power Demand (kW)	Hardware Cost	Installation Cost	Make Ready Cost
Dept. of Public Works	L2 (12-15 kW)	1	15	\$1,060	\$1,856	\$121,782
	DCFC (150 kW)	2	300	\$64,461	\$54,405	
Police Station	L2	0	0	-	-	-
	DCFC	0	0	-	-	
Take Home – Police Station	L2 (3-6 kW)	17	102	\$6,420	\$44,940	\$61,309
	L2 (6-8 kW)	3	24	\$2,211	\$7,738	
Total		23	441	\$74,152	\$108,939	\$183,091

Take Home Vehicles

- Mustang Mach-E comes with a charger; install at home
- Cost of electricity = amount of energy used * cost of electricity

About Make Ready

Make-Ready Upgrades

Make-Ready Upgrades entail infrastructure developments on both **the customer-side and on the utility-side of the meter**.

- **Utility Side costs** include any upgrades required between the Transmission Lines and your metered location. Utility Side costs may include extending power lines and upgrading transformers.
- **Customer Side costs** include any upgrades to bring electricity from the electrical meter up to the customer's panel, where electricity is delivered to your site. These upgrades may entail upgrading electrical capacity of panels or circuit breakers, installing wiring under or overground, engineered site design, permitting, and labor costs.
- Remember to engage early and often with your utility.

Labor

Labor and Installation costs will vary by local electrician rates along with the amount of time required to complete the work. This analysis assumes a labor rate of \$120-\$150 per hour. Labor is separated by installation hours and non-installation hours, which include mounting, signage, protection, and restoration of the charger.

Material

Material costs include wiring and panel upgrades. The cost of conduit and cables will vary based on the distance from the charger to the electrical panel and by the size of the wire used. Electrical Panels, or circuit breakers, split the power that enters from the meter into multiple circuits, serving as a safety barrier. The capacity of the panel must be increased when adding significant new electrical load.

Trenching and Site Work

One of the largest cost impacts to a site upgrade project relates to the level of effort required to connect the new chargers to the electrical grid. To connect conduit, a site will likely require wiring above ground or below ground. If making an underground connection, trenching, or digging, will be required. Trenching costs are typically based on distance and type of ground surface. Asphalt or concrete is significantly more expensive to trench through than soil or grass. Wiring completed above ground is often the lowest cost option. Additionally, the distance between the charger and panel can greatly impact costs. The farther the charger is from the panel, the more conduit will be required to make a connection. Conduit and cables can cost up to \$25 per linear foot required. To reduce costs, the university may consider locating chargers as close as possible to the panel, even if this is out of the way. Then, invest in good signage to direct users to the charging site.

Charger Unit Cost Assumptions

Charging Level	Charger Nameplate Demand (kW) Range	Total Equipment Cost	Total Installation Cost	Description	Typical Light-Duty Range and Charge Times
Level 2 Chargers (L2)	4-6 kW	\$500	\$3,500	Use a 208 V (commercial) or 240 V (residential) AC split phase service	10-20 miles of range per hour (4-6 hours for full charge)
	6-8 kW	\$1,000	\$3,500		
	8-11 kW	\$1,500	\$3,500		
	12-15 kW	\$2,000	\$3,500		
	15-19 kW	\$2,500	\$3,500		
DC Fast Chargers (DCFC)	50 kW	\$29,000	\$28,070	Use 208 V or 480 VAC, three-phase service connection requiring a dedicated circuit	60-80 miles in 20 minutes of charging (~0.5 hours for full charge)
	150 kW	\$50,000	\$42,200		
	300 kW	\$128,000	\$61,560		

Non-Road Equipment Recommendations

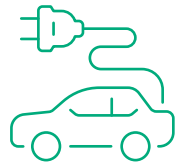
Non-Road Equipment					
Equipment Type	Total Fleet Quantity	Quantity Recommended to Convert to Electric	Financial Savings (across lifespan for all recommended equipment)	GHG Emission Reductions (across lifespan for all recommended equipment)	Sample Electric Manufacturers
Backhoe	2	0	N/A	-	Polaris, John Deere, Hisun
Loader	1	0	N/A	-	Crown, Raymond, Komatsu
TOTAL	3	0	N/A	-	

Next Steps



Get Support

Have questions about this report? Contact your Account Manager to discuss challenges and answer questions.



Explore Resources for Electrifying.

Visit the [Pepco EVsmart](#) webpage to find resources about available incentives, trainings, news and updates, and more.



Move Forward with Electrifying Your Fleet.

Circulate the findings of this report with key stakeholders in your organization. Contact your Account Manager for additional support in preparing to present these findings and incorporate them into your planning.

The [EVsmart website](#) has the tools you need to succeed.

Visit the webpage and you can:

- Explore funding opportunities
- Find eligible EV Chargers and Network Providers
- Find information about EV and EVSE operation and maintenance
- Learn about the Pepco Vehicle Charging Time of Use (TOU) Rate
- See frequently asked questions about Pepco rebates

We're here to help. Contact us for help with your report, support navigating next steps, or just to speak with an expert.

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