

Tune in to hear from: **PDs DRIVING EVs**



GET THE FULL DEBRIEF:

- Return on Investment (ROI)
- Total Cost of Ownership (TCO)
- Officer safety & comfort
- Handling, reliability, & performance
- Charging logistics & more



**Chief Jeff
Christiansen**
Linn Creek, MO



**Chief Foti
Koskinas**
Westport, CT



**Chief Robert
Kalamaras**
Fairfield, CT



**Sergeant Clay
Leak**
Boulder, CO



**Officer Charles
Sampson**
Westport, CT



Barry Kresch
President
EV Club of CT



U. S. Department of Energy



AGENDA

- Welcome / Introduction
- EV Experience & Financials
 - Sergeant Clay Leak (Boulder, CO)
 - Barry Kresch (Westport, CT)
- EV Police Fleet Panel
 - Moderator: Chief Robert Kalamaras (Fairfield, CT)
 - Chief Jeff Christiansen (Linn Creek, MO)
 - Sergeant Clay Leak (Boulder, CO)
 - Chief Foti Koskinas (Westport, CT)
 - Officer Charles Sampson (Westport, CT)
- Audience Q&A
- Closing

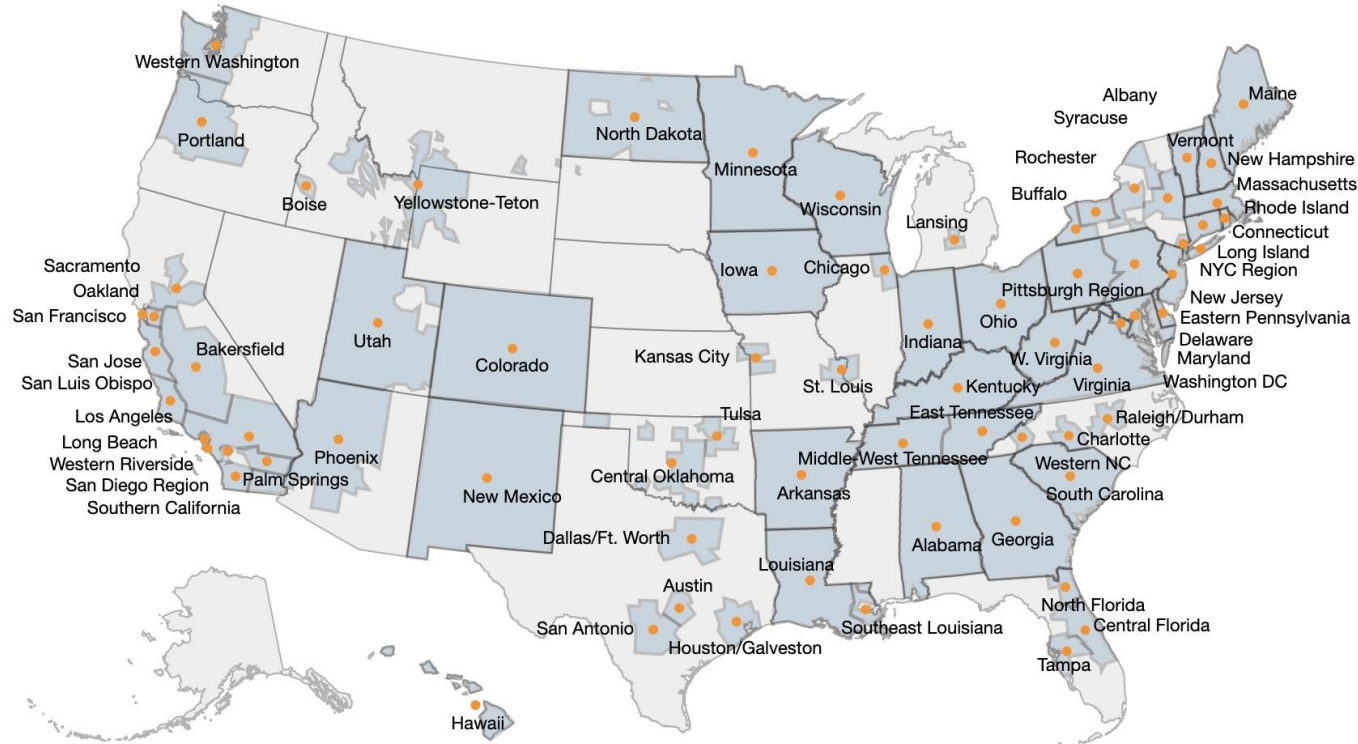
EVENT AGENDA

REMINDERS

- Raise your hand for questions during the audience Q&A
- Add questions to the chat or Q&A box during the event
- Enter your name, state, and organization in the chat
- What questions, challenges, or concerns do you have about electric police vehicles?
- Unbiased information and assistance with achieving your goals
- This meeting is being recorded and will be sent out afterwards

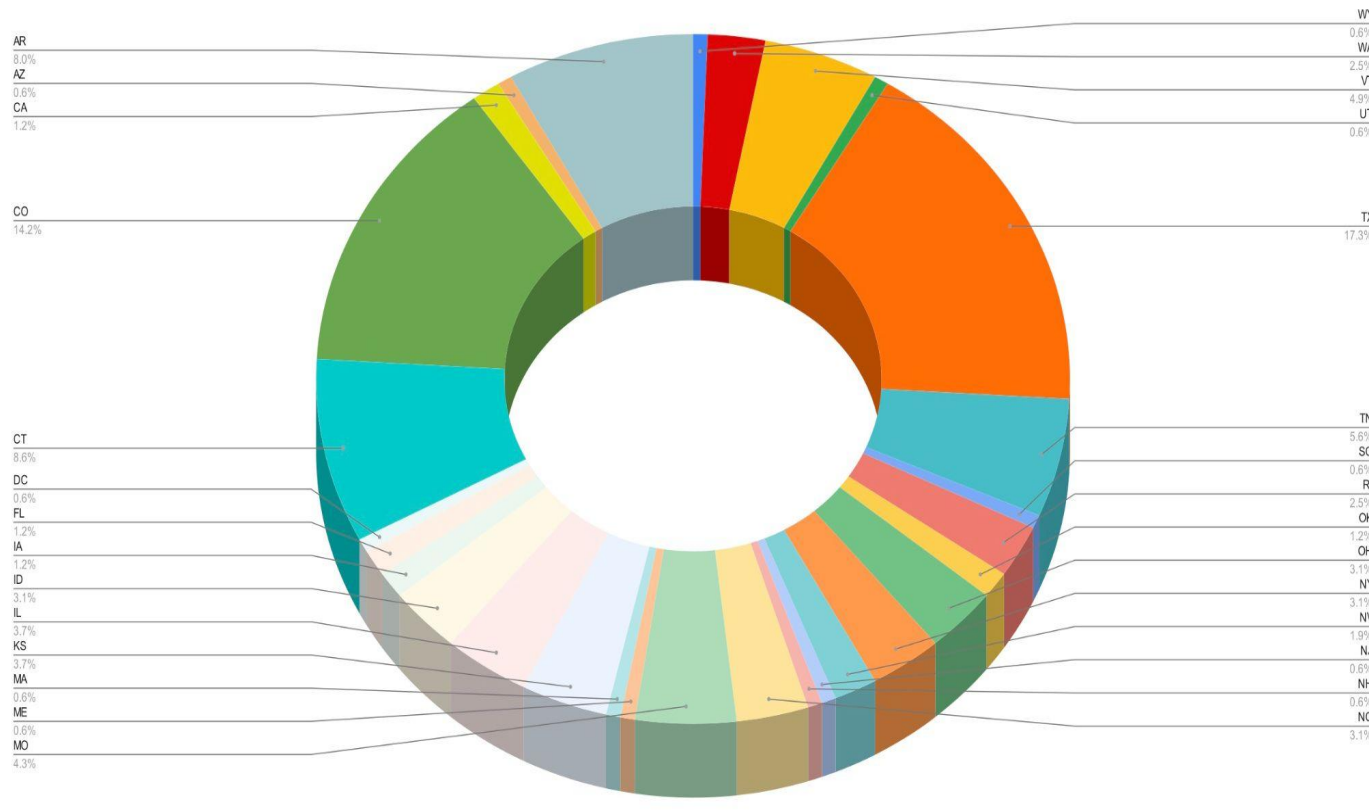
REMINDERS

U.S. Clean Cities Network



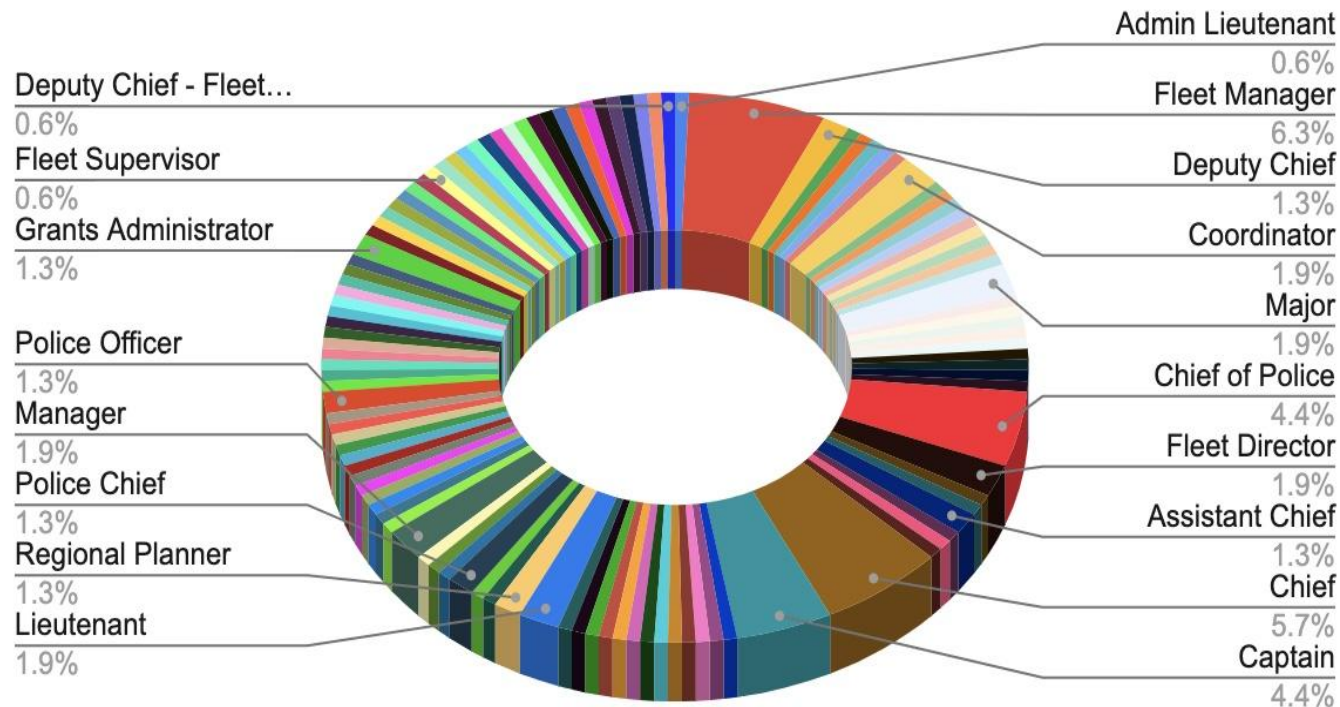
CLEAN CITIES

U.S. States in Attendance



ATTENDEES

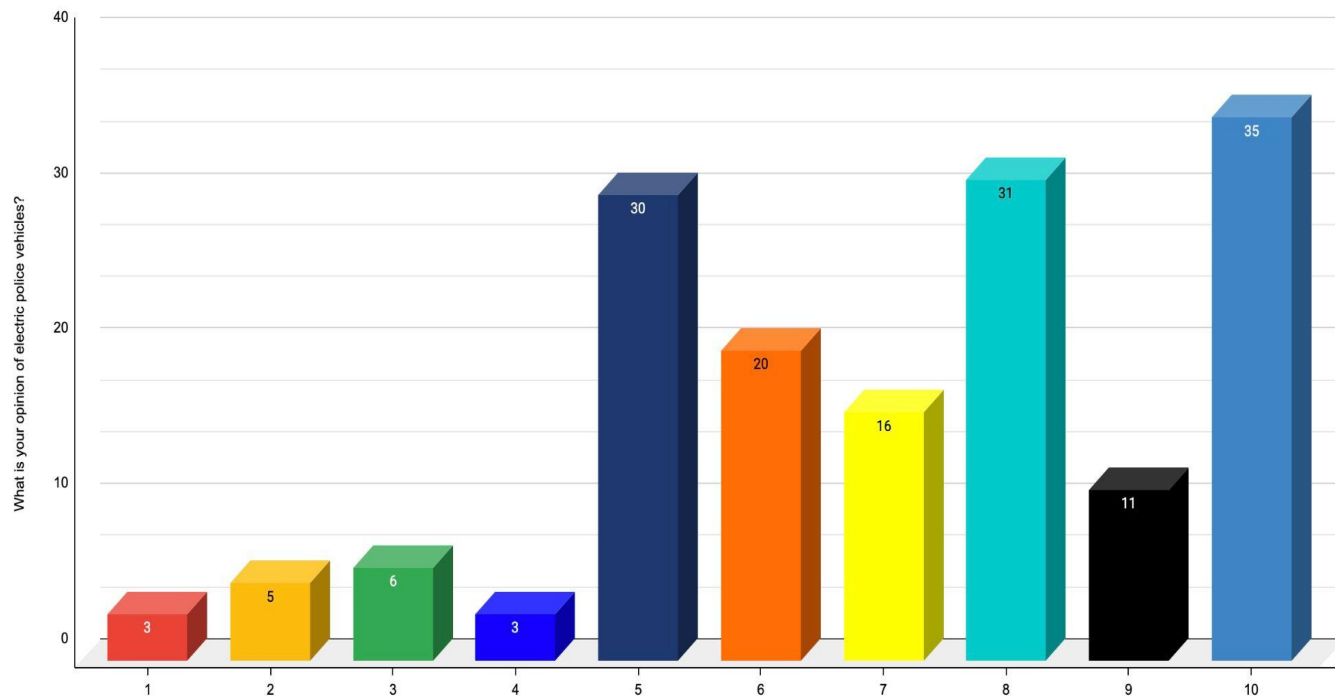
Titles of Attendees



ATTENDEES

What is Your Opinion of Electric Vehicles?

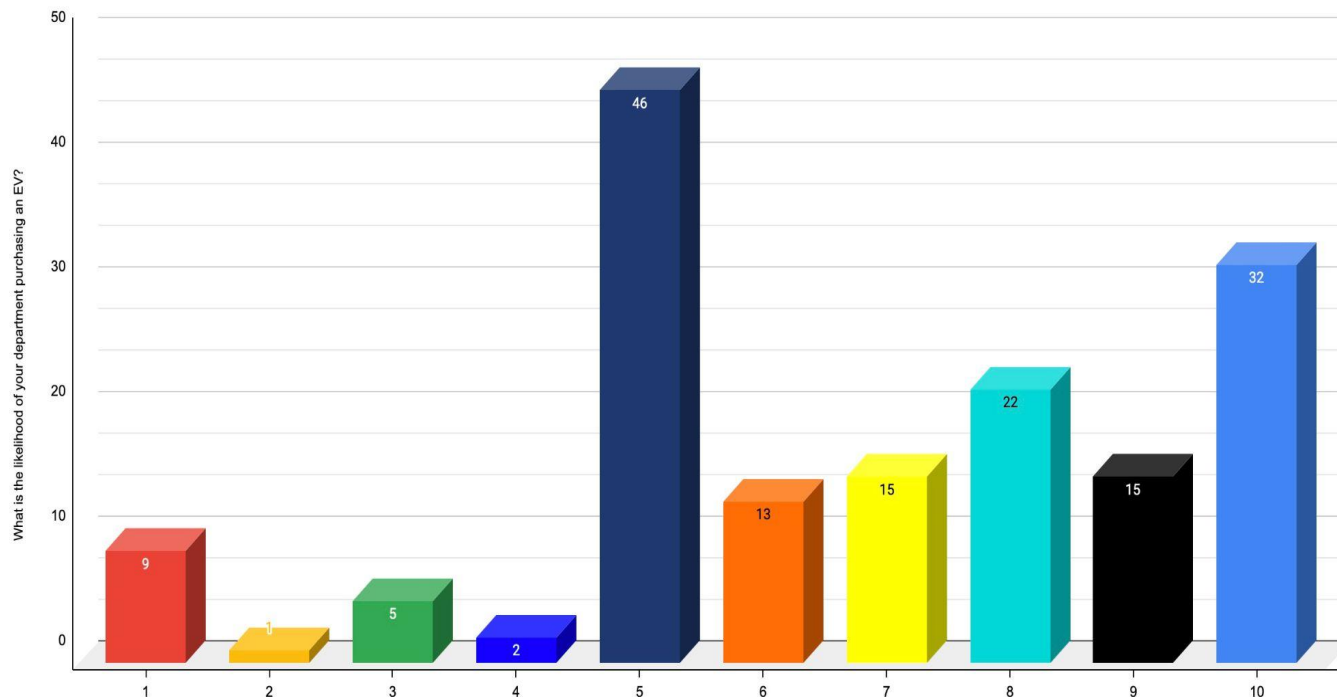
What is your opinion of electric police vehicles?



ATTENDEES

Likelihood of Your Department Purchasing an EV?

What is the likelihood of your department purchasing an EV?



ATTENDEES



BOULDER COUNTY SHERIFF'S OFFICE

TESLA PATROL VEHICLE
PILOT PROJECT

SPECIFICATIONS

2020 Tesla Model Y Long Range

- AWD
- Ground clearance: 6.6"
- Range: 326 mi
- Performance: 384 hp, 376 lb. ft.
- Acceleration: 0-60 in 4.8 sec
- Cargo space: 68 cu. Ft.
- Payload: 886 lbs

2020 Ford Police Interceptor

- AWD
- Ground clearance: 7.4"
- Range: 304 mi
- Performance: 285 hp, 415 lb. ft.
- Acceleration: 0-60 in 7.8 sec
- Cargo space: 52 cu. ft.
- Payload: 880 lbs

MARKET COMPARISON – SOLE SOURCE [CIRCA LATE 2019]

- In the EV crossover/SUV category, there are only 4 other options:
 - Mustang Mach E: \$56,040 for their extended range (270mi) AWD model. Currently only in pre-order/pre-production status
 - Rivian R1S SUV: only in pre-production/concept status. Range “up to 400mi” and starting price of \$72,500
 - Audi e-tron: \$66,995 for base AWD model, 222mi range
 - Jaguar I-PACE: \$69,850 for base AWD model, 234mi range
- The presence of Tesla’s robust supercharger network was also a consideration, as was their top-notch safety rating and robust warranty (8yr/100k for battery & powertrain, 4yr/50k basic)

INITIAL PRICING COMPARISON

2020 TESLA MODEL Y LONG RANGE

- Purchase Price = \$50,000
- Configured with emergency equipment = \$61,000

2020 FORD POLICE INTERCEPTOR

- Purchase price = \$38,000
- Configured with emergency equipment = \$61,000

Note: the Tesla was configured with a standard patrol supervisor setup, so it does not have a prisoner cage, partition, or push bumper. It also has an internal visor-mounted lightbar instead of a roof-mounted lightbar.

As a result, outfitting costs were lower than a fully-outfitted patrol vehicle.

OPERATING COSTS & ROI

TESLA MODEL Y

- Predicted
 - Efficiency = 350 Wh/mi
 - Electricity cost = \$0.045/kWh (HQ)
 - \$0.092/kWh (home charging)
 - Cost of 21,000 miles driven annually = \$330
 - $(0.350\text{KWh/mi} \times 21,000\text{mi} \times \$0.045)$
 - Cost per mile driven: \$0.029
- Actual (with 10,657 miles driven):
 - Efficiency = 252 Wh/mi
 - Electricity cost = \$247 [max]
 - Maintenance = no associated costs
 - Cost per mile driven: \$0.023

FORD POLICE INTERCEPTOR

- Predicted
 - Fuel economy = 16mpg
 - Bulk gasoline cost = \$2.33/gal (10yr avg)
 - Cost of 21,000 miles driven annually = \$2,447
 - Maintenance
 - Brakes: \$160 once per year
 - Oil changes/PM (5/yr @ \$75/ea) = \$375
 - Cost per mile driven: \$0.146
- Actual (compared to 10,657 miles driven)
 - Bulk gasoline cost = \$2.78/gal
 - Cost = \$1,852
 - Cost per mile driven = \$0.173
 - Doesn't account for additional maintenance costs

In fuel/electricity alone, the Ford Police Interceptor costs approximately \$15,000 more over its lifetime to operate than the Tesla



USAGE EXPERIENCE

- I used it in traffic enforcement role until I moved to detectives
 - Worked great for traffic
 - Would be great for detectives
 - Car is now assigned to an admin commander
- My experience
 - Drove about 125 miles per day
 - Used average of 23 kWh of electricity per day
 - Charged using a level 2 charger at home overnight. Charge to 90%, would take 4-6hrs to recoup from the day. Used ~\$40/month in electricity
 - Would normally make it home with about 40% battery remaining (~130 miles)
 - Tracked charging using third party software (TeslaFi)

EXPERIENCE/LESSONS LEARNED

- Has been a great success. Huge icebreaker, tons of community engagement. The car performs marvelously and is awesome for running traffic
- Foresee and dispel myths and misconceptions – bring data, create internal buy-in early
- The driver's seat is a little cramped with the OEM seat
 - The seat has held up surprisingly well to duty gear
- The slicktop/visor-mount lightbar is not practical for nighttime use (glare/flashback)
- The QR code on the car pointing to a website with information on the project was beneficial
- Charging – need a smoother process for reimbursing for home charging; need DCFC at HQ
- Was a challenge tying into the car's systems (e.g., OEM lighting control, PRND sensing)



Sergeant Clay Leak, M.S. (*he/him/his*)
Operations | Detective Sergeant
SWAT Negotiator Team Leader
LGBTQ Liaison
Boulder County Sheriff's Office
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(303) 441-3895 | Office
(303) 441-4444 | Dispatch
cleak@bouldercounty.org

Westport First Selectman - Jim Marpe
Westport Chief of Police - Foti Koskinas
Police Project Director - Charles Sampson

Tesla Model 3

Long Range
All-Wheel Drive
Performance
Fully Customized for Law Enforcement
Purchase Date: 12/19
Entered Service: 2/20

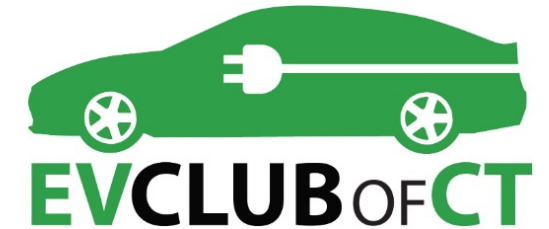
Prepared for
the
Town of Westport
by
Barry Kresch

Blog post - bit.ly/WPDTesla

**Note: This file is for intended recipient only. Not for
distribution without permission.**



Law Enforcement Customization Done by:
Whelen Engineering
Fleet Automotive
(Discounts Were Provided for the Pilot Vehicle)



Tesla Model 3 Pilot

Customization:

- *Charging Station and Installation
- *Lights (no cost)
- *Siren (no cost)
- *Spare Tire (Tesla only - Ford purchase includes a spare)
- *Weapons Rack (no cost)
- *Front Camera (no cost)
- *License Plate Reader (Tesla tech lowers cost)
- *Police Computer
- *Antenna (no cost)

Maintenance/Operation:

- *Electricity
- *Brakes (once every two years)
- *Tires (once per year)

Tesla Model 3 Next

Customization:

- *Charging Station and Installation
- *Lights
- *Siren
- *Spare Tire (Tesla only - Ford purchase includes a spare)
- *Weapons Rack
- *Prisoner Transport Cage (not included in pilot)
- *Front Camera
- *License Plate Reader (Tesla tech lowers cost)
- *Police Computer
- *Antenna

Maintenance/Operation:

- *Electricity
- *Brakes (once every two years)
- *Tires (once per year)

Ford Explorer:

Customization:

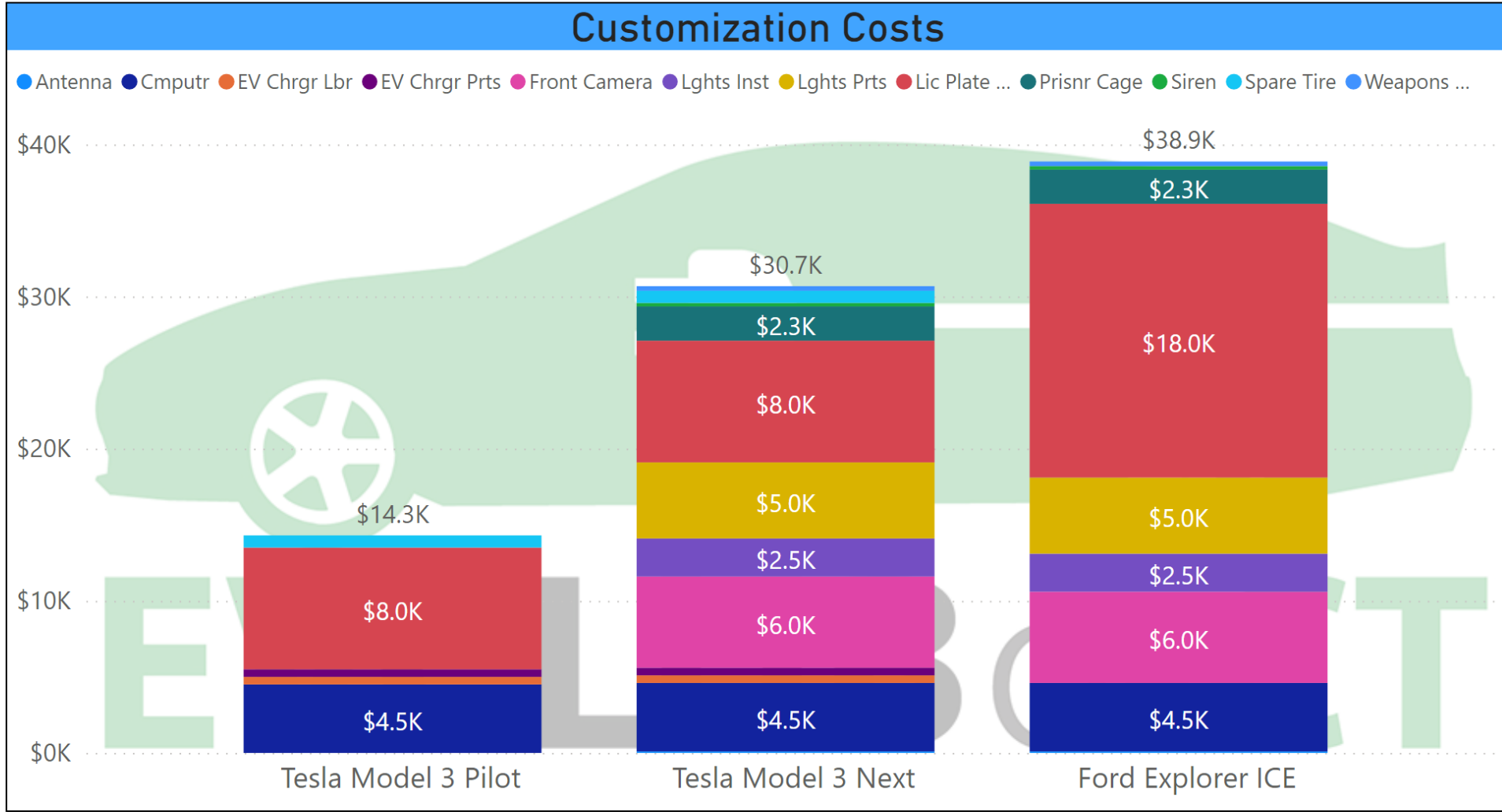
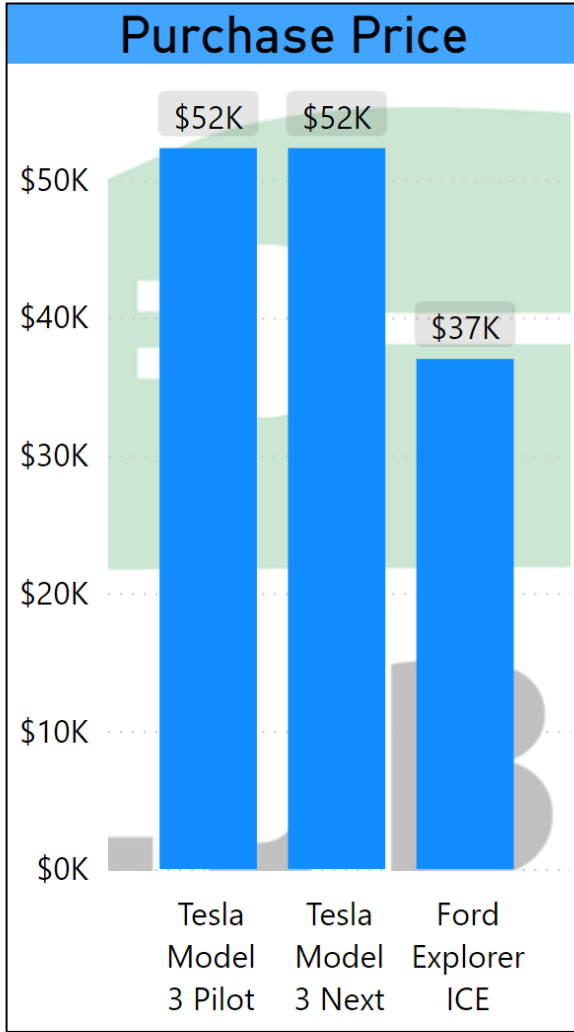
- *Charging Station and Installation
- *Lights
- *Siren
- *Spare Tire (Tesla only - Ford purchase includes a spare)
- *Weapons Rack
- *Prisoner Transport Cage
- *Front Camera
- *License Plate Reader
- *Police Computer
- *Antenna

Maintenance/Operation:

- *Gasoline
- *Brakes (2x annually)
- *Tires (2x annually)
- *Oil changes (4x annually)
- *Transmission maintenance
- *Catalytic Converter
- *Water pump
- *Spark plugs
- *Alternator

Service Life

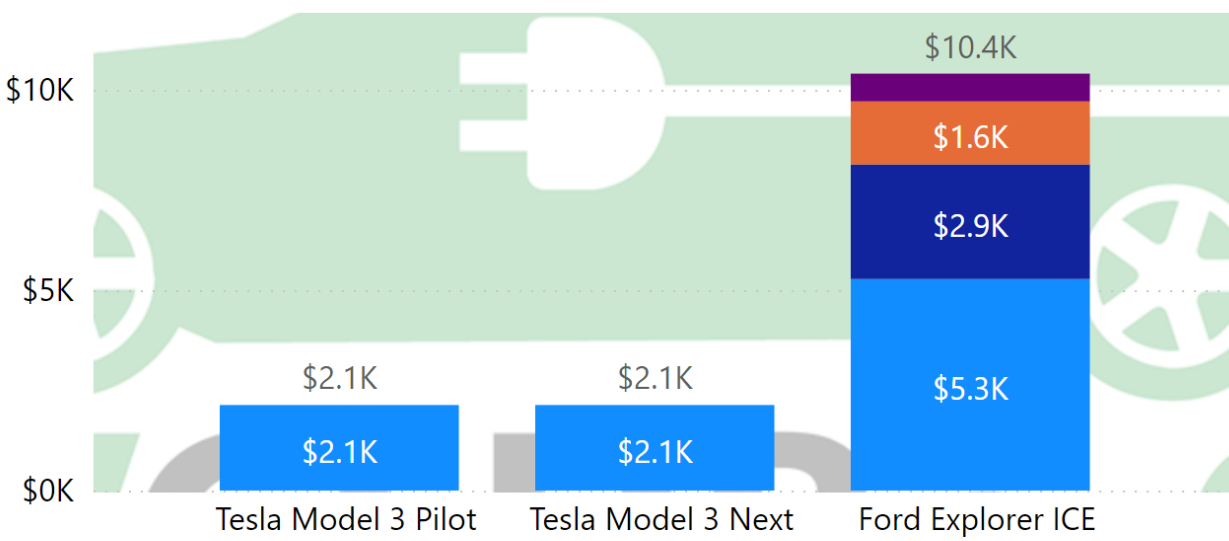
Ford Explorer: 4 Years
Tesla Model 3: 6 Years



Tesla Pilot - No charge for lights, siren, front facing camera, weapons rack, antenna. No prisoner cage.
Teslas require purchase of a spare tire and charging stations
License plate reader - Re-purposing of native Tesla technology enables a savings of \$10,000

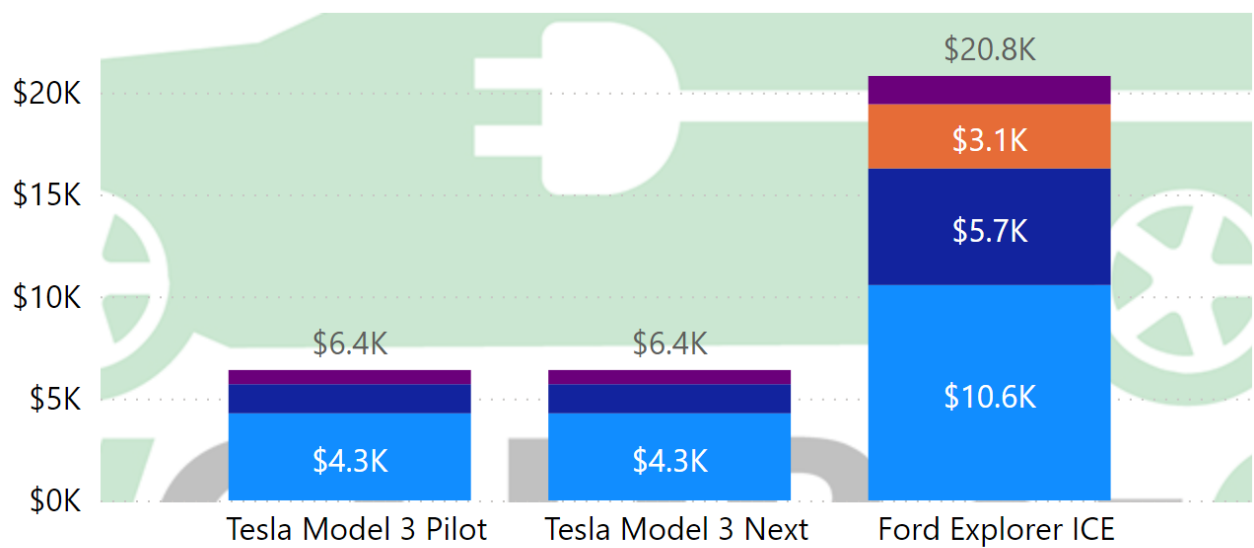
Ongoing Costs Yr 1

Maintenance Items ● Fuel ● Ford Brakes ● Oil Changes ● Ford Tires



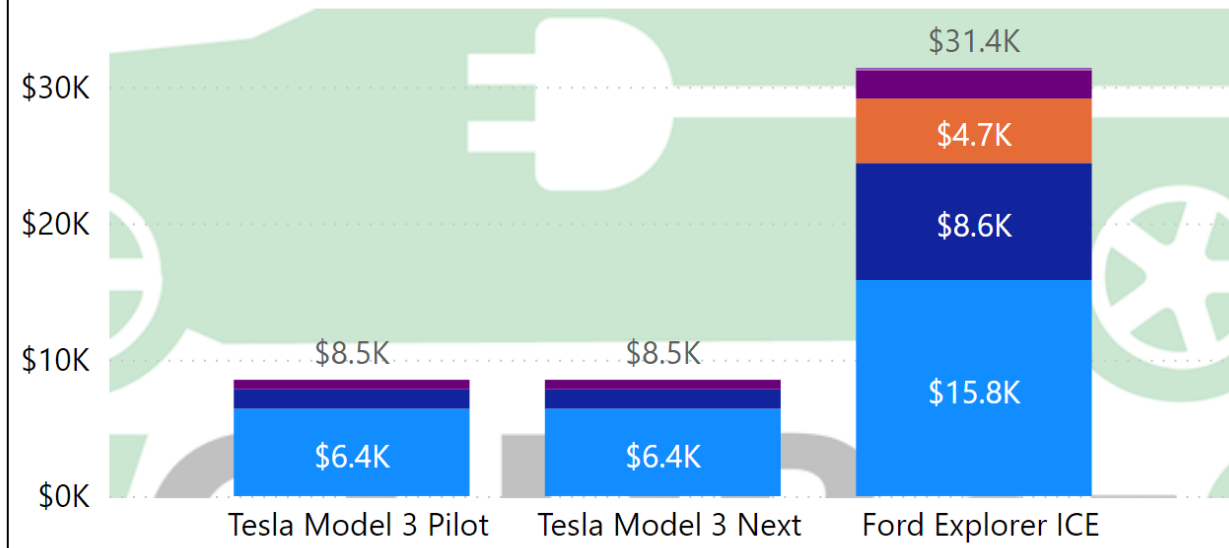
Ongoing Costs Yr 2 Cumulative

Maintenance Items ● Fuel ● Brakes Yr 2 ● Oil Chg ● Tires Yr 2



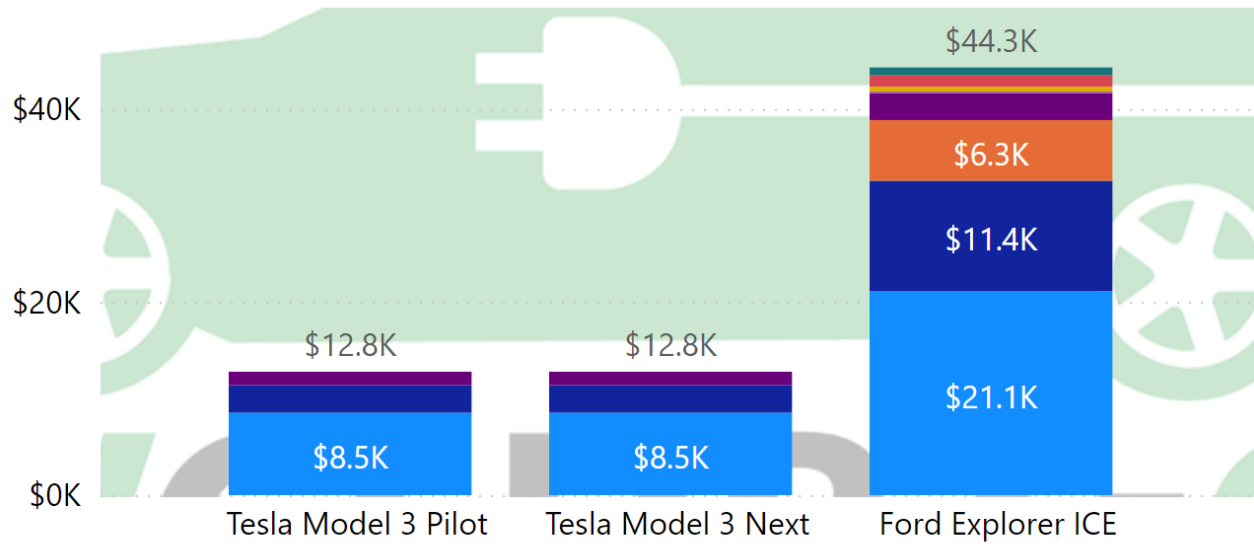
Ongoing Costs Yr 3 Cumulative

Maintenance Items ● Fuel ● Brake... ● Oil C... ● Tires ... ● Spark... ● Trans...



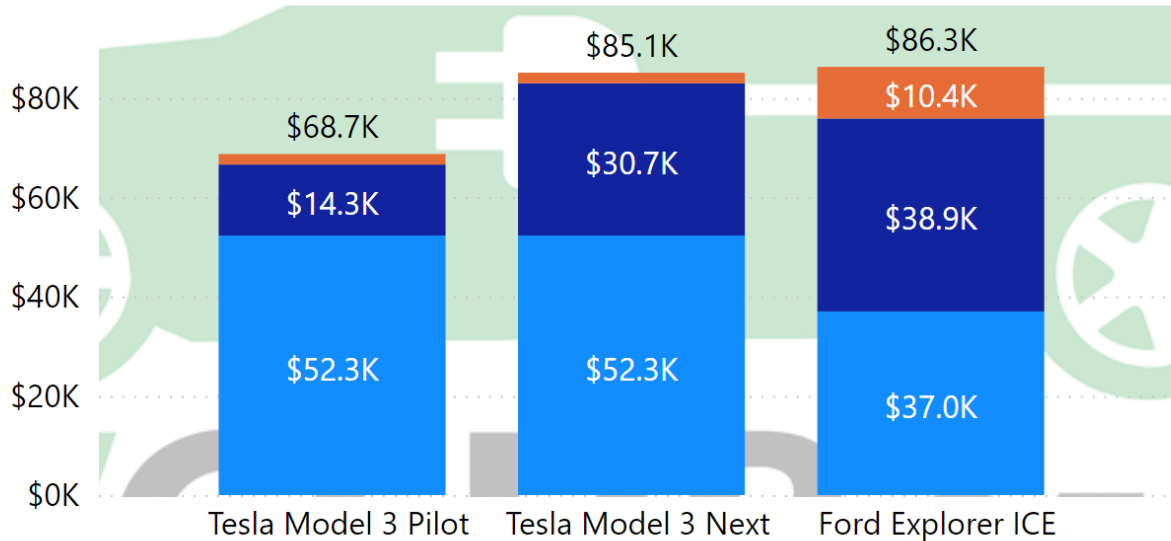
Ongoing Costs Yr 4 Cumulative

Maintenance Items ● Fuel ● Brakes ... ● Oil Chg ● Tires Yr 4 ● Sparkpl... ● Trans... ▶



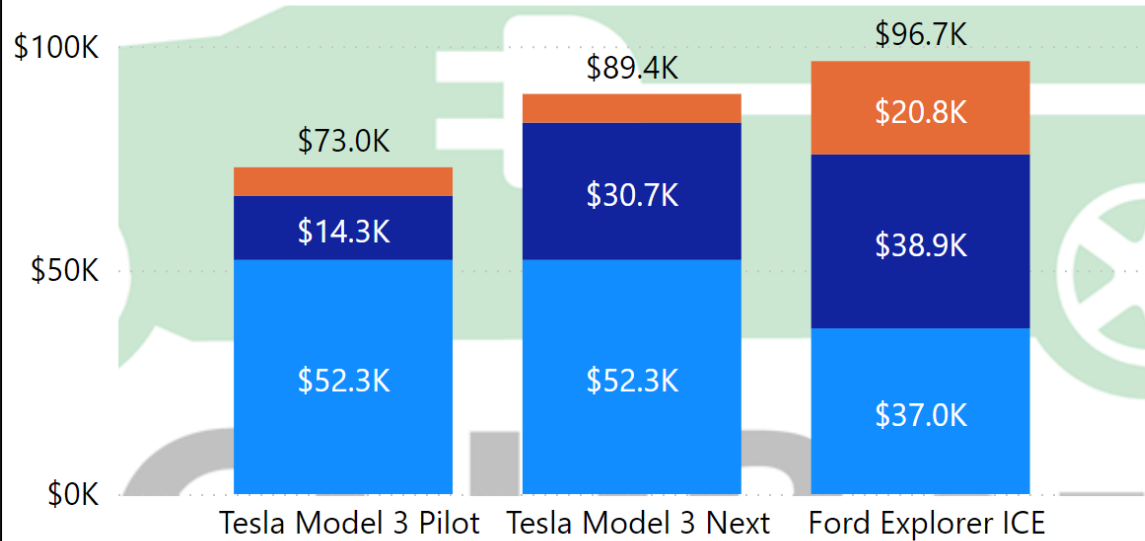
Vehicle Cost Comparison Year 1

● PurchasePrice ● Customization ● Ongoing



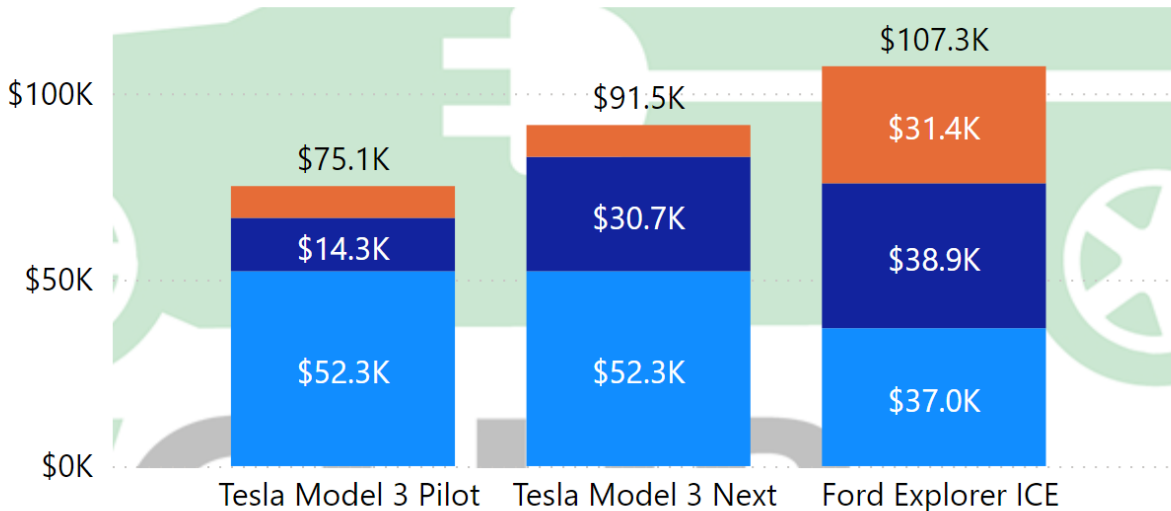
Vehicle Cost Comparison Year 2

● PurchasePrice ● Customization ● Ongoing Cumulative



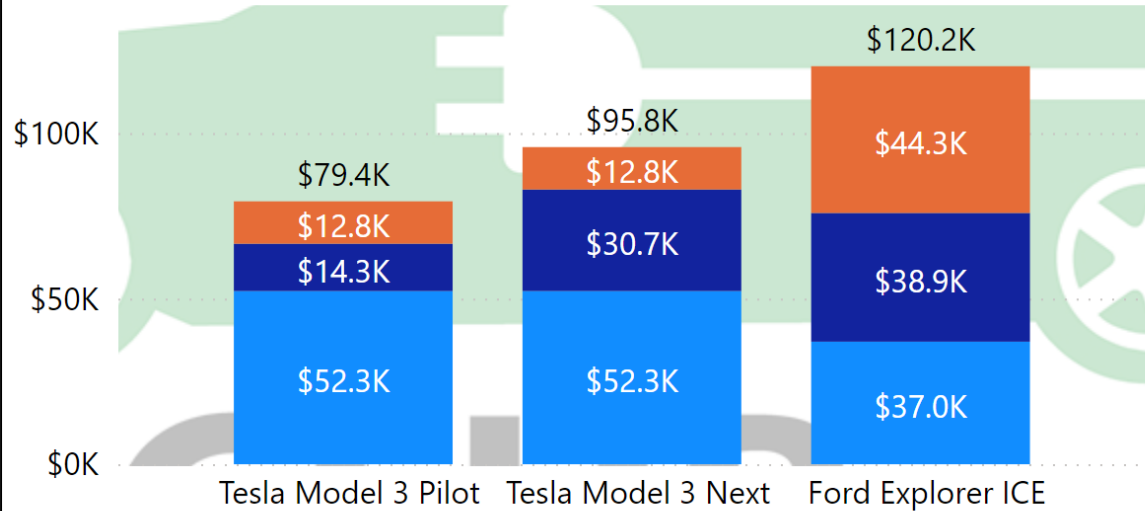
Vehicle Cost Comparison Year 3

● PurchasePrice ● Customization ● Ongoing Cumulative



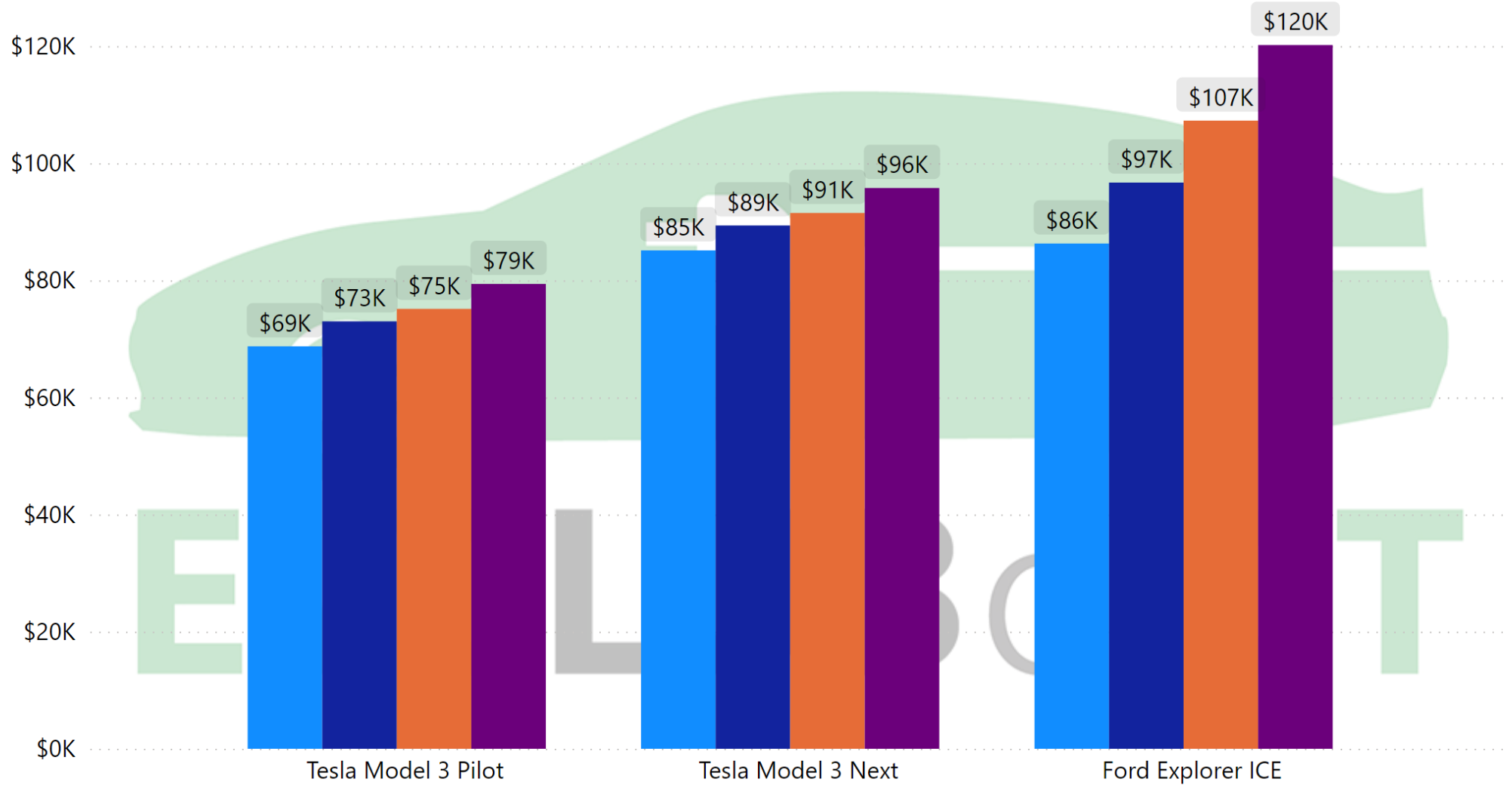
Vehicle Cost Comparison Year 4

● PurchasePrice ● Customization ● Ongoing Cumulative



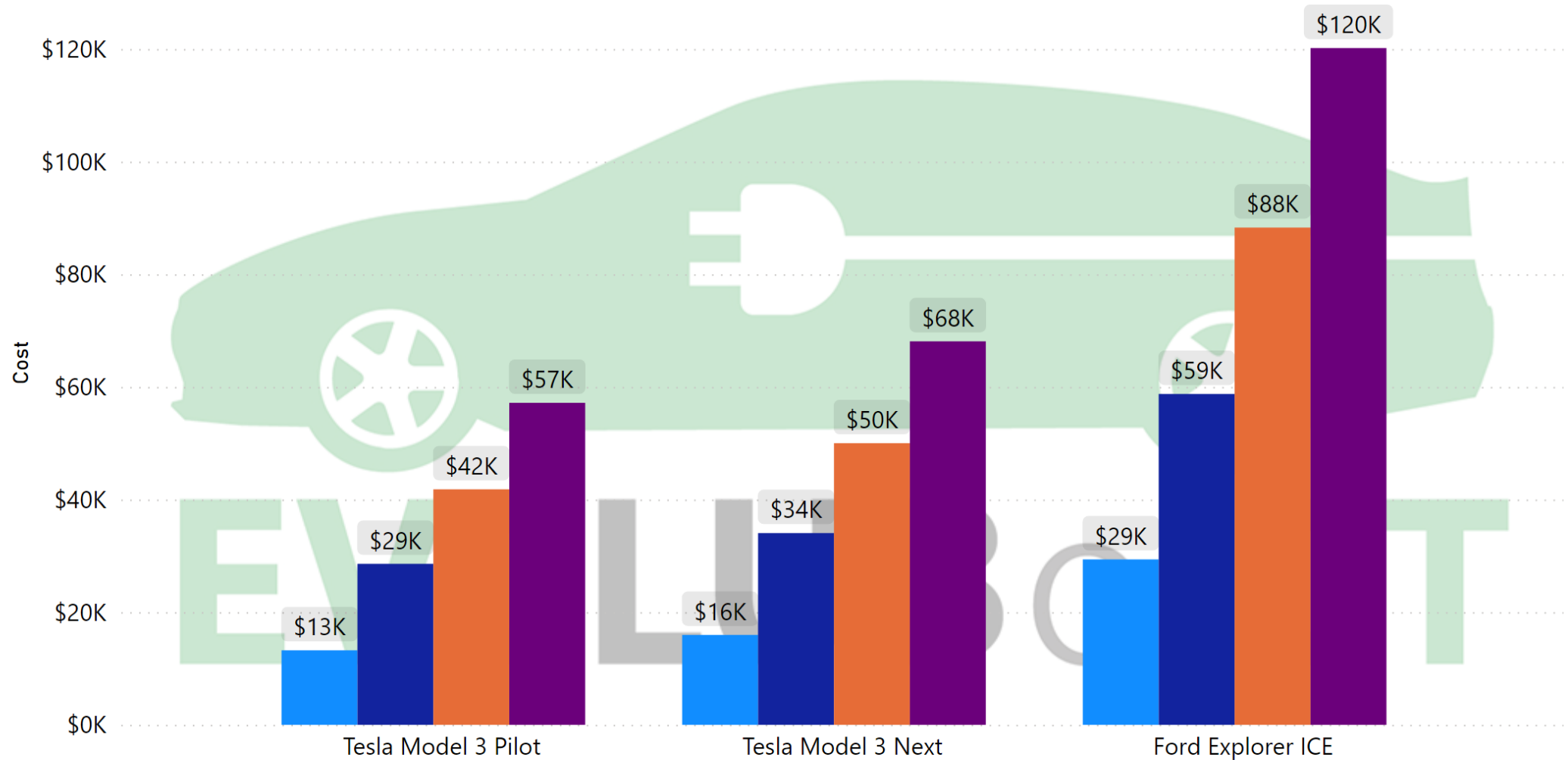
Total Cost By Vehicle By Year With Cumulative Ongoing Costs Cash Basis

● Total Year 1 Cost ● Total Year 2 Cost ● Total Year 3 Cost ● Total Year 4 Cost

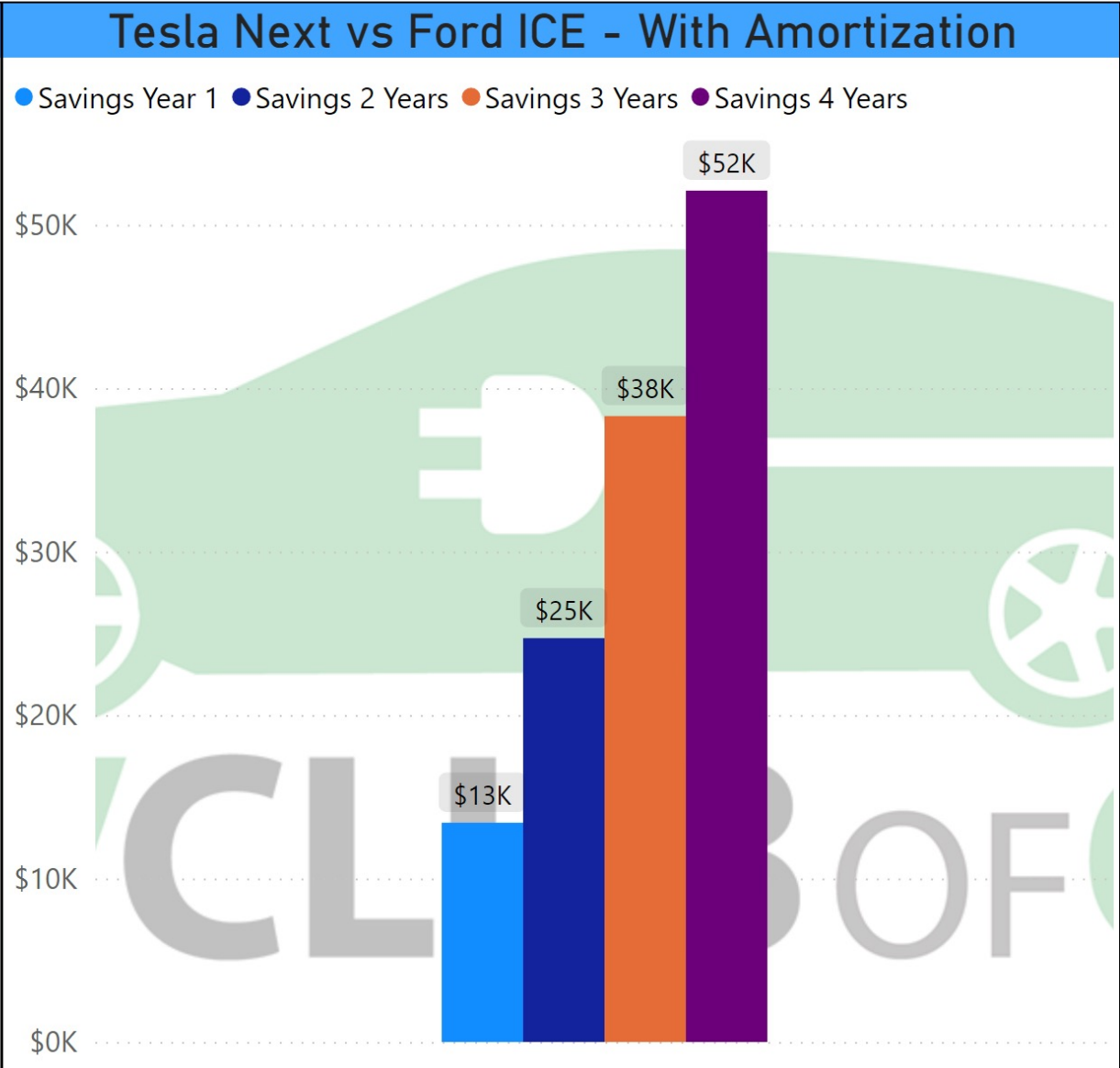
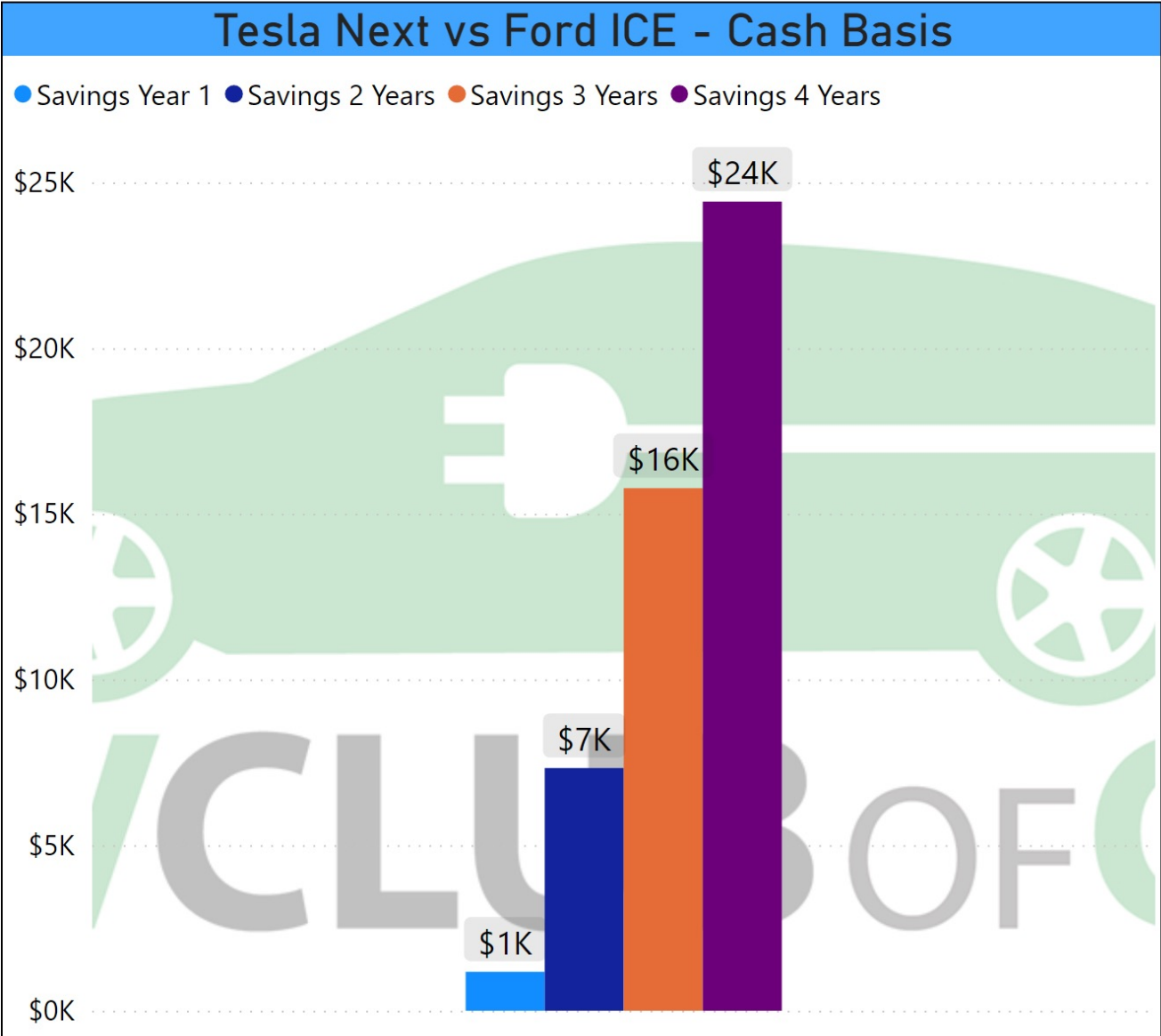


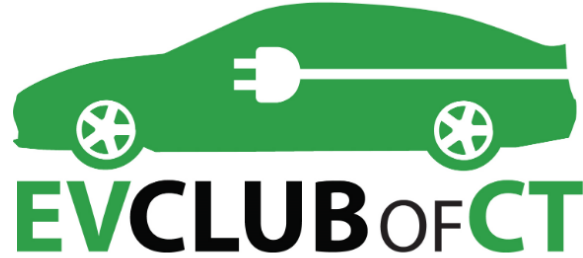
Total Cost By Vehicle By Year With Cumulative Ongoing Costs And Amortization

● AmortTotalYr1Cost ● AmortTotalYr2Cost ● AmortTotalYr3Cost ● AmortTotalYr4Cost



Savings: Tesla Model 3 Next vs. Ford ICE
Cash and Amortization Basis





Final Notes

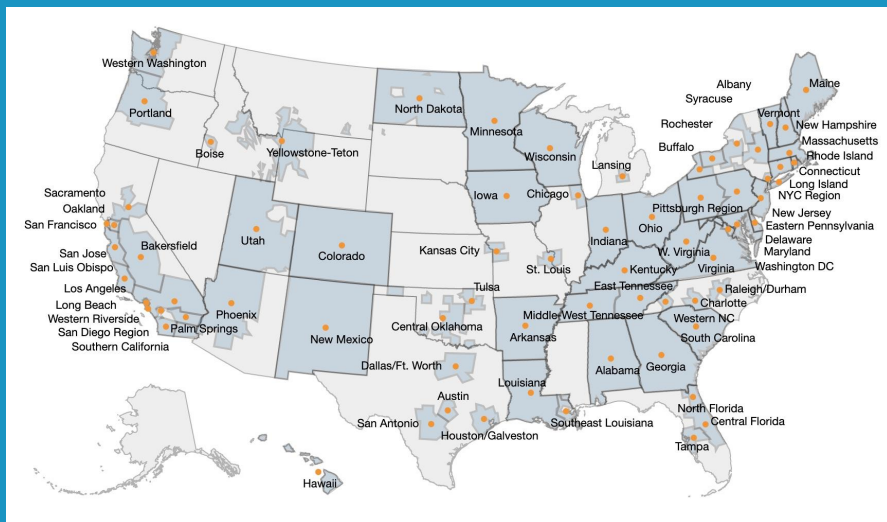
- This is an opportunity to both reduce emissions and save a lot of money - over \$50,000 in this example.
- It's not only about Tesla. Other EVs will suit other use cases. Our police department has several makes of EVs.
- Two follow up points:
 - The 12-volt in the Tesla has needed to be replaced after two years, most likely due to the radio and lights being powered by this battery. If it were replaced twice in 4 years, it would add \$250. (Other accessories were powered by the large battery.)
 - The charger purchased (\$500) was residential grade. Commercial grade is more expensive.
- Use of existing charging infrastructure.
- Future savings could be greater:
 - Exploiting the native Tesla technology for customization savings is still a work in progress.
 - No incentives (federal, state, utility) were used for this or any EV in the police force. In CT, there are now incentives for which municipalities are eligible.

EVClubCT.com

Blog post - bit.ly/WPDTesla

Questions & Resources

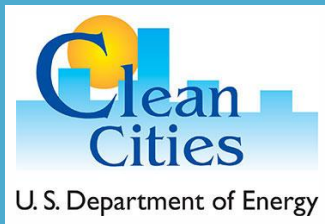
- [Post-Event Questionnaire](#)
(Please support your local Clean Cities by filling this out)
- [Alternative Fuels Data Center](#)
- [Alternative Fueling Station Locator](#)
- [Federal & State Laws / Incentives](#)
- [AFDC Case Studies](#)
- [FuelEconomy.gov](#)
- [Clean Cities Coalition Network](#)



RESOURCES

THANK YOU!

For more information, please reach us at:
Matt@DriveCleanCO.org



www.cleancities.energy.gov

A SPECIAL THANKS TO:

Chief Christiansen
Chief Kalamaras
Chief Koskinas
Officer Sampson
Sergeant Leak
Barry Kresch

