Shelburne Fleet Electrification Final Report

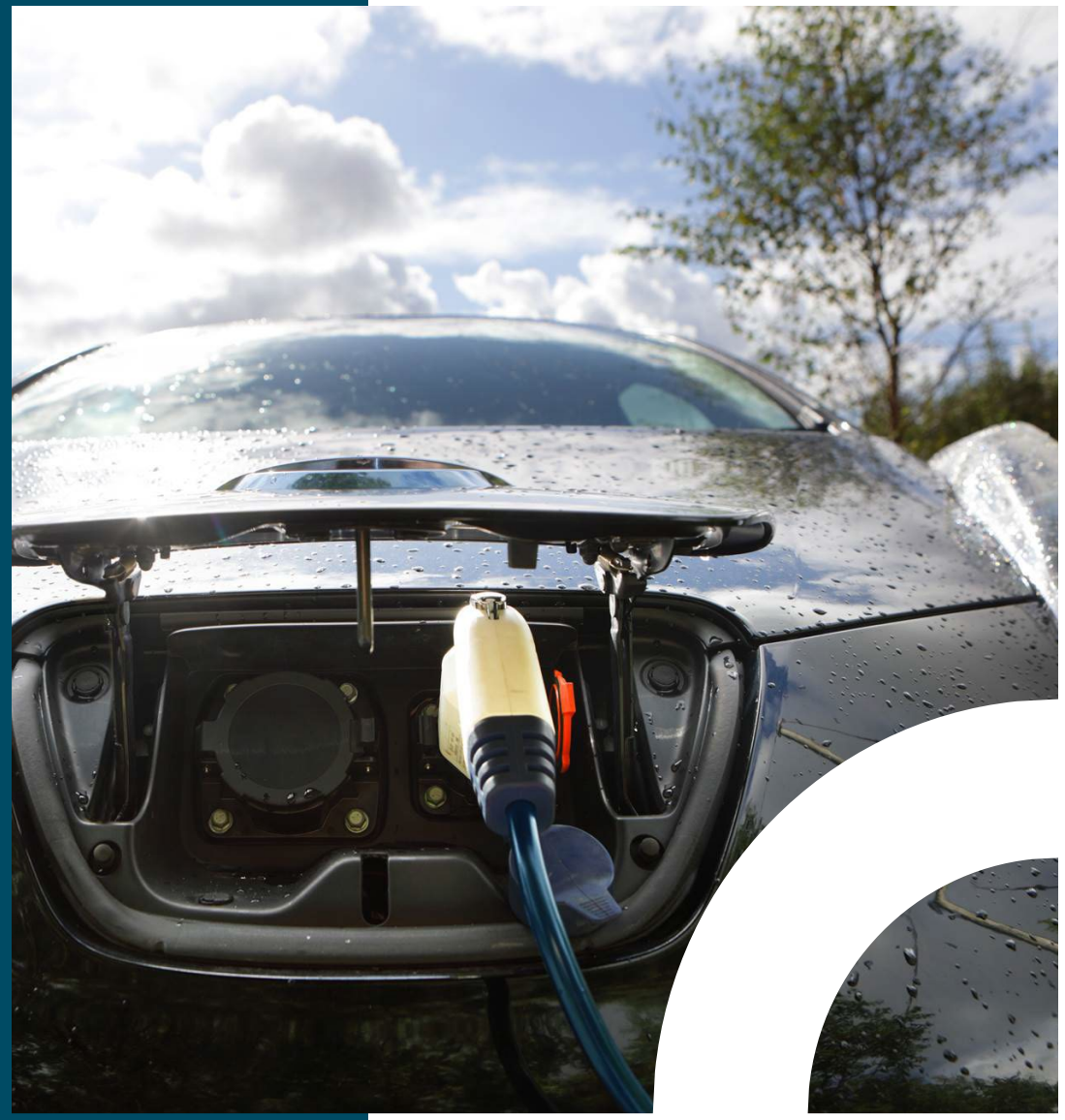
October 2025 - Final

Overview

VEIC was engaged by CCRPC to provide fleet electrification support to Shelburne and two other municipalities. This work is guided by the energy efficiency and pollutant reduction goals called out in the CCRPC ECOS regional plan, which incorporates the region's enhanced energy plan.

VEIC worked with Town staff from several departments to assess potential light-duty EV deployment in Shelburne's fleet, with a focus on implementation support, including charging infrastructure assessment and recommendations, a review of operational considerations, and capital budget planning support for vehicle purchases.

This work builds on prior Town efforts to advance municipal fleet electrification.



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Background

- At the start of this work, Shelburne had no EVs in their municipal fleet, and staff expressed desire develop an actionable plan to start electrifying their fleet.
- Shelburne's Energy goals within its Town Plan include replacing "fossil fuels with renewably generated electricity for the transportation and heating sectors."
- In early 2025 while this work was underway, Shelburne deployed an all-electric Rivian R1T pickup truck assigned to their Stormwater department

Methodology

Shelburne staff shared key fleet vehicle characteristics with VEIC for 22 light-duty Town vehicles used by various departments

- **Fire/Ambulance/Rescue:** Three large SUVs and two pickups
- **Buildings and Grounds:** Two pickup trucks and a large SUV
- **Highway, Sewer/Wastewater and Water:** Eight pickup trucks
- **Police:** Three police cruisers, a pickup truck, and two large SUVs

The project team gathered information from town leadership on high-level operational requirements of each vehicle, expected retirement dates, and other considerations which would affect each vehicle's potential replacement by a comparable electric vehicle.

VEIC also organized demos of the Chevy Blazer EV Police Cruiser and the Ford F-150 Lightning for Shelburne staff (along with Williston and South Burlington staff)

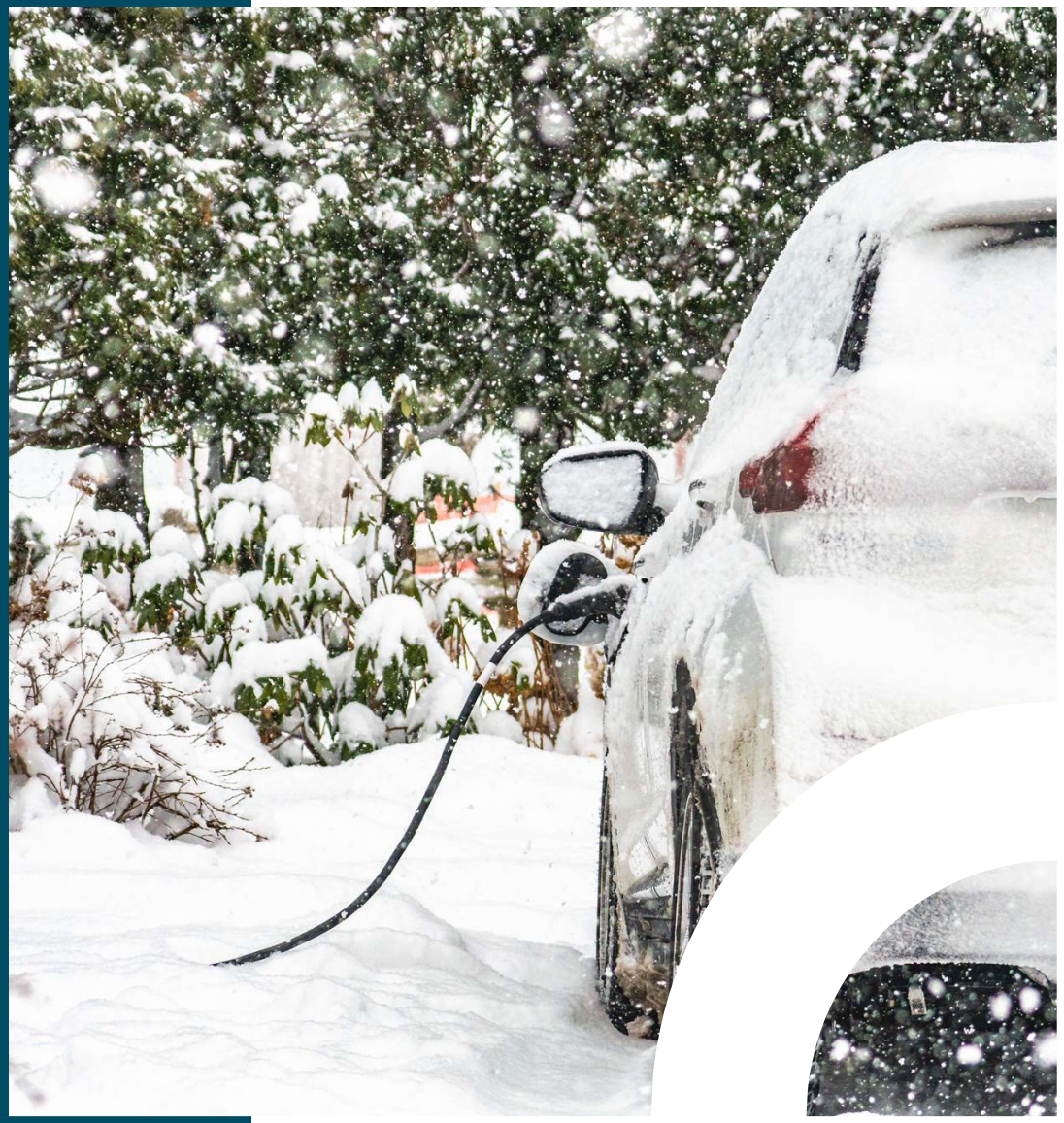
Methodology

Criteria for EV replacements

- Comparable EV options currently available on market from established manufacturers
- EV alternative would be capable of meeting all provided operational requirements (driving range, towing/cargo capacity, idling time, etc.) of existing vehicle under “worst-case” cold-weather scenario

What we did not look at/consider

- Medium and heavy-duty vehicles – due to small size of municipal fleet and limited options for redundancy



Existing Vehicles Recommended for EV Replacement Further Consideration

Department	Site Name	Vehicle Number	Year	Make	Model	Vehicle Type	Up for Replacement	Recommended for EV Replacement When Current Vehicle is Retired?
Buildings/ Grounds	Highway Garage	0003	2016	GMC	SIERRA 2500	Pickup Truck	2026-2027	Yes (if plowing is not critical)
Buildings/ Grounds	Town Center	0042	2018	FORD	EXPLORER	SUV	2027-2028	Consider EV options at next replacement
Buildings/ Grounds	Town Center	0077	2023	FORD	F150 Pickup	Pickup Truck	2030-2031	Yes (if plowing is not critical)
Fire	Fire Department	0035	2017	DODGE	RAM 3500	Utility Truck	2032	Consider EV options at next replacement
Fire	Fire Department	0071	2023	FORD	F150 FIRE DEPT. PICKUP	Pickup Truck	2033	Consider EV options at next replacement
Law Enforcement	Town Center	0012	2023	FORD	POLICE INTERCEPTOR	Police Cruiser/ SUV	2026-2027	Consider EV options at next replacement
Law Enforcement	Town Center	0060	2019	CHEVROLET	TRAVERSE	Police Cruiser/ SUV	2026-2027	Consider EV options at next replacement
Law Enforcement	Town Center	0069	2021	FORD	EXPLORER	Police Cruiser/ SUV	IN VSP IMPOUND	Consider EV options at next replacement
Sewer/ Wastewater	Turtle Lane WWTP	0032	2017	FORD	F350 UTILITY TRUCK	Pickup Truck	Unknown	Yes (if plowing is not critical)
Sewer/ Wastewater	Turtle Lane WWTP		2013	TOYOTA	TACOMA	Pickup Truck	Unknown	Consider EV options at next replacement
Water	Highway Garage	0045	2017	FORD	F150	Pickup Truck	2026-2027	Yes
Water	Highway Garage	0070	2022	FORD	F150	Pickup Truck	2031-2032	Consider EV options at next replacement

Existing Vehicles Considered for EV Replacements

Light Duty Pickup Trucks – Buildings/Grounds, Fire, Sewer/Wastewater, Water

Overnight Parking Locations: Town Center; Highway Garage; Fire Dept; Turtle Lane WWTP

Potential EV Replacements: Chevy Silverado EV Work Truck, Ford F-150 Lightning, Rivian R1T etc. - see Drive Electric Vermont - Find Your EV

Consider Operational Requirements:

- Payload and towing capacities – up to 2,400lbs and 10,000lbs for Chevy, Ford and Rivian electric trucks
- Plowing: Current LD EV pickup trucks are not capable of plowing, so the Town will need to determine whether plowing with any of these trucks is critical (or could be handled by other trucks in fleet)
- Electric Truck Ranges- EPA Ratings: 240-500 miles; Subzero temp or Towing: 130-300mi

Recommended for EV Replacement? Yes, if plowing is not critical and payload/towing capacities are sufficient

Existing Vehicles Considered for EV Replacements

Police Cruisers/SUVs – Law Enforcement

Overnight Parking Location: Town Center

Potential EV Replacements: Chevy Blazer EV PPV, Ford F-150 Lightning Pro SSV

Consider Operational Requirements:

- Electric Range - EPA Ratings: 240-320 miles; Subzero temp or Towing: 130-160mi
- Where feasible, start by replacing non-pursuit vehicles (like detective, detail, parking enforcement or admin) first to develop familiarity and comfort with EVs
- If pursuit vehicles are run multiple shifts per day with minimal downtime between shifts, plan on installing DC Fast Chargers with 250kW or more of charging power to enable nearly complete recharging in under 30 minutes.

Recommended for EV Replacement? Consider EV options at next replacement

EVSE Planning

Shelburne staff also shared details on existing Electric Vehicle Supply Equipment (EVSE) in the Town:

Current:

- Town Center – Two Level 2 ports, installed in 2025 from Charge Vermont workplace charging program.
    - One port is available to employees and the Carshare Vermont EV which was available to staff for admin trips through a pilot that ended in Feb 2025.
    - The second port could be dedicated exclusively for Police use

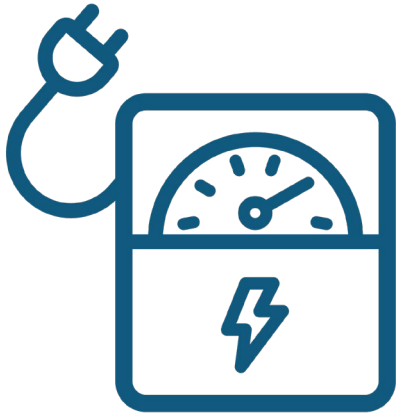
Recommendations & Next Steps

1. **Police Department Town Center Parking Lot**

    a. During any future repaving or renovation, minimize future cost and disruption by installing underground conduit to enable the Police parking to provide Level 2 and DC Fast Charging capability in the future. Plan for one 19.2 kW Level 2 EVSE port per police EV, as well as one (1) to two (2) 250 kW DCFC ports for potential future electric police patrol vehicles.

    b. Level 2 ports can be wall mounted to adjacent building for space and cost efficiency. DCFC will likely require ground mounting with dedicated pad and bollards

Recommendations & Next Steps



2. **Town Center; Highway Garage; Fire Dept; Turtle Lane WWTP**

    a. Plan and install 19.2kW L2 EVSE ports as needed to support any electric pickup trucks deployed

    b. During future renovations/repaving, consider installing underground conduit to serve the fleet parking areas with additional Level 2 and DC Fast Charging capability in the future. Plan for one 19.2 kW Level 2 EVSE port per vehicle and up to two (2) 250 kW DCFC ports

    c. Assess whether recommended DCFC ports installed for police at Town Center could be made available for shared use across departments to reduce infrastructure costs.

Recommendations & Next Steps

3. **Consider employee home-based vehicle charging for any fleet vehicles taken home daily**
    a. Fleet charging at employee homes can provide several benefits, such as ensuring a fully charged vehicle at beginning of each workday, increased staff convenience, and avoiding additional infrastructure investments or vehicle crowding at fleet facilities.
    b. Example resources for fleet home charging:
        a. EV Fleet Home Charging - Considerations & Benefits for Fleets | Geotab
        b. Federal Home-to-Work Electric Vehicle Program Guide
        c. Electric vehicles: Easy at-home charging for commercial EVs | WEX Inc.
        d. How To Reimburse Electric Vehicle Drivers for Charging at Home - Green Fleet - Automotive Fleet

Appendix A: Vehicle Anti-Idling Considerations

Vehicle Anti-Idling

What is Vehicle Idling?

Idling is running a vehicle's propulsion engine when the vehicle isn't moving. Idling wastes fuel and creates harmful emissions. Idling has significant environmental and economic consequences as the vehicle consumes fuel and increase engine-wear while idling.

Technologies/Strategies to reduce vehicle idling

- Auxiliary power units (APUs)
- Heaters/Air conditioners
- Engine idle management systems
- Electrified parking spaces (EPS)
- Telematics Systems
- Cab insulation, window glazing, reflective paint, passive measures
- Anti-idling policies and driver training

APU and EPS in action

- Case Study: Argonne National Laboratory
    - Location: Vermont (Vermont Dept. of Environmental Conservation)
    - Vehicle type: Ambulance
- Ambulances often idle to maintain equipment and medication temperatures. The study tested two solutions using APUs and EPS kiosks.
- Battery APUs helped ambulances save at least $5,100 annually per vehicle in fuel and reduced oil changes by 50%, with a payback period of 1.1 to 1.3 years.
- EPS kiosks at hospitals provided plug-in electricity and climate control, reducing idling and emissions near sensitive populations without requiring ambulance modifications.

Using APU for idle reduction in Fire Department

- Reported by Argonne National Laboratory and Firehouse Magazine
- Fire apparatus often have more idle time than actual transit time
    - Traffic controls, medical calls when the vehicle sits idle in standby mode for the majority of calls
- Idleness provides a good use case for deploying APUs. When in idle mode, APUs can supply enough power for the communication equipment, HVAC and Heat
    - reducing fuel costs, emissions and engine-wear

ZeroRPM: an engine idle management system

Engine-off A/C Through the Factory Vents

Using patented ZeroRPM technology, the system provides cooling through the factory vents without running the chassis engine.

Engine-off Heat Through the Factory Vents

The system provides heating through the factory vents without running the chassis engine. You no longer have to enter a freezing vehicle on a cold day!

Lithium-Iron Power to All Electronics

Using safe Lithium-Iron batteries, the system provides power to all electronics (*e.g.* radio, lights, and computers) without running the chassis engine. The batteries have a five-year warranty.

Automatic Recharging

The batteries charge natively from a 12V alternator. Solar panel and shore power integrations are optional.

ZeroKEY™

ZeroKEY allows you to securely leave the vehicle while our system takes care of climate control and powering your electronics. When you return to the vehicle everything will be in operation as you left it.

ZeroIDLE®

ZeroIDLE prevents the IMS® from automatically starting the engine in "no-idle" zones. The operator can be notified by an optional buzzer, backup alarm, or voice annunciator.

ZeroDRAW™

Our system protects the chassis batteries from being drained from your vehicle's accessories. This protects you from returning to your vehicle to find a dead chassis battery.

Electric PTO Optional

The system can provide energy to powered take-off equipment such as hydraulic buckets, booms, and lifts, all while the engine is off.

Appendix B: Cold Climate MD/HD Electric Vehicle Deployment Examples

Rizon Class 4-5 Trucks Reach Canada

- 22 class 4-6 Rizon trucks with various body upfits including dry boxes, service bodies, and landscape dumps were shipped to British Columbia and Quebec Canada in November 2024.
- Rizon recently expanded its North American operations in Canada starting in April 2024.
- Rizon dealerships are now located in British Columbia, Ontario, and Quebec Provinces.

FleetOwner

EMISSIONS & EFFICIENCY

Daimler Truck's first wave of electric Rizon trucks reaches Canada

Nov. 6, 2024

Nineteen of the units will be delivered to customers in British Columbia and Quebec. The remaining three units will be used for demonstration purposes.

Kruger Energy all-electric Semi: Montreal, Quebec

- Two Peterbilt 579EV electric semi-trailers
- Battery range of up to 348 miles with a 50-ton load.
- Two trucks run 20 hours per day, traveling roughly 40 miles per trip between Crabtree and Laval.
- Company has ordered 50 additional electric since 2023.

Kruger Energy puts first two electric trucks into service, plans to add 50 more

EV FLEETS JAN 26, 2023 MEHANAZ YAKUB

With two Class 8 trucks finally hitting the road outside Montreal, Kruger Energy is expanding its ambitions and plans to add 50 new electric trucks to its Canadian fleet

Kruger Energy, a Montreal-based developer and manager of renewable energy power plants, has made a significant step towards sustainable logistics by deploying a pair of all-electric class 8 vehicles in Quebec. Photo: Kruger Energy

Snowplow Semi Truck Trial: Norwegian Public Road Administration

- Built on Volvo FH Chassis created by Swiss Firm Designwerk Technologies AG
- Equipped with a 1,000-kWh battery.
- Battery range of up to 348 miles with a 50-ton load.
- Operated for nearly nine hours with battery depletion from 90% to 28% during the trial.

The world's first semi electric truck with 1,000 kWh capacity is plowing snow in Norway like a boss

Michelle Lewis | Feb 8 2024 - 2:52 pm PT | 24 Comments

Photo: Eli Ramstad/Norwegian Public Roads Administration

Appendix C: Police EV Considerations

Addressing Electrifying Police Fleet Considerations

Availability of pursuit-rated, appropriately sized EV for police use

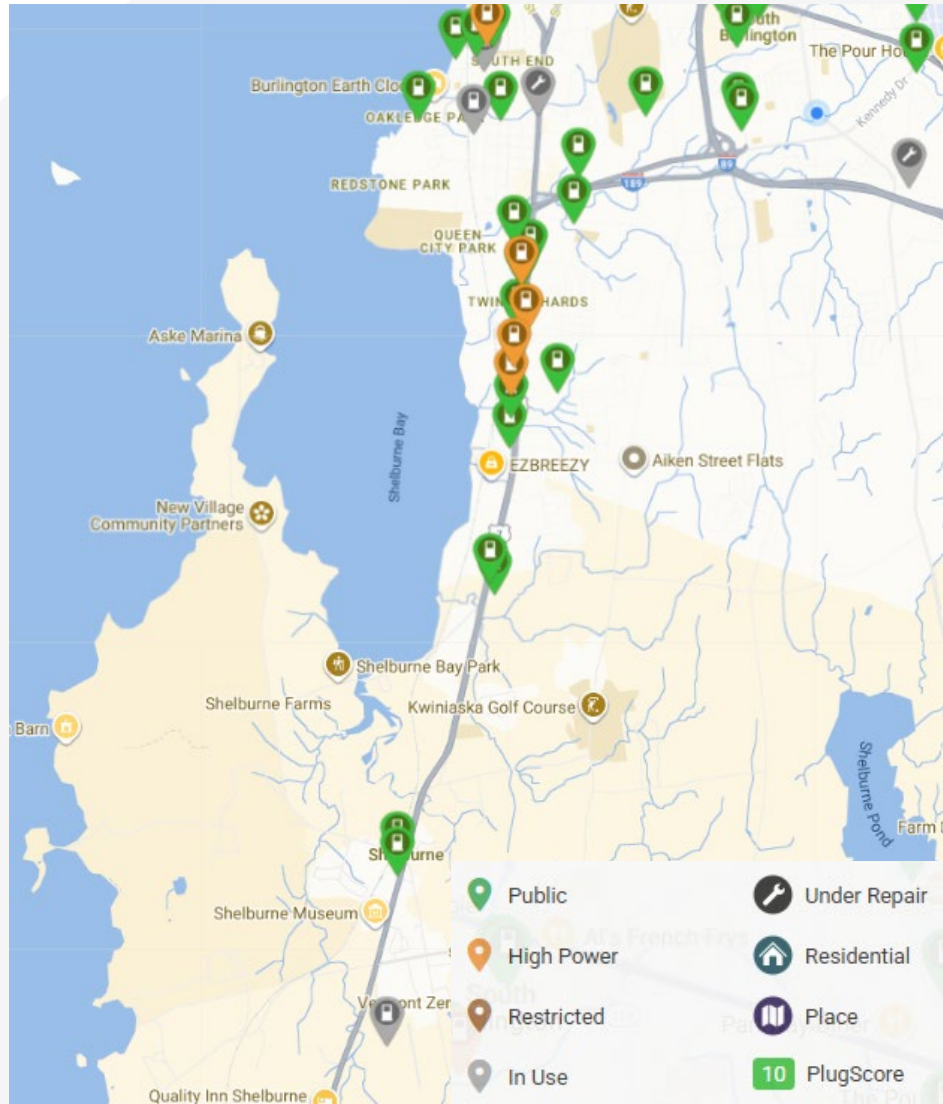
- Released in 2024, the Chevrolet Blazer EV police-pursuit vehicle is a purpose-built SUV for police use
- EPA-estimated 297 mile of range
- In testing, reaches 60 mph quicker than ICE Chevy police-rated blazers
- Can be upfitted with prisoner partitions, cargo barriers, vertical weapon mounts, as with ICE Chevy Blazers
- Larger cargo storage than civilian model

EV capacity for police equipment

Purpose	Manufacturer	Vehicle Name	Range	Cargo Area*	Style
Patrol	Chevrolet	Blazer EV PPV	297 miles	25.5 cu.ft	Compact SUV
Specialty	Chevrolet	Bolt SSV	247 miles	16.6 cu.ft	Compact SUV
Specialty	Ford	F-150 Lightning Pro SSV	240 miles	14.1 cu.ft	Pickup truck
Patrol	Ford	Mustang Mach-E GT	320 miles	29.7 cu.ft	Compact SUV
Specialty	Tesla	Model Y upfitted	308 miles	30.2 cu.ft	Hatchback

EV's ability to run for longer than 12 hours

- Average patrol duration is 10-12 hours
- Average miles travelled per patrol ranges from 80-120 miles
- Recent study finds that police cruiser spend 60% of time idling and used 21% of fuel when parked
- Most EVs on the market suitable for police use have max range of 240 miles and above
- EVs expend less energy when idling



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Cold weather range challenge in EVs

- Studies found that EV suffers range loss between 10-40% in subzero temperature
- Many EV models suitable for police use have special features to reduce battery loss from cold, such as heat pump technology, heated seats and steering wheel and eco-climate features
- There are certain EV operations best practices that will help with cold weather range loss

Reliability of charging

- Availability of charging is critical to fleet electrification
- Importance of depot infrastructure planning to ensure charging is available at town-owned sites
- Utilize police vehicle idle time, such as the downtime between calls to top-off