Royal Oak

Life Now Playing

ROYAL OAK

Final Presentation

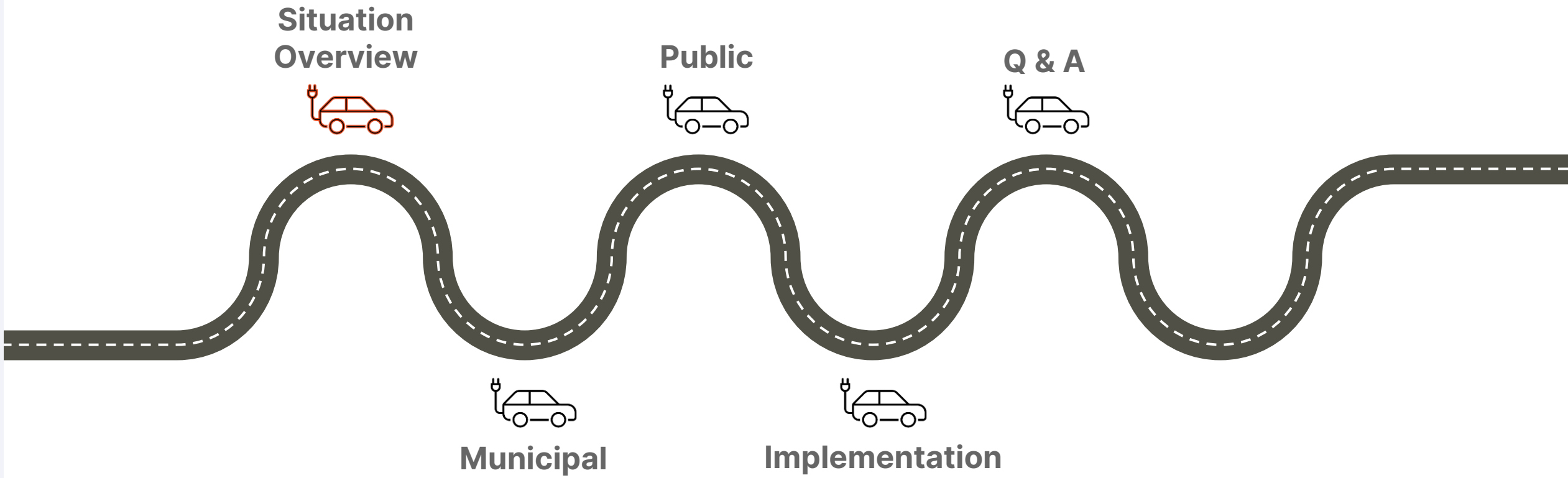
REDE

AN EV
CHARGING
NETWORK
THAT'S
ALWAYS
READY
.

2023

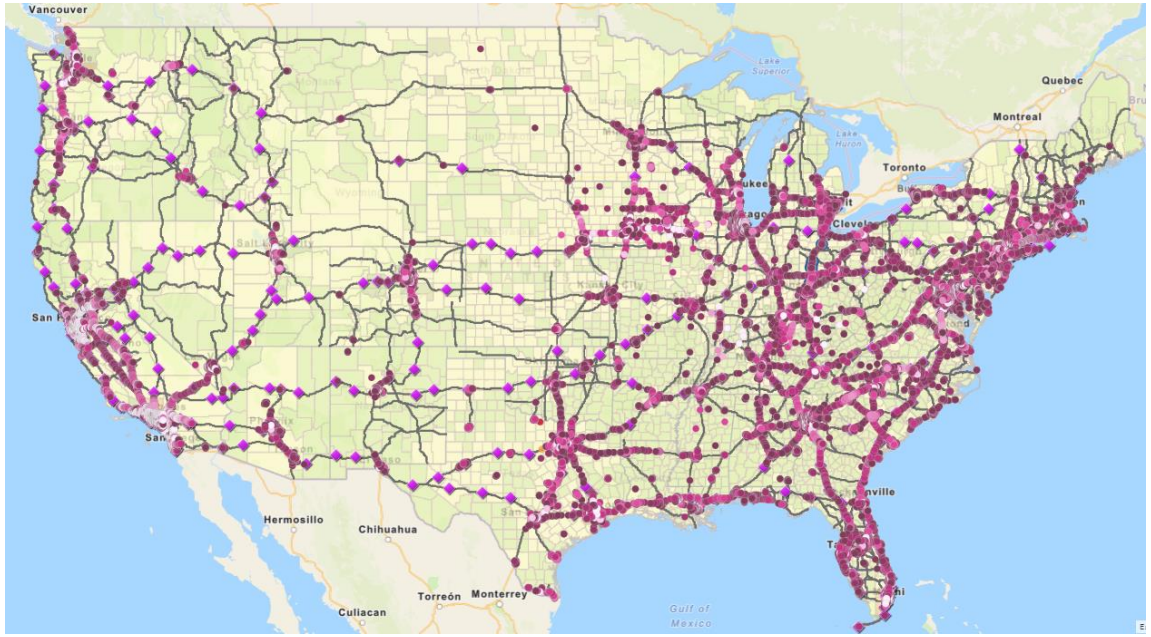
AN EV CHARGING NETWORK THAT'S ALWAYS READY. AN EV CHARGING NETWORK THAT'S ALWAYS READY. AN EV CHARGING NETWORK THAT'S ALWAYS READY.

> Agenda



> SITE & PORTFOLIO ANALYSIS

Red E has developed their own proprietary software to estimate utilization and profitability across potential EVSE investment sites.



EVSE Strategy

Using GIS tools and thousands of data points, locations are 'scored' based on EV-relevant data points such as traffic, registration counts, competing EV Chargers in the area, economic and population growth patterns, and other features. Higher scores correlate to higher utilization. The projected utilization is used to make informed investment decisions as it helps compute revenue and operating costs.

These scores are compared to the utilization performance of existing locations with similar scores to ensure estimated utilization accuracy. AI and real-time data are used to continuously improve the model over time as EV trends are quickly changing.

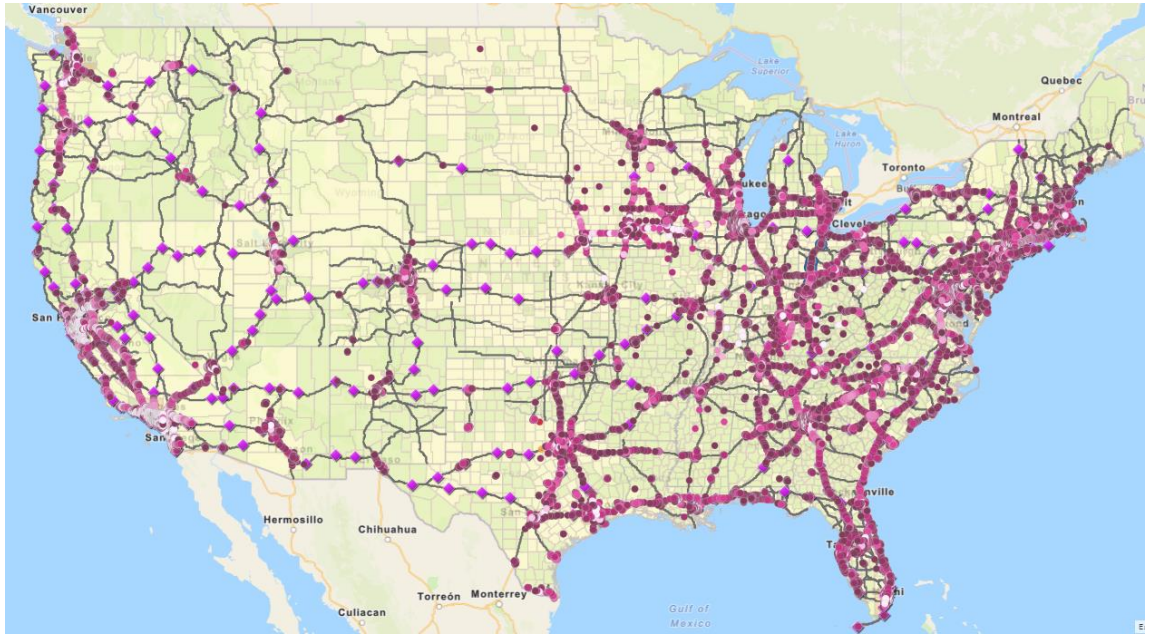
Utilization estimates, costs, and rebate/incentive programs are aggregated for each site to ensure profitability. Underutilized charging equipment and unprofitable projects are a waste for the site host and Red E.

For Royal Oak, Zip code 48067 was used to determine their 'score'

RED E

> SITE & PORTFOLIO ANALYSIS

Red E has also developed a winning formula to ensure site integrity and profitability across your portfolio



EVSE Strategy

•Our proprietary analytics tool identifies thousands of data points like traffic, EV registration, distance/speed of other chargers, income, crime, etc. and compares these to existing charger utilization to determine an accurate prediction of usage

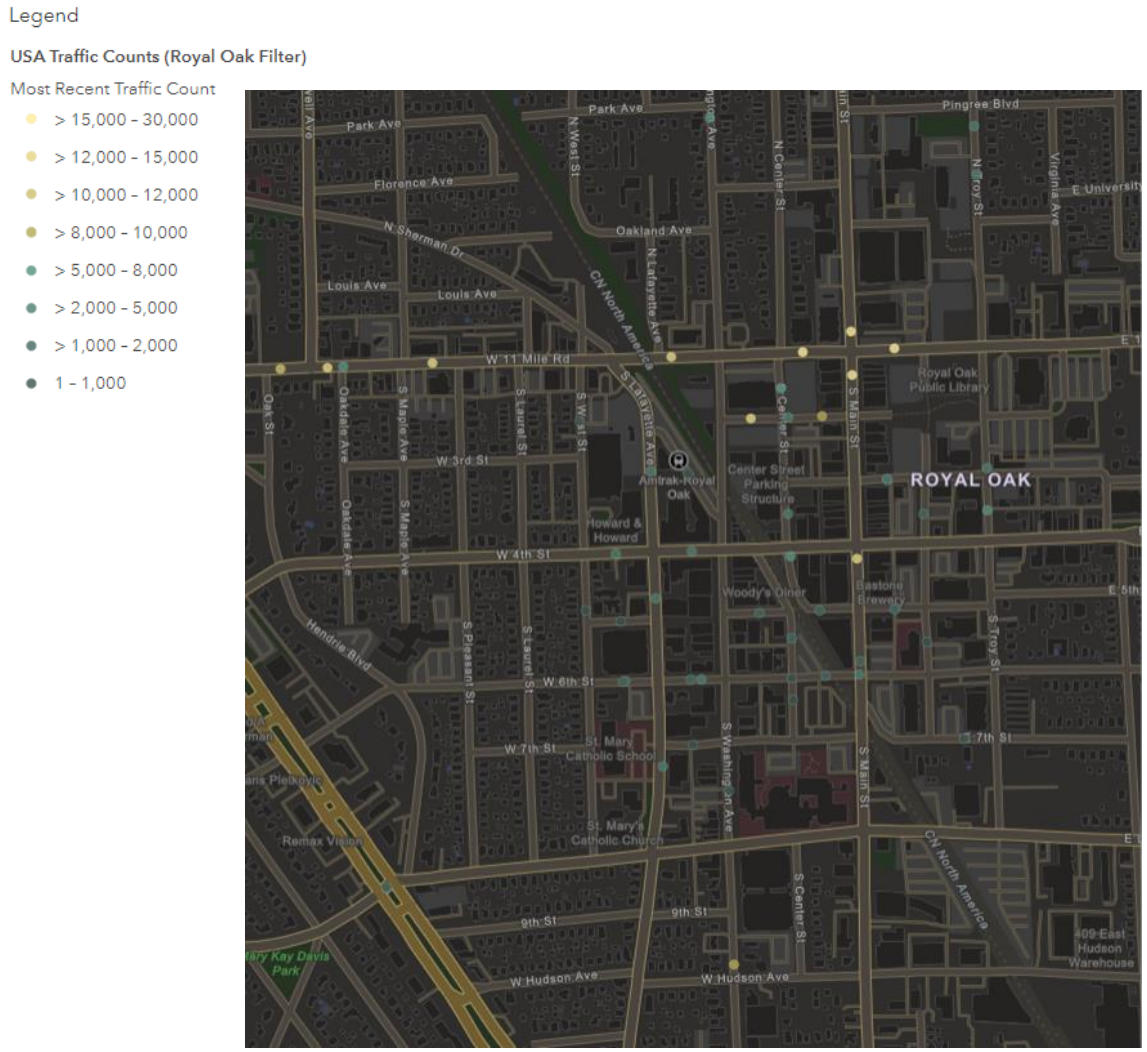
•Dedicated incentives team provides available opportunities as an additional layer to calculate project ROI

•Portfolio density analysis is performed to optimize charger placement for maximum market capture

RED E

> Royal Oak

Red E is working with the city of they Royal Oak to develop a comprehensive EV charging strategy for both municipal vehicles and public access



OVERVIEW

Red E has worked extensively to evaluate the current issues, determine the ideal state, and formulated a recommendation to reach it

AREA HIGHLIGHTS

Royal Oak is located closely to Detroit and has thousands of vehicles passing through daily through major roads and highways, the city's EV per capita is 2.5x State Average

METRICS

Metric	Value
# of EV's Registered in Royal Oak	250 +
Average Daily Traffic Volume	20,000
Estimated Daily Demand for EV Charging	50+

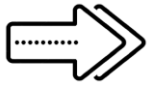
RED E

> Scope of Work

Red E has been tasked with and has agreed to provide the following information in the Scope of Work

Existing Conditions Summary

- State of Infrastructure
- Ordinances/Zoning Codes
- EV Demand and Growth
- Key stakeholders



Recommendations

- Municipal and Public Locations
- Ordinance Adjustments
- Phased Implementation
- Install and Deployment Cost

RED E

> Existing Conditions Summary

Red E has evaluated Royal Oak's charging sites, ordinances/zoning laws, EV demand, and existing chargers

Site Visit Summary

15 Site Visits
- Public Parking
- Municipal Lots
- Downtown Street Lots

Factors Considered
- Utility and Power Access
- Distance from downtown
- Available Space
- Traffic Volume
- Fleet Usage
- Fuel Cost Saving

Ordinances and Zoning

Zoning
- Royal Oak Responsible for designating city owned lots

Ordinance Codes
- Contractor Determine Ordinances on a Site-by-Site basis

(Code 770-109) Parking Lots
- Changes must be submitted and approved by building official

Overall, no significant issues

EV Demand and Charging

Current EV Demand
- 250 + Registered EV's

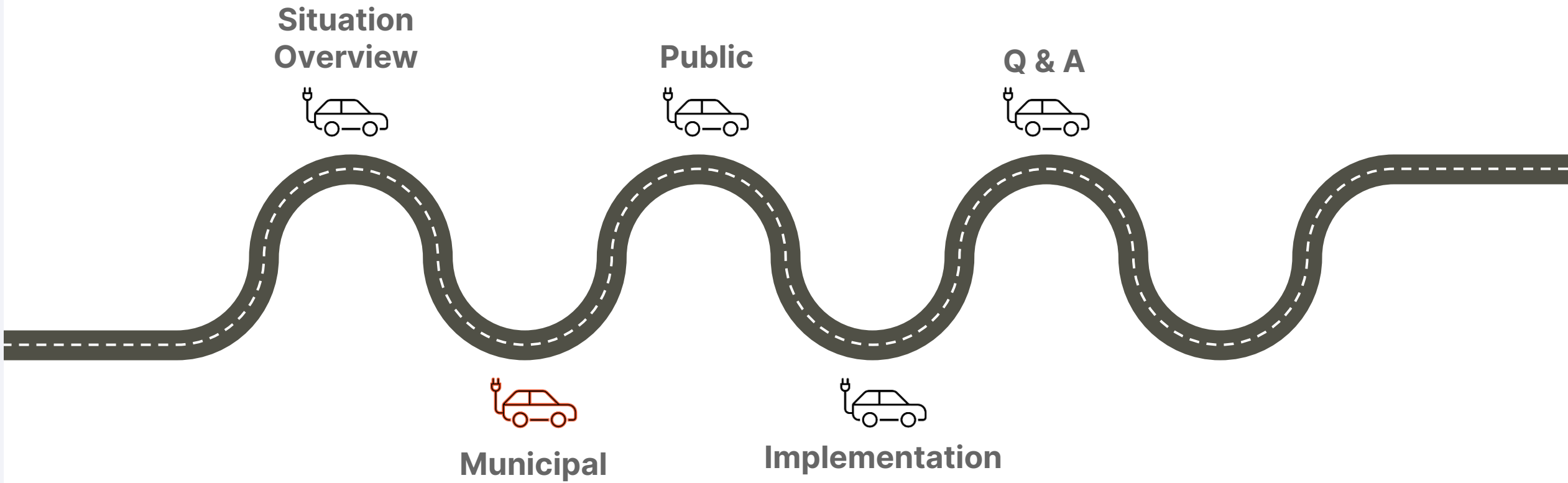
EV Demand Growth
- Est. 20% YoY growth

Current Infrastructure
- 3-7 Level 2 Chargers
- 0 DC Fast Chargers

*80 level 2 chargers and 2 chargers is estimated to support RO Fleet and general public vehicles over the next 7 years. Est ~600 vehicles.

RED E

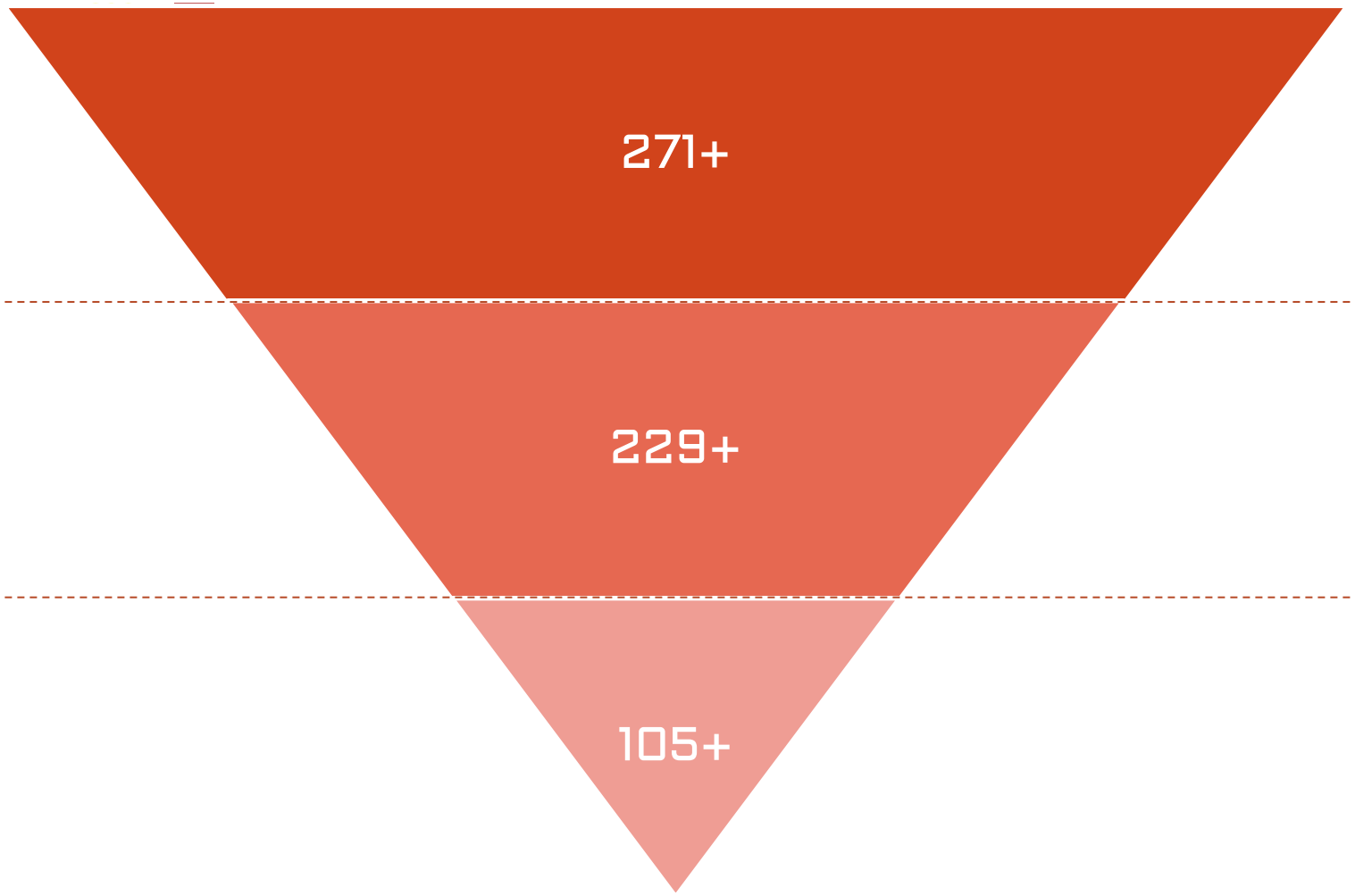
> Agenda



RED E

> Current Status

Royal Oak deploys a fleet comprising of traditional ICE vehicles with multiple types of uses



Current Fleet Strategy

- Royal Oak Currently maintains a fleet of 271 vehicles of all types and functions including those beyond roadworthy vehicles
- Of the 271 Vehicles, only 229 are slated for replacement after the current vehicles are retired
- Of these 229, only 105 vehicles have EV equivalent's falling within the category of Motorcycle, Car, SUV, Light Truck, Heavy Truck, or Van

RED E

> Future Fleet EV Goals

Royal Oak plans to develop and convert a portion of its fleet to EVs over the next few years with at least 30 EVs

EV Fleet Size

Conversion of fleet vehicles to EVs over 6 years

56%+ of Fleet converted by Y6

105 Current fleet Vehicles have an EV Equivalent

.56x 105 = **59 EV Fleet Vehicles**

Programs

Department of Public Services
- Split between DPS building and parking Garage
- 10-20 Vehicles

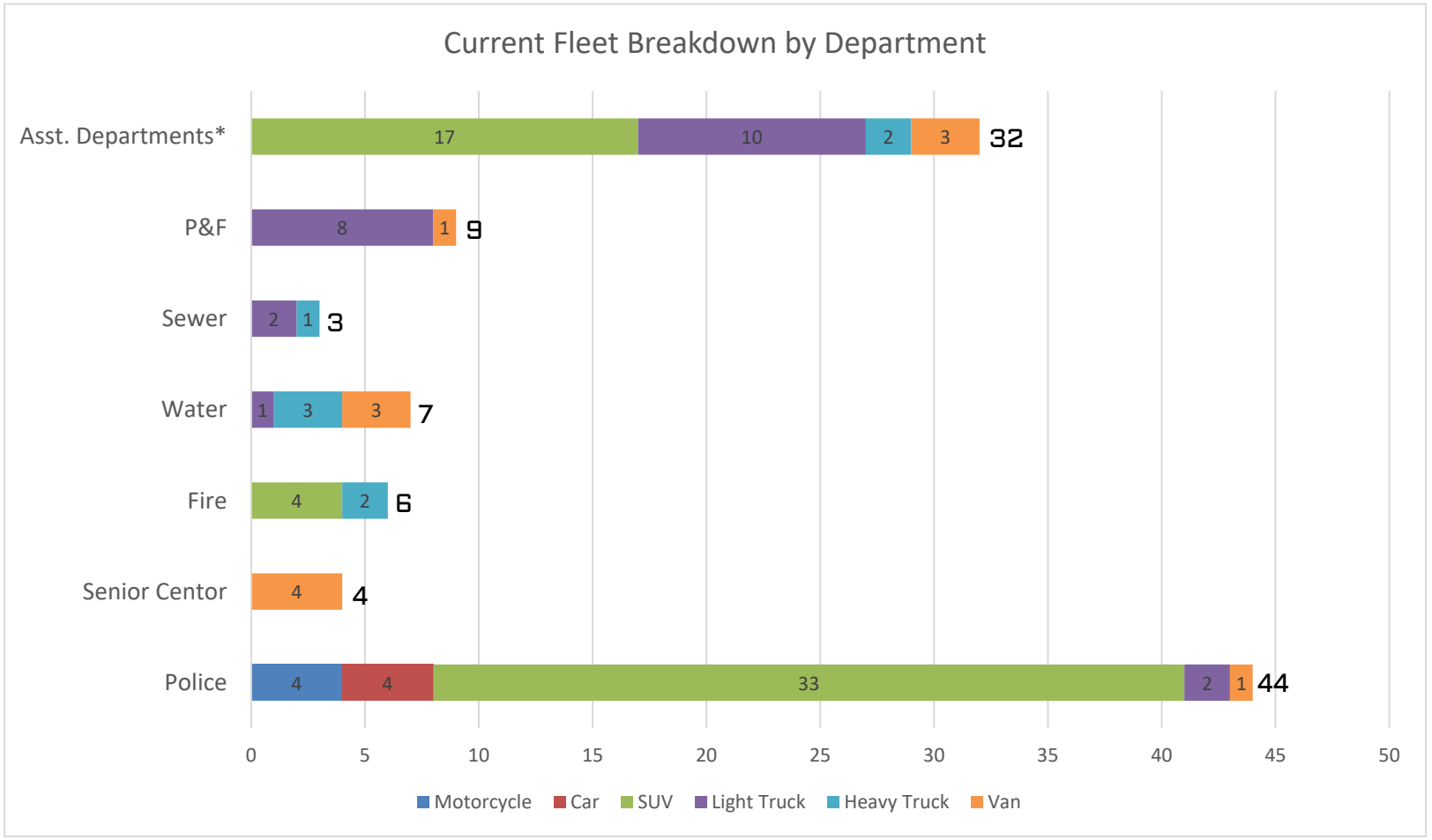
Senior Busses
- Replacing current buses due to capacity utilization issues
- ~8-12 Chevy Bolt or Equivalent

Police Vehicles
- Fleet Parking in downtown lot near municipal buildings
- ~17+ Vehicles

RED E

> Potential Replacement Candidates

Royal Oaks fleet has 105 current vehicles that have EV Equivalents currently on market



Current Fleet Strategy

- Royal Oak replaces their fleet vehicles every ~7 years
- 24% of fleet is up for replacement by the end of 2024 (47% of the fleet is up for replacement by the end of 2025)
- Royal Oak relies heavily on Cars, SUVs, and Light Trucks (easier to convert to EV) as well as Heavy Trucks (more difficult to convert to EV)
- Likely targets for EV conversion in the Motorcycle, Car, SUV, and Light Truck segments

*Hwy, Inspec, Eng, Assessor, Auto Pkg, Building Maint, Cable, DPS, MP

RED E

> Fleet Analysis

Significant cost saving opportunities exist through switching over fleet vehicles from ICE to Electric

Analysis of Cost Savings

- Cost differences analyzed over total lifetime and assessed on a yearly level
- Breakdown into specific vehicle types/categories across Royal Oak Fleet
- Comparing total cost of ownership between vehicle types

Segment	ICE Cost per Year*	EV Cost per Year**	Yearly Cost Difference
Motorcycle	$ 3,659.71	$ 3,495.08	$ 164.62
Car	$ 6,019.62	$ 4,736.86	$ 1,282.75
SUV	$ 10,000.93	$ 5,812.83	$ 4,188.10
Light Truck	$ 12,237.48	$ 11,157.14	$ 1,080.34
Heavy Truck	$ 8,534.52	$ 9,852.58	$ (1,318.06)
Van	$ 7,521.25	$ 7,338.34	$ 182.91

*ICE cost per year is based on Initial Cost/7-year service life + Yearly ICE Maintenance + Yearly ICE Fuel Costs
**EV cost per year is based on projected initial cost/7-year service life + Yearly EV Maintenance + Yearly EV Fuel Costs.
EV maintenance costs are estimated at ~20-50% of ICE and Fuel costs at ~40%

EV Maintenance - https://www.fleetmaintenance.com/equipment/battery-and-electrical/article/21250369/breakdown-of-ev-maintenance-expenses
EV Cost per Mile - https://news.energysage.com/electric-vehicle-charging-cost-vs-gas/#:~:text=In%20June%202021%2C%20the%20Department,driven%3A%20a%204%20cent%20difference!

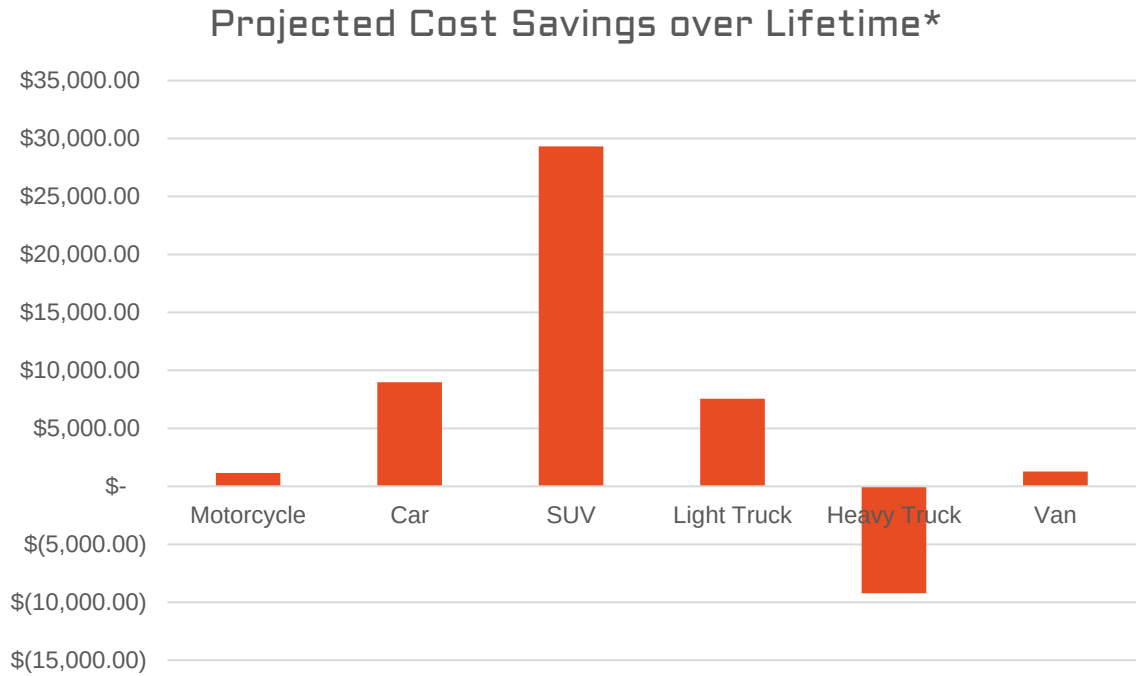
RED E

Fleet Recommendation

Royal Oak has an opportunity to transition significant portion of current fleet over to Electric to realize cost savings

Vehicle Replacement Recommendations

- **Motorcycles/Vans:** Low hanging fruit—publicly available and replacing soon in low quantities. Ideal for pilot programs/testing.
- **Car/SUV/Light Truck:** Biggest opportunity – Target these segments throughout the Royal Oak fleet portfolio to realize biggest cost savings opportunity
- **Heavy Truck:** Wait to deploy EVs until the market has produced and can support segment with cost effective vehicles



*Projected lifetime savings is calculated by multiplying yearly savings by the roughly estimated 7 year lifespan of vehicles

> Department Analysis

Cost analysis indicate potential for thousands of savings in just fuel costs

Fuel Costs and Usage

Department	Fuel Cost Per Mile	EV cost per Mile	Savings From Converting	Average Mile Per Vehicle	Cost Savings per Vehicle	**Overall Score**
ASSESSING	$0.13	0.04	$0.09	1622	$145.98	**1**
ENGINEERING	$0.18	0.04	$0.14	2640	$369.6	**3**
BUILD/INSPEC.	$0.11	0.04	$0.07	4463	$312.41	**3**
FIRE	$0.08	0.04	$0.04	14991	$599.64	**5**
DPS	$0.20	0.04	$0.16	5986	$957.76	**7**
POLICE	$0.15	0.04	$0.11	17753	$1,952.83	**9**
SENIOR BUSES	$0.22	0.04	$0.18	10797	$1,943.46	**10**

Converting Police Fleet alone could save over $63,000 in annual fuel spending and 418 Metric Tons of Co2 Emissions

Additional Factors for Consideration

Cost Savings from Lower EV Maintenance

Is there an EV Equivalent Available

Daily Performance/Distance Required

Common Fleet Routes for Departments

Total annual savings are calculated by taking [current fuel cost/mile]-[EV fuel cost/mile]*[Avg mile per vehicle]
Overall Score is based roughly on Cost Savings per Vehicle. Higher is better.

*Fuel Costs per mile and average mile per vehicle provided by Royal Oak
EV Cost per Mile - https://news.energysage.com/electric-vehicle-charging-cost-vs-gas/#:~:text=Across%20all%20EV%20manufacturers%2C%20the,kilowatt%2Dhour%20(kWh).

RED E

> Department Recommendation

Three main departments were identified as most beneficial to begin converting to EVs: DPS, Seniors, and Police

1 - Department of Public Services + Assorted

20x Level 2 Chargers

Site 1 – DPS Facility
1600 N Campbell Rd,
Royal Oak, MI 48067

Site 2 – 6th Floor 11 Mile
110 E Eleven Mile Rd,
Royal Oak, MI 48067

DPS and 11 Mile departments would benefit the most as they posses many heavily utilized light trucks and SUVs

2 - Senior Activity Center

8x Level 2 Chargers

Site 1 – Senior Center
3500 Marais Ave,
Royal Oak, MI 48073

Senior Center is chosen because the currently inefficient leased Buses can be easily replaced, and the location can serve a dual public/municipal purpose

3 – Police Department

10x Level 2 Chargers
2x DC Fast Chargers

Site 1 - Police
450 E Eleven Mile Rd,
Royal Oak, MI 48067

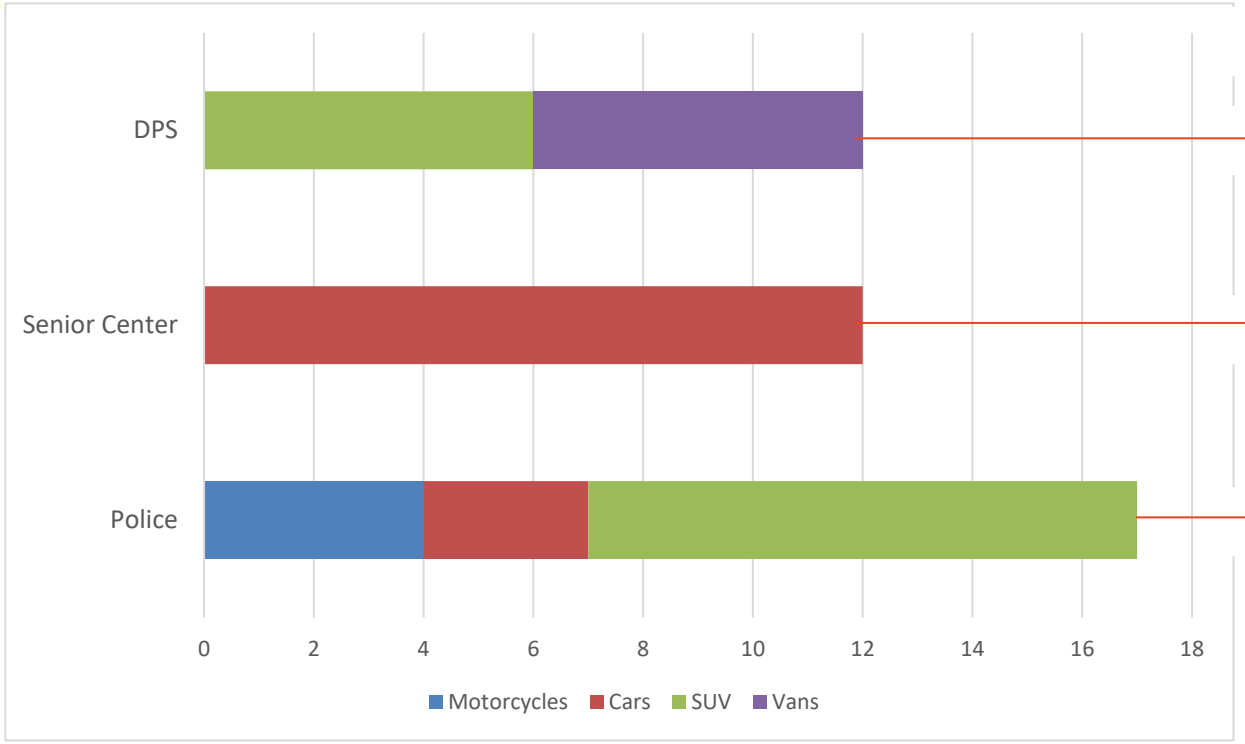
Police Department is chosen because much of the fleet consists of Ideally replaced vehicles with heavy utilization

RED E

Fleet EV Charging Infrastructure Needs

For Royal Oak to support new fleet of Electric Vehicles – City must build out EV charging infrastructure throughout its municipal footprint

Fleet EV Replacements by 2026*



EV requirements to support fleet

	Level 2	DCFC
DPS	10	0
Senior Center	8	0
Police	10	2

Opportunity to switch over 41 vehicles to EV and build out

*11 Mile – Fleet is not shown as it supports multiple departments. ~10 chargers will be required for 20+ vehicles at 11 Mile.

RED E

> Fleet EV Replacement Schedule

Recommended implementation schedule for both fleet conversions by department and vehicle

		2023	2024	2025	2026	2027	2028	2029	2030
Police	Motorcycle	4							
Senior Center	Cars		6	6					
Police	Cars		2	1			1	1	
Police	SUV		2	4	4	2	3	6	10
DPS	SUV		3	3		6	4	2	2
DPS	Vans			3	3	1	1		
DPS	Light Truck				5	5	0	1	1
	Total ALL	**4**	**13**	**17**	**12**	**14**	**9**	**10**	**13**
	Est. Cost*	**$100,000**	**$390,000**	**$570,000**	**$520,000**	**$540,000**	**$290,000**	**$320,000**	**$410,000**

*Motorcycles~25k, Cars/SUV~30k, Vans/Light Truck ~ 50-60k

RED E

> Fleet EV Charger Deployment Schedule

Recommended implementation schedule for fleet charger implementation

	2023	2024	2025	2026	2027	2028	2029	2030
DPS	0	3	3	4	-	-	-	-
Senior Center	0	4	4	-	-	-	-	-
Police*	2	4	4	-	-	-	-	-
11 Mile - Fleet	0	3	3	4	-	-	-	-
Charger Total	**2**	**14**	**14**	**8+**	**TBD**	**TBD**	**TBD**	**TBD**

* Beyond Level 2 chargers listed in the chart, we also recommend installation of 2 DC Fast chargers at the police building for cases where urgent quick charging is needed

Note: 38 level 2 chargers recommended for municipal. 30 in phase 1, 8+ in phase 2

RED E

> Combined Deployment Schedule

Recommended implementation schedule for both Fleet conversion to EV as well as EV charging infrastructure buildout

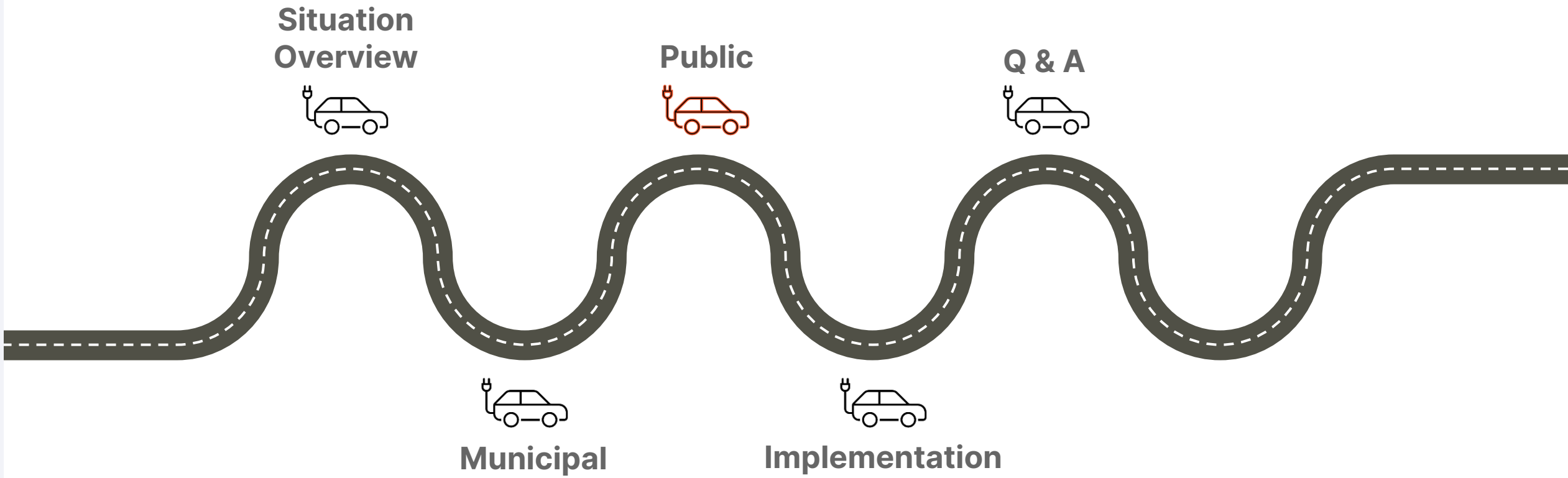
	2023	2024	2025	2026	2027	2028	2029	2030
Motorcycle	4	0	0	0	0	0	0	0
Cars	0	8	7	0	0	1	1	0
SUVs	0	5	7	4	8	7	8	12
Vans	0	0	3	3	1	1	0	0
Light Truck	0	0	0	5	5	0	1	1
EV Total	**4**	**13**	**17**	**12**	**14**	**9**	**10**	**13**
DPS	0	3	3	4	-	-	-	-
Senior Center	0	4	4	-	-	-	-	-
Police*	2	4	4	-	-	-	-	-
11 Mile - Fleet	0	3	3	4	-	-	-	-
Charger Total	**2**	**14**	**14**	**8+**	**TBD**	**TBD**	**TBD**	**TBD**

* Beyond Level 2 chargers listed in the chart, we also recommend installation of 2 DC Fast chargers at the police building for cases where urgent quick charging is needed

Note: 38 level 2 chargers recommended for municipal. 30 in phase 1, 8+ in phase 2

RED E

> Agenda



> Sites Visited

Over 11+ Site were scouted and assessed by Red E for potential Public Use

= Current Chargers

Downtown/Street Service

Williams Street x 4th
Downtown Service

Sherman St Lot
Downtown Service

5th St x Williams Street
Downtown Service

Main/7th Street North Lot
Downtown Service

North Main Garage
Main Street

300 Center Street Garage
Main Street

Central Locations

Royal Oak Municipal Offices
Centralized Transformer

Etkin Garage
Farmers Market, Court

South Lafayette Garage
ChargePoint Replacement

11 Mile Parking
Both Fleet and Public

Other Potential Locations

North Main Garage
Event Centers

Theatre Lot
Event Center/Shopping

North Lafayette Garage

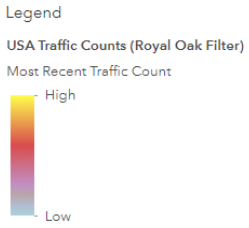
RED E

> Public Charging Strategy

Red E analyzed traffic, location, and projected demand to create a recommendation

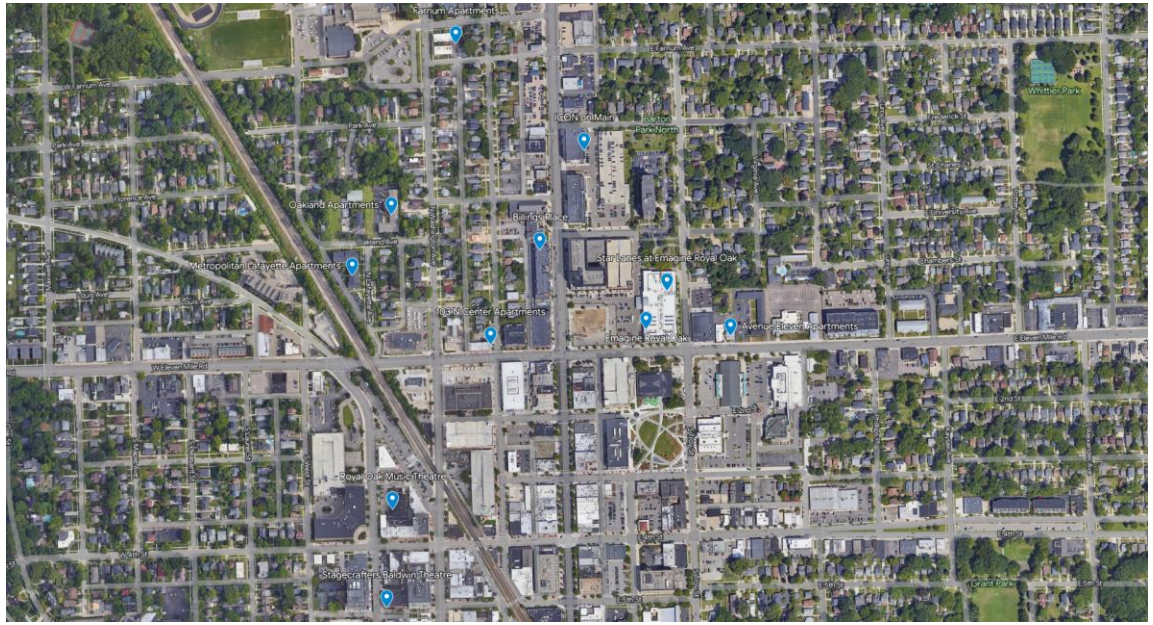
Daily Traffic Analysis

Analysis of daily traffic
Determining average EV flow



Location/Amenities/Apartments

Accessibility to other factors
- Amenities
- Apartment Complexes
- Public Spaces



RED E

Public Charging Quantities

Red E determined that demand would increase significantly over the next few years and 100 Level 2 Chargers will eventually be needed.

Meeting Future EV Demand

Projected EV Demand

Y1	Y2	Y3	Y4	Y5
300	360	432	520	630+

Average Public Chargers per 100 Vehicles: 17.6

Total Chargers Required

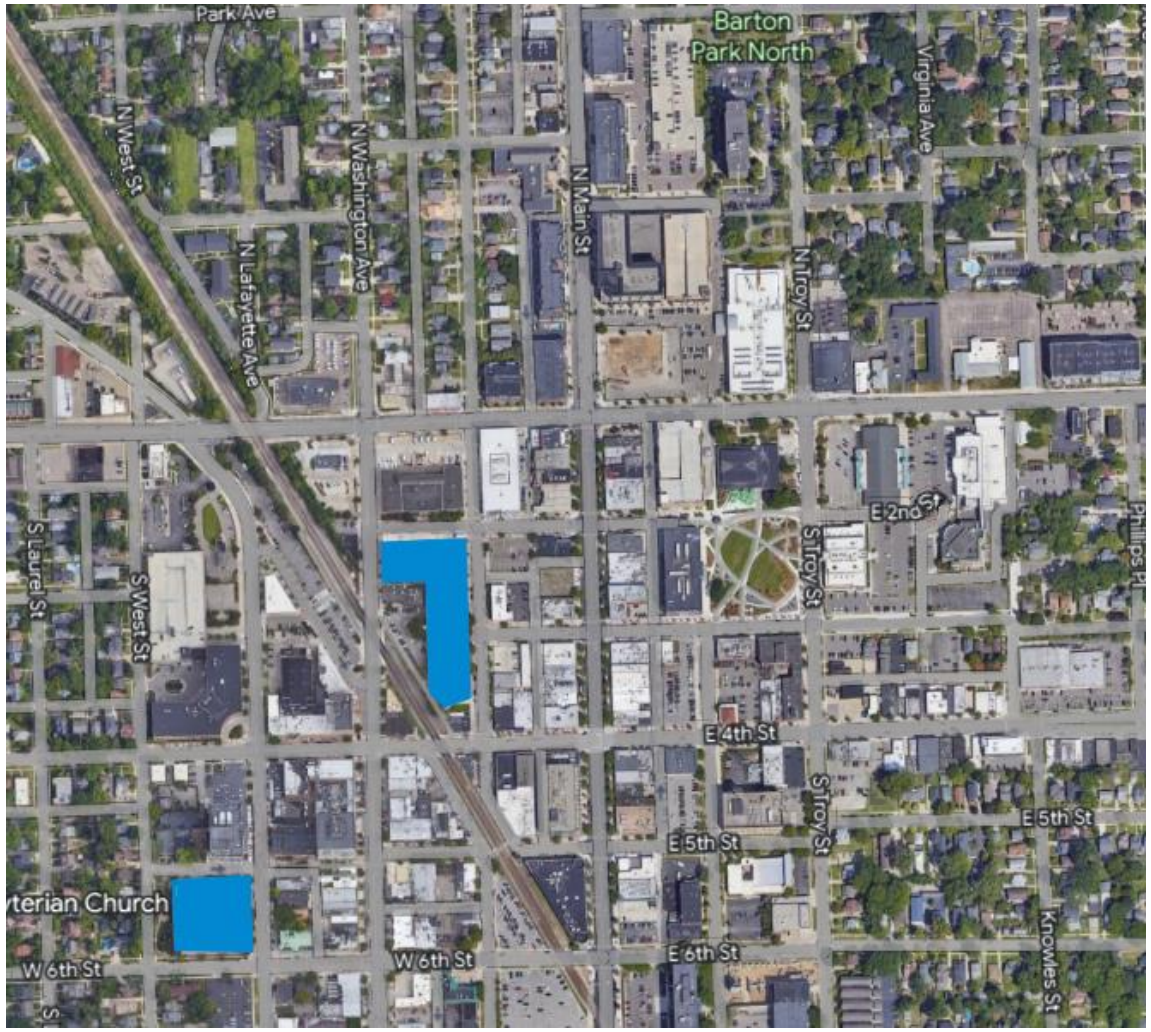
Y1	Y2	Y3	Y4	Y5
50	60	73	89	100+

*Chargers at ~ 1/6 of EV numbers in Royal oak. Chargers Required ~ [EV Demand/100]*17.6

RED E

> Current Public Setup

Current Royal Oak public charging is completely inadequate to meet public demand



Current Infrastructure

3-7 low-power Level 2 Chargers

Current Demand

250 EVs in Royal Oak

20% of EV Drivers lack home charging

= 50 Chargers required for current demand

Royal Oak is currently equipped with old, obsolete chargers in quantities that cannot support current demand let alone future demand

RED E

> Public Recommendations

A total of 42 public chargers across at least 7 Lots is recommended

1	11 Mile Garage	6x Level 2
2	Municipal	10x Level 2
3	William Street lot	2x Level 2
4	5th Street lot	4x Level 2
5	300 Center Street	10x Level 2
6	Main & 7th lot	6x Level 2
7	North Lafayette	4x Level 2

Total Chargers: 42

RED E

> Public Deployment Schedule

Recommended implementation schedule for public supporting level 2 Chargers

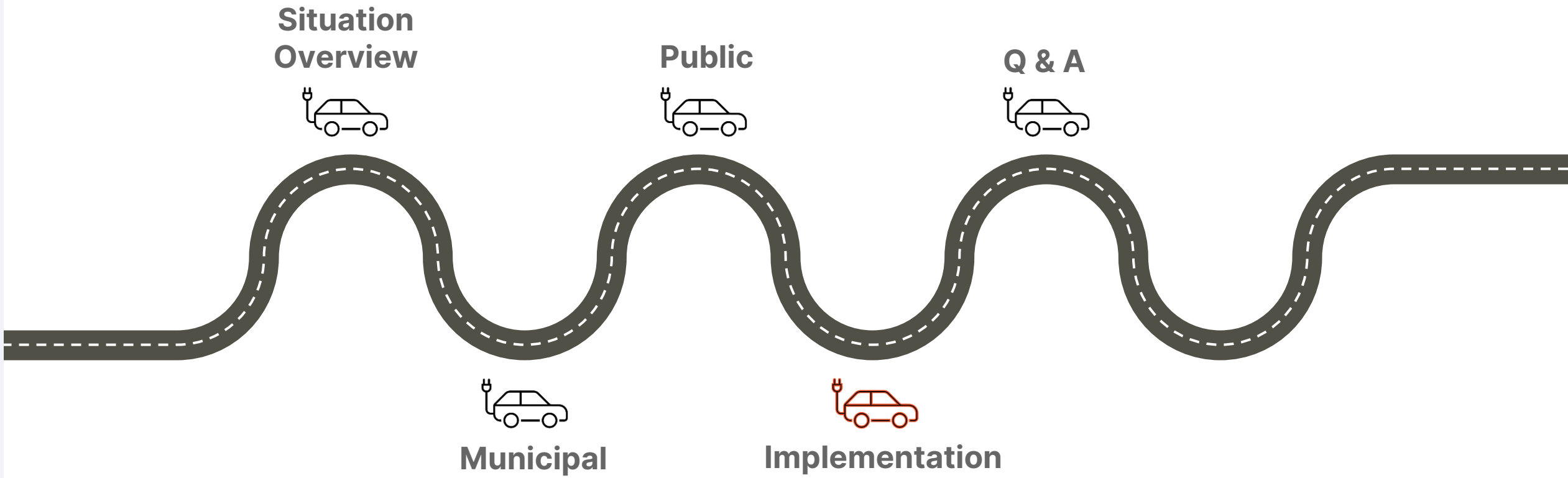
	2023	2024	2025	2026	2027	2028	2029	2030
300 Center Street Parking	2	4	4	-	-	-	-	-
Municipal Buildings	-	2	4	4	-	-	-	-
11 Mile - Public	-	-	4	2	-	-	-	-
Main & 7th Parking Lot	-	-	-	3	3	-	-	-
5th Street Lot	-	-	-	2	2	-	-	-
Additional Locations*	-	-	-	3	3	TBD	TBD	TBD
Charger Total	**2**	**6**	**12**	**14**	**8**	**TBD**	**TBD**	**TBD**

* Beyond Level 2 chargers listed in the chart, we also recommend installation of 2 DC Fast chargers at the police building for cases where urgent quick charging is needed

Note: 38 level 2 chargers recommended for municipal. 30 in phase 1, 8+ in phase 2

RED E

> Agenda



> 4 Phase Implementation Plan

A four-phase implementation plan is recommended: Replace, Establish, Expand, and Sustain.

Y0 → Y1-Y2 → Y3-Y5 → Y6+

Phase 0 - Replace

Stabilize, repair, and monetize current Infrastructure

Rip and Replace current obsolete Level 2 Chargers

Initial Testing/Pilot

Phase 1 – Establish

Install major fleet and public sites

Municipal/Fleet Sites
- Senior Center
- Police
- DPS

Public Sites
- 11 Mile
- Etkins Parking
- Municipal Buildings

Phase 2 - Expand

Expand Fleet and Public sites as demand grows

Municipal/Fleet
- Fire, Engineering, etc.

Public Sites
- Downtown Service

Phase 3 - Sustain

Monitor demand of EV Charging

Promote EV Charging construction

Establish EV Charging Friendly Ordinance

RED E

> Royal Oak EV Implementation Summary

Summary of EV Fleet Conversion, Fleet Charger Buildout, and Public charger buildout over the next 6-8 years

Fleet Strategy

Replacement Overview

	2023	2024	2025	2026	2027	2028	2029	2030
EV	4	13	17	12	14	9	10	13
Charger	2	14	14	8+	TBD	TBD	TBD	TBD

Fleet Sites

Police has 10 level 2 chargers to support daily demand and 2 DC fast chargers(not shown in chart) for urgent demand

Senior Center has 8 level 2 chargers for fleet and public charging

DPS has 10 level 2 chargers for daily fleet usage

11 Mile has 10 level 2 chargers to support fleet there

Public Strategy

	2023	2024	2025	2026	2027	2028
300 Center Street Parking	2	4	4			
Municipal Buildings		2	4	4		
11 Mile - Public			4	2		
Main & 7th Parking Lot				3	3	
5th Street Lot				2	2	
Additional Locations*				3	3	TBD

Note: total chargers recommended, 38 fleet, 42 public. In phase 1, 30 Fleet and 20 Public chargers will be installed.

RED E

> Implementation Phases

The majority of recommended chargers will be installed in Phase 1 and Phase 2

Phase 1

Department of Public Services - DPS Fleet	6
Senior Activity Center - Senior Shuttle Fleet	8
300 Center Street	10
Municipal/Police Buildings	16
11 Mile Parking	10
Total	**50**

Phase 2

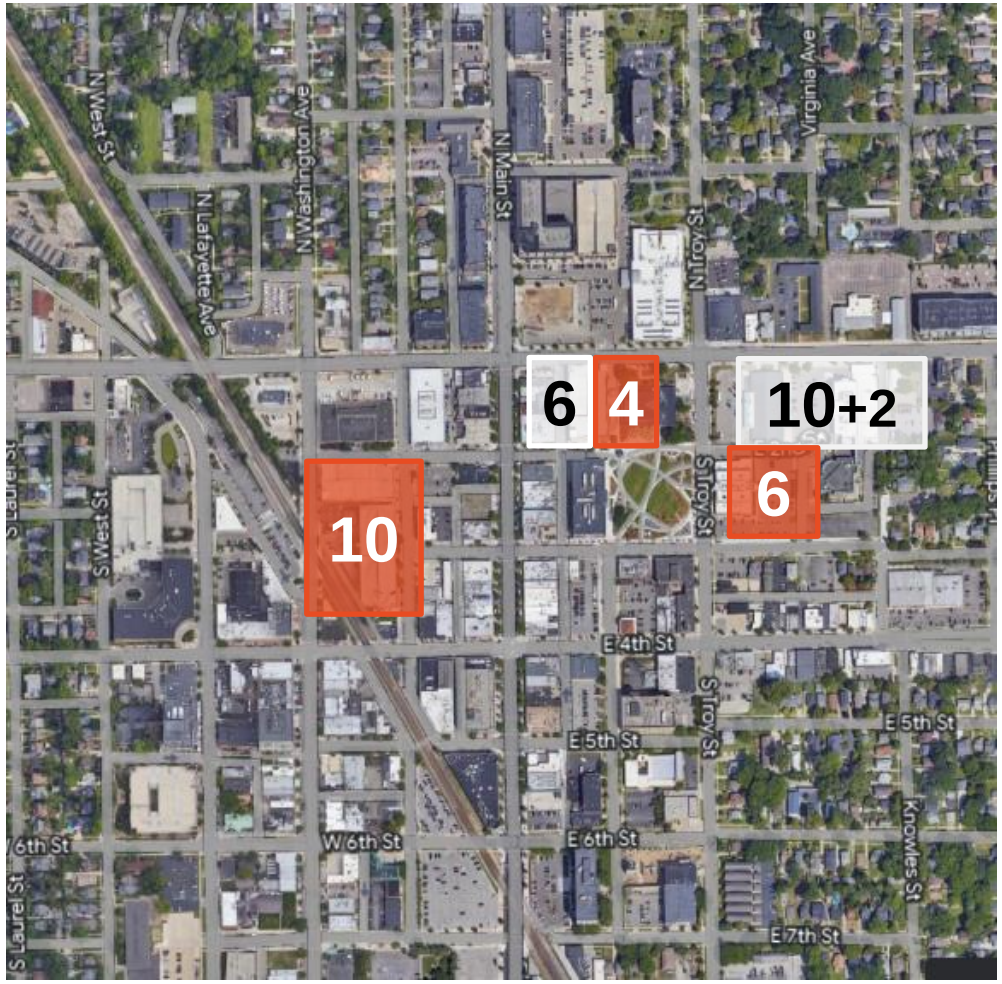
Main & 7th Parking Lot	6
North Lafayette Garage	4
11 Mile Parking	6
Other Assorted Public Chargers	14+
Total	**30+**

*1/5 EV owners don't have access to home charging. Michigan has 1 charger for every 7 EV Drivers

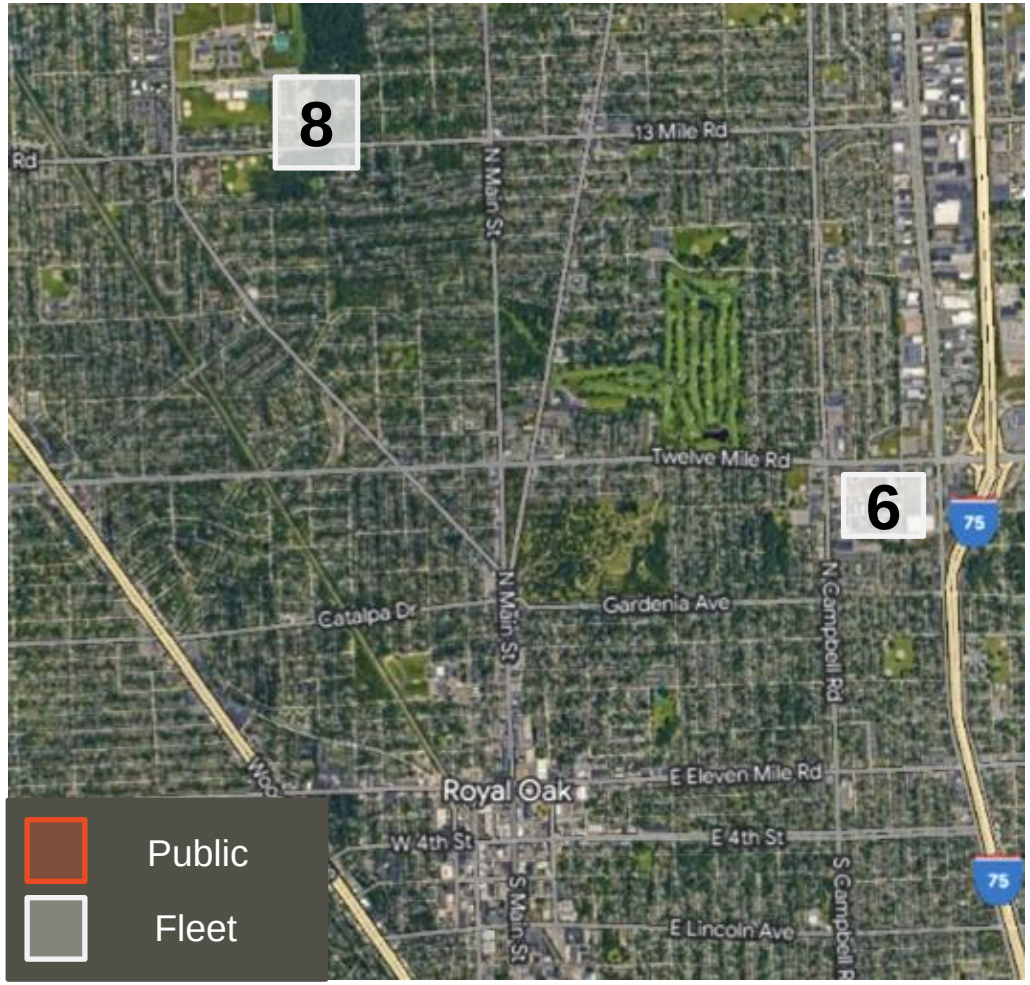
RED E

> Charger Locations Phase 1– 2023-2025

Red E Recommends a Mix of Public and Private lvl2 Chargers in the first few years



10 Chargers +2 DCFC Police
10 Chargers 300 Main Street
6 Chargers Municipal Building
6 Fleet + 4 Public Chargers 11 Mile

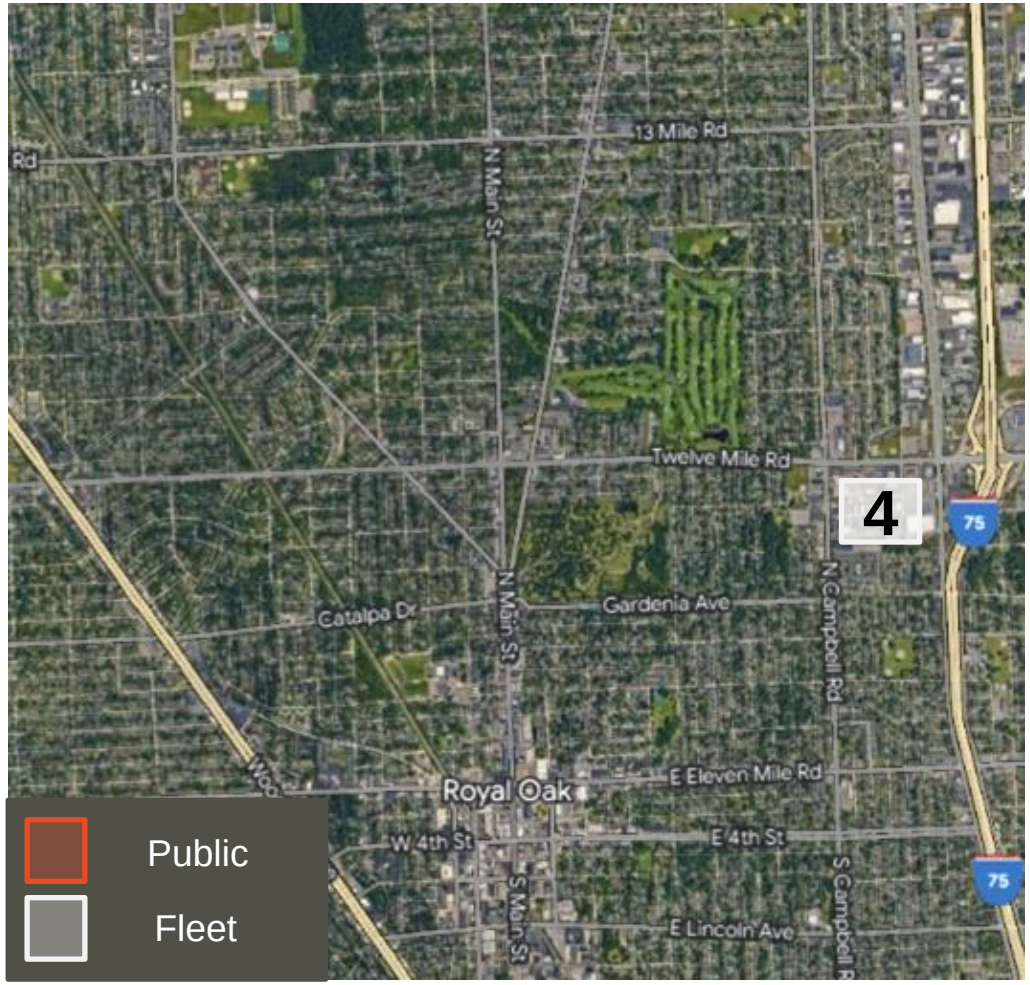


8 Chargers Senior Center
6 Chargers DPS

RED E

> Charger Locations Phase 2– 2026-2030+

Red E Recommends a slow growth and expansion after initial infrastructure is built



6 Chargers	Main & 7th	4 Fleet + 2 Public	11 Mile
4 Chargers	5th Street	TBD	North Lafayette
4 Chargers	Municipal Building		

4 Chargers DPS

RED E

> Implementation Costs

Rough implementation costs have been drafted including Phase 0**, Phase 1, and Phase 2

SITE	Level 2	DCFC	Hardware Cost (est.)	Installation Costs (est.)	Total Costs (est.)
Department of Public Services - DPS Fleet	6	0		$60,000	
Senior Activity Center - Senior Shuttle Fleet	8	0		$70,000	
300 Center Street Parking	10	0		$60,000	
Municipal/Police Buildings	16	2		$150,000	
11 Mile Parking	10	0		$75,000	
Phase 1 Total	**50**	**2**		**$415,000**	
Main & 7th Parking Lot	6	0		$35,000	
5th Street Lot	4	0		$30,000	
11 Mile Parking	6	0		$40,000	
Additional Locations*	14+	--		--	
Phase 2 Total	**30+**	**0**		**$105,000+**	

*Additional Locations: William Street Lot, 11 Mile Public, North Lafayette, Continued Municipal/DPS additions

Phase 1 = until end of 2025 80 total chargers recommended, 38 fleet, 42 public. In phase 1, 30 Fleet and 20 Public chargers will be installed.

Phase 2 = 2026 onwards

Phase 0 only covers about 4 motorcycle replacements and 2-4 lvl2 chargers. Replacement~ 25k/vehicle, Hardware~8-14k, Install~30k | **Total~ 145k

RED E

> Recap

Overall, the current infrastructure is lacking. Red E recommends installing 70+ chargers with a phased implementation over the next five years.

Current Situation

Demand
- Currently 250+ EVs
- 20-30% growth YoY
- Need for 50+ Chargers expected to grow to 100

Infrastructure
- 3-7 old Level 2 Chargers

Slow and low quantity

Ordinance/Zoning
- Traditional laws
- No Issues but also no benefits

Recommendation

Fleet
- Install 38 Level 2 chargers and 2 DCFC to support EV conversion of Fleet
- DPS, Police, Senior

Public
- Install 42 Level 2 chargers downtown to support growing public demand

Ordinance/Zoning
- Implement EV friendly ordinance laws for new constructions

Implementation

Four Phase Implementation

Replace
- Repair and update current EV Charging

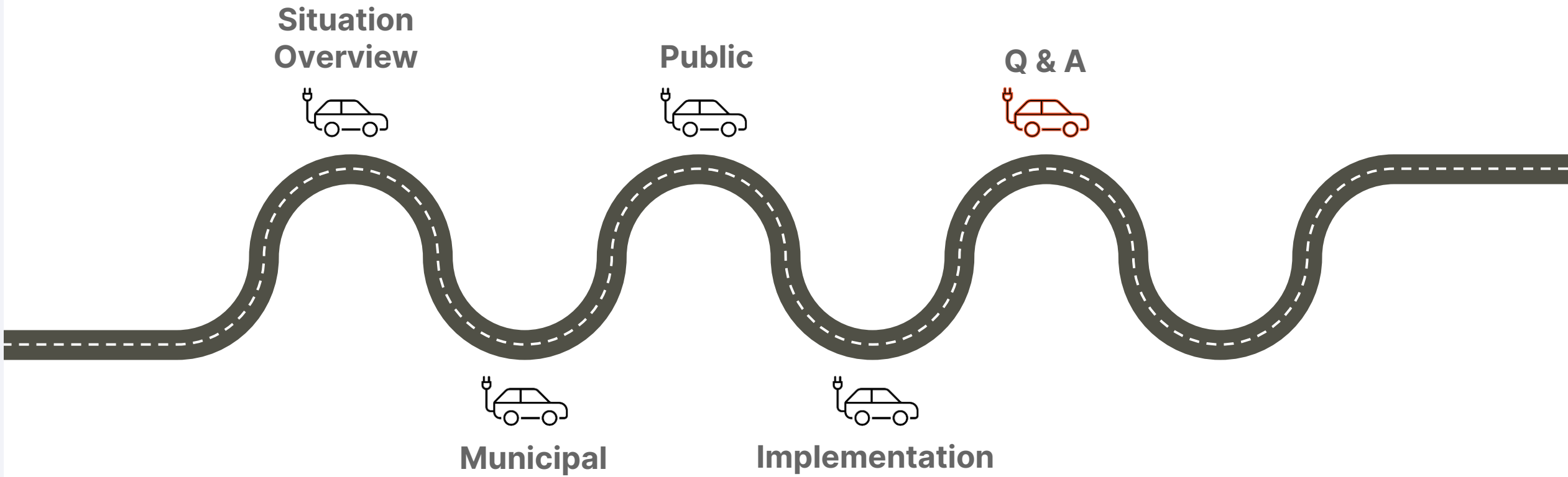
Establish
- Build current demand requirements for Fleet and Public Charging

Expand
- Expand to meet growth over next 5 years

Sustain
- Continue monitoring and encouraging EV growth

RED E

> Agenda



RED E

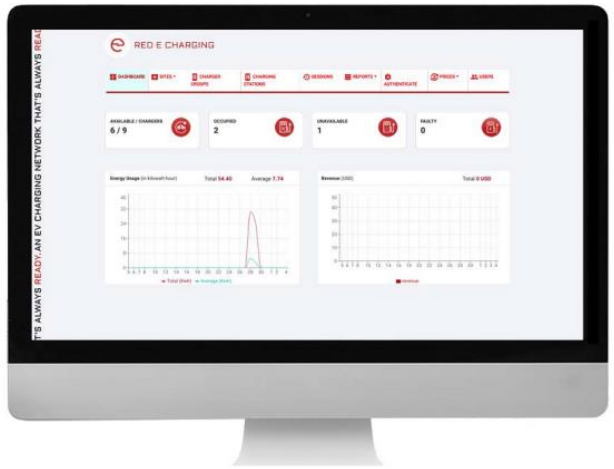
THANK YOU

AN EV
CHARGING
NETWORK
THAT'S
ALWAYS
READY
.

2023

> Software Overview

Best-in-class software designed specifically for ease of use for the driver as well as straightforward backend charger management for the site owners



Red E Enterprise Features

Built to be Easy - Our platform was built from the ground up to reduce server interactions which is the leading cause of charger downtime

Flexible Payment - Pay via card reader, app, or web portal (no app required)

Remote Diagnostics - Read codes, perform resets, push charges. 95% of all issues can be resolved over the air

Custom Reporting - Track usage and profit

Multi Site Management - Easily track, manage, and set pricing for multiple site groups

Utility Approved - Approved for rebate programs nationwide

RED E

> Level 2 Technology Overview

Level 2 Chargers

Charger Model: Red E Pro80 (19.2kW)

Features:

- 2-4 Hour Charge Time
  - Shopping and Leisure
- Wi-Fi Enabled
- Built in Body Holster
- Sleek user-friendly design
- Included cable management
- Multiple payment options: Pay directly QR code or app (App not required to charge)

RED E

> DCFC Technology Overview

DC Fast Chargers

Charger Model: 160kw Dual Port DCFC

Features:

- 20-30 Minute Charge Time
  - Commuters and Long Distance
- Wi-Fi Enabled
- Dual Port for Charging Up to 2 Vehicles
- Sleek user-friendly design
- Included cable management
- Multiple payment options: Credit Card Reader, RFID Chip, QR code or app

RED E

AN EV CHARGING NETWORK THAT'S ALWAYS READY. AN EV CHARGING NETWORK THAT'S ALWAYS READY.

> Cost Savings Calculations

Class		Average Cost	Average Maintenance	Average Fuel Costs	Average Lifetime	Annual Costs	Total Cost	Total Cost Per Year	
0182	Motorcycle	$ 23,850.00	$ 172.56	$ 80.00	7	$ 252.56	$ 25,617.95	$ 3,659.71	
0185	Low Profile Car	$ 30,000.00	$ 324.39	$ 910.68	7	$ 1,235.07	$ 38,645.52	$ 5,520.79	
0184	Low Profile SUV	$ 38,948.58	$ 2,430.90	$ 2,480.51	7	$ 4,911.41	$ 73,328.48	$ 10,475.50	
0186	K-9	$ 39,343.00	$ 2,072.80	$ 2,436.31	7	$ 4,509.11	$ 70,906.79	$ 10,129.54	
0189	Police Patrol SUV	$ 38,202.00	$ 4,022.37	$ 4,654.12	7	$ 8,676.49	$ 98,937.40	$ 14,133.91	
0190	Police Patrol Car	$ 34,357.00	$ 854.86	$ 755.44	7	$ 1,610.30	$ 45,629.12	$ 6,518.45	
0191	Police Patrol Truck	$ 40,924.00	$ 4,069.72	$ 4,429.42	7	$ 8,499.14	$ 100,417.99	$ 14,345.43	
0205	4w drive Pickup	$ 29,942.09	$ 1,619.00	$ 1,759.30	7	$ 3,378.30	$ 53,590.20	$ 7,655.74	
0210	Pickup/ Utility	$ 29,494.00	$ 2,725.80	$ 2,474.07	7	$ 5,199.86	$ 65,893.05	$ 9,413.29	
0215	SUV	$ 27,750.19	$ 673.91	$ 755.18	7	$ 1,429.08	$ 37,753.76	$ 5,393.39	
0225	Van	$ 33,487.13	$ 925.91	$ 1,811.46	7	$ 2,737.37	$ 52,648.72	$ 7,521.25	
EV Equivil ants							Total Cost	Total Cost Per Year	Delta
	Motorcycle	$ 24,000.00	$ 34.51	$ 32.00	7	$ 66.51	$ 24,465.59	$ 3,495.08	$ 164.62
	Low Profile Car	$ 30,000.00	$ 64.88	$ 364.27	7	$ 429.15	$ 33,004.06	$ 4,714.87	$ 805.92
	Low Profile SUV	$ 30,000.00	$ 486.18	$ 992.21	7	$ 1,478.39	$ 40,348.70	$ 5,764.10	$ 4,711.40
	K-9	$ 45,000.00	$ 414.56	$ 974.52	7	$ 1,389.08	$ 54,723.59	$ 7,817.66	$ 2,311.89
	Police Patrol SUV	$ 30,000.00	$ 804.47	$ 1,861.65	7	$ 2,666.12	$ 48,662.85	$ 6,951.84	$ 7,182.08
	Police Patrol Car	$ 30,000.00	$ 170.97	$ 302.18	7	$ 473.15	$ 33,312.04	$ 4,758.86	$ 1,759.58
	Police Patrol Truck	$ 60,000.00	$ 813.94	$ 1,771.77	7	$ 2,585.71	$ 78,099.99	$ 11,157.14	$ 3,188.29
	4w drive Pickup	$ 60,000.00	$ 323.80	$ 703.72	7	$ 1,027.52	$ 67,192.65	$ 9,598.95	$ (1,943.21)
	Pickup/ Utility	$ 60,000.00	$ 545.16	$ 989.63	7	$ 1,534.79	$ 70,743.51	$ 10,106.22	$ (692.92)
	SUV	$ 30,000.00	$ 134.78	$ 302.07	7	$ 436.85	$ 33,057.96	$ 4,722.57	$ 670.83
	Van	$ 45,000.00	$ 185.18	$ 724.58	7	$ 909.77	$ 51,368.36	$ 7,338.34	$ 182.91

> EV Fleet Replacement Schedule

		Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
		2023	2024	2025	2026	2027	2028	2029	2030
	POLICE	4 Police Motorcycles	4 Police Cars/SUVS	5 Police Cars/SUVS	4 Police Cars/SUVS	2 Police Cars/SUV/Truck	4 Police Cars/SUV/Truck	7 Police Cars/SUV/Truck	10 Police Cars/SUV/Truck
	SENIOR CENTER		6 Senior Center Bolts	6 Senior Center Bolts					
	DPS		3 DPS Cars/SUVS	6 DPS Cars/SUVS/Vans	8 DPS Cars/SUVS/Vans /Truck	12 DPS Cars/SUVS/Vans/ Truck	5 DPS Cars/SUVS/Vans	3 DPS Cars/SUVS/Vans/ Truck	3 DPS Cars/SUVS/Vans/ Truck
	Implimentation Schedule	4	11	15	12	14	9	10	13
		2023	2024	2025	2026	2027	2028	2029	2030
Police	Motorcycle	4							
Senior Center	Cars		6	6					
Police	Cars		2	1			1	1	
Police	SUV		2	4	4	2	3	6	10
DPS	SUV		3	3		6	4	2	2
DPS	Vans			3	3	1	1		
	Light Trucks				5	5	0	1	1
	Total ALL	4	13	17	12	14	9	10	13

> EV Emission Estimates

Compare CO2 emissions for gas and electric cars over a year of driving.

15000 How many miles do you drive per year?

A year of CO2 emissions.

Utilities generate electricity from a variety of sources, including hydroelectric, coal, nuclear, natural gas and a variety of renewable methods, such as solar and wind.

Switch to EV and reduce your carbon emissions by an estimated:

8,508 LBS

Gas **11,839** LBS CO_2/yr

EV **3,331** LBS CO_2/yr

Est. gm CO_2/mile (gas)	Est. MPG of vehicle		Estimated mile/kWh	Est. gm CO_2/mile (EV)
358	24	RESET ALL	3.07	100.7160
	Gas Model Year		EV Year	
	Gas Vehicle Brand		EV Brand	
	Gas Vehicle Model		EV Model	

This is just one publicly available source comparing EVs to Traditional Vehicles.
On average, EVs produce about 1/3 emissions, mainly through the production process.

RED E