

Teslas for Police: A Better Deal Than Ever

Post by Barry Kresch

Tesla Patrol Car Purchase Price Now Lower Than Ford Explorer ICE Police Vehicle

In 2019, when the Westport Police purchased a Model 3 for use as a patrol car for \$52,000 vs. \$37,000 for the incumbent gasoline-powered Ford Explorer, it was a good deal. But it had to be proven, as some were skeptical that the savings would be significant enough to overcome the \$15,000 purchase premium. In our analysis, we found that when factoring in savings in fuel, maintenance, customization, and expected vehicle life, the Model 3 is projected to save over \$50,000 over a 4-year period. The purchase price differential was recouped in the first year. That detailed analysis is [here](#). Fast forward a few years, however, and things have really changed.

The law-enforcement version of the Ford Explorer, which comes with a few augmentations, such as a heavy-duty alternator, to be able to support the customization needs of the police, is now \$47,000. The Westport Police expect delivery next month of their third Tesla and second Model Y, purchased this year, for which they paid \$53,000. This new Tesla is eligible for Inflation Reduction Act incentives of \$7500, making the acquisition price lower than the Ford.

The IRS code section 45W, clean vehicles for fleet incentives, applies to this vehicle. In 2023, obtaining the credit is a little cumbersome because an entity that does not pay taxes must file for “direct pay” to get the funds from the Treasury. This will become easier in January when the transfer provision

goes into effect. The buyer transfers the tax credit to the seller and the seller gives the incentive as a rebate, deducted off the invoice price. This [article](#) describes the process for non-taxable entities.

The department buys the same Tesla vehicles that consumers buy. The Model Y that the police bought is the lowest-priced trim level – dual motor (AWD), standard range (279 miles). With continuing price-cutting by Tesla, that model, if bought today, goes for \$47,740. At that price, it would also be eligible for a CHEAPR rebate of \$2250. (CHEAPR rebates for fleet purchases are expected to be implemented within the next couple of months of this writing on 6/27/23.) The net purchase price for a Model Y will be \$37,990, or \$9000 less than the Explorer.

The Model Y now seems to be the EV of choice for the Westport Police, rather than the Model 3 due to the extra space. At the time the Model 3 was purchased, the Model Y did not yet exist. (The only other police department in the state with an electric patrol car is Wethersfield, which has a Ford Mach-E. The Westport PD also has other EVs for non-patrol duty uses, including these [new additions](#).) A video walk through of a fully customized Model Y and the Mach-E can be found on the Club's [YouTube](#) channel.

Increased Expectations for Vehicle Service Life

When we did the financial analysis in 2021, after the Model 3 had been in service for a year, we built an amortization schedule based on a projected 6-year service life for the Tesla compared to the historical 4 years for the Explorers. (After 4 years, the maintenance costs for the Explorers make it not cost-effective to continue using them as patrol cars.) Three years into the use of the Model 3, the police feel it is quite possible that the 6-year projection may be too

conservative. The vehicle is holding up well. Maintenance costs are as low as forecast. The battery is in good shape (and they are monitoring it with Tesla-Fi). They intend to run with it as long as they can. Let's say, and this may also be conservative, that the 6 years turns into 8 years. *That means the capital cost of acquiring patrol cars gets cut in half.*

How Is This Not a No-Brainer?

- Lower acquisition cost
- Lower fuel costs
- Lower maintenance costs
- Double the service life
- Better performance

TOWN OF WESTPORT, CT



1835
VEHICLES DISPLAYED COURTESY OF
CHIEF FOTI KOSKINAS

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Time for Ludicrous Mode

Post by Barry Kresch

An Opportunity for Large Cuts in Emissions Along With Major Budgetary Savings.

When the Westport Police were doing their diligence in advance of the purchase of a Tesla Model 3 for use as a patrol car, they worked with Sustainable Westport (SW) to run a set of estimates for the payback time period. After running the numbers, they were confident that within 3 years, the purchase premium would be recovered.

The vehicle entered service in February 2020. This spring, the EV Club approached the Westport Police about their interest in doing a deep dive on the financials: purchase, customization, operation, and maintenance. The police shared granular details of costs, including a maintenance schedule, which is the basis for the analysis. The [completed analysis](#) showed that full payback happens in year one and considerable savings are realized by year 4.

When I initially started the analysis, my expectation was that the SW numbers were reasonable and we would end up somewhere in that neighborhood. I hadn't thought the financials would end up being such a slam-dunk with savings of \$52,000 over 4 years, enough to buy a new Tesla.

Police fleet vehicles offer a bigger opportunity than initially expected.

This Tesla Pilot was only a test, but it begs the question: with such strong results, is there any reason not to go all-in for EVs, and forget gradualism?

To help understand what the financial ramifications look like, I used the information I had learned about the Tesla and the Ford Explorer comparison vehicle to model what a transition might look like. This is a general, somewhat macro exercise, and not specific to Westport or anywhere else. I would need more data for that. Nevertheless, I believe it is possible to generate directional numbers with the information at hand. The scenario, which is for a fleet of 12 vehicles, is obviously not New York City, but the basic findings wouldn't change if it were larger.

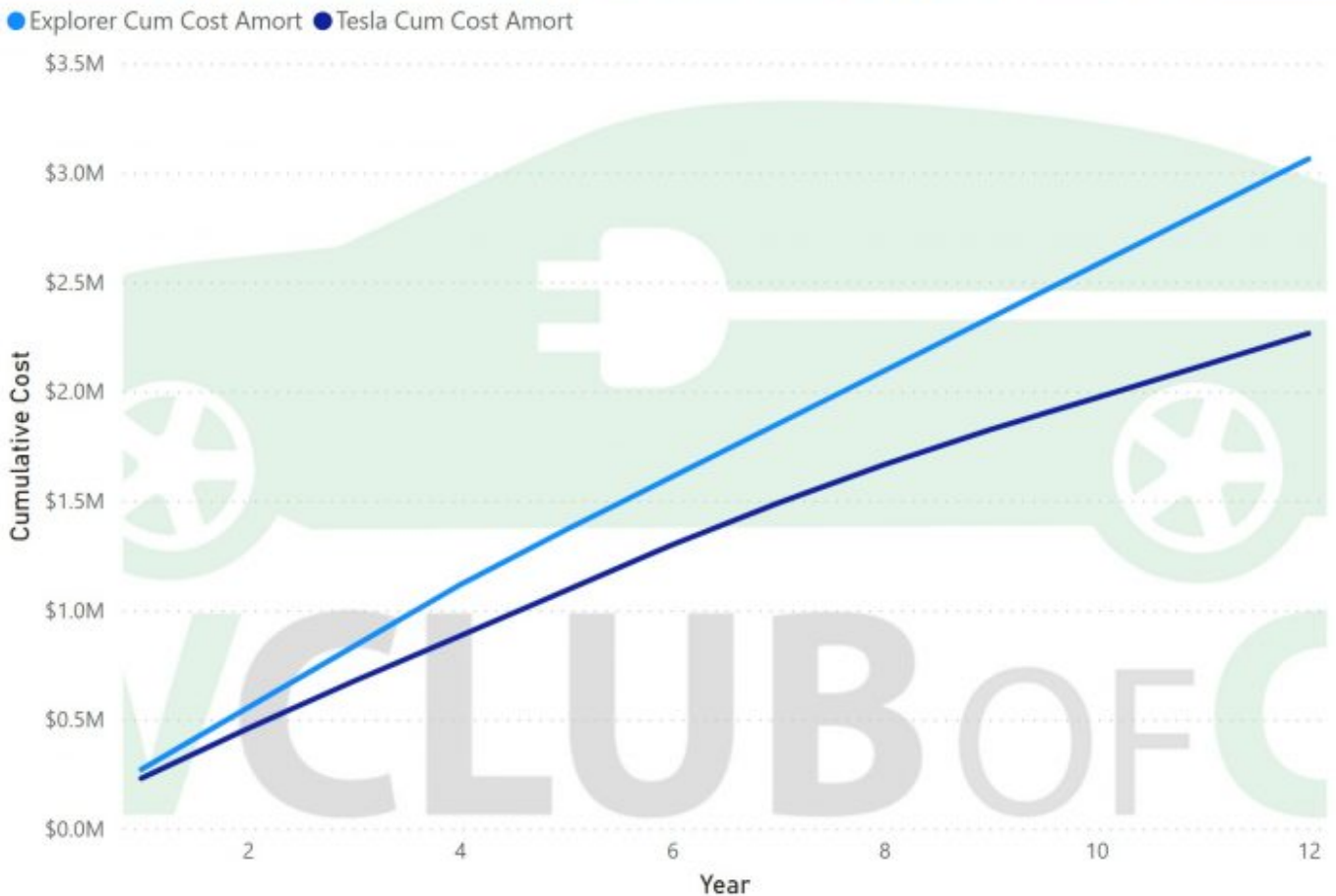
Scenario

- A starting fleet of 12 patrol cars, 4 Ford Crown Victorias, and 8 Ford Explorers. The Crown Vic was a ubiquitous patrol car before Ford discontinued them. Many are still around, including in Westport.
- It is assumed the price for the Crown Vic and the Ford Explorer are the same. They probably aren't but doubt the difference is that much.
- Service life is 4 years for the Ford patrol cars and 3 vehicles are turned over each year. The Tesla service life is 6 years. The service life is what is used in Westport.
- In the business as usual (BAU) scenario, each vehicle is replaced by a new Ford Explorer.
- In the ZEV scenario, each car is replaced by a Tesla Model 3.

- All cars are fully customized for law enforcement. When a new car replaces a like car, it is assumed that customization is reused and a zero cost is assigned in those instances. (This is most certainly understating the cost as the customization presumably does not install itself. If I had those costs, it would narrow the customization differential between Ford and Tesla due to less frequent turnover of the Teslas.) Also, in real life, if there is a model refresh, that can cause customization parts not to fit. Based on history, that is likely to happen more frequently with the Ford. But for the sake of keeping it simple for this exercise, all customization is treated as 100% re-usable.
- It is assumed that the first 6 Teslas will have to incur full customization costs and in the BAU case, the same goes for the Explorers that replace Crown Vics. But in general, the BAU scenario has a lesser degree of customization.

The chart at the top of the post depicts the cumulative savings in this hypothetical example of 12 patrol cars over 12 years with staggered turnover. It comes in just a whisker short of \$800,000. The charts below show the cumulative cost lines by year for each scenario. The charts for the fixed costs are calculated on an amortized basis with fixed costs divided by the respective service life of each vehicle.

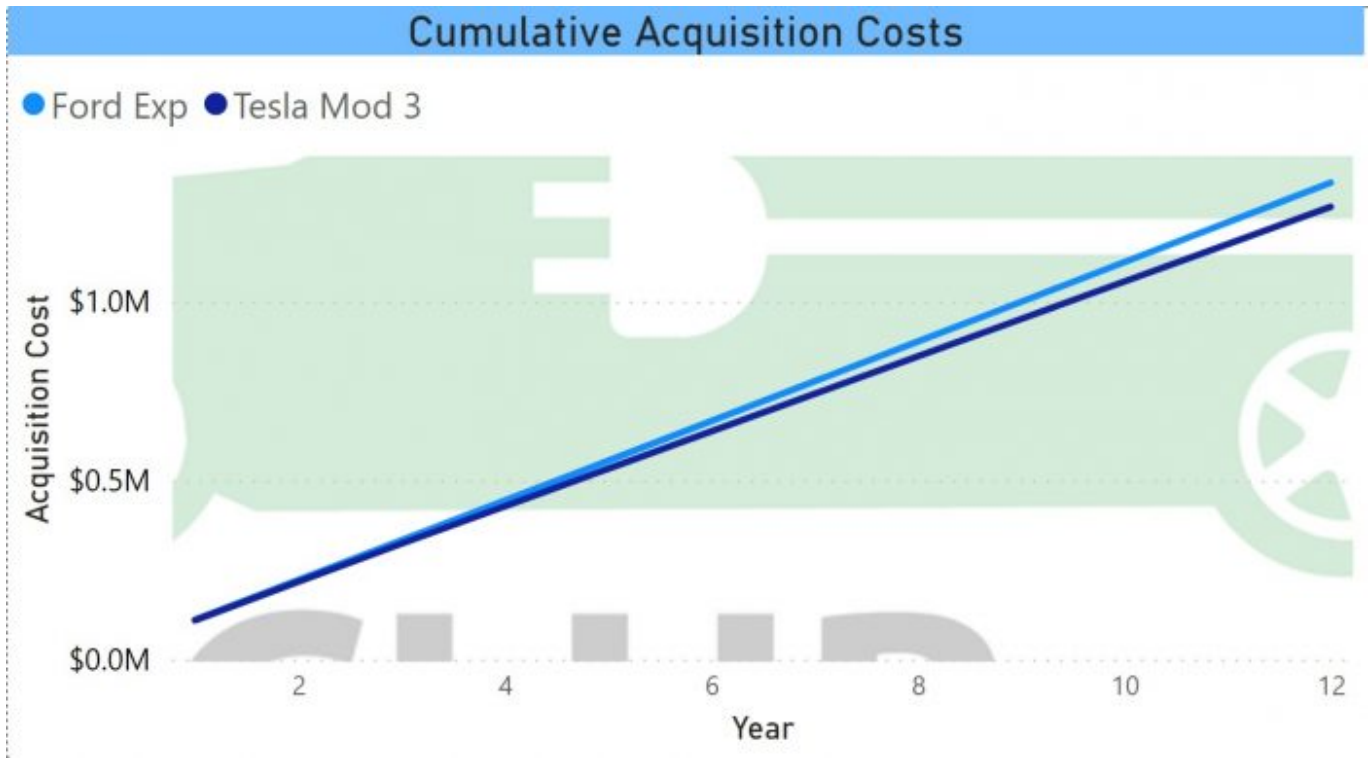
Projected Cumulative Cost of Converting Fleet to ZEV vs BAU



Components

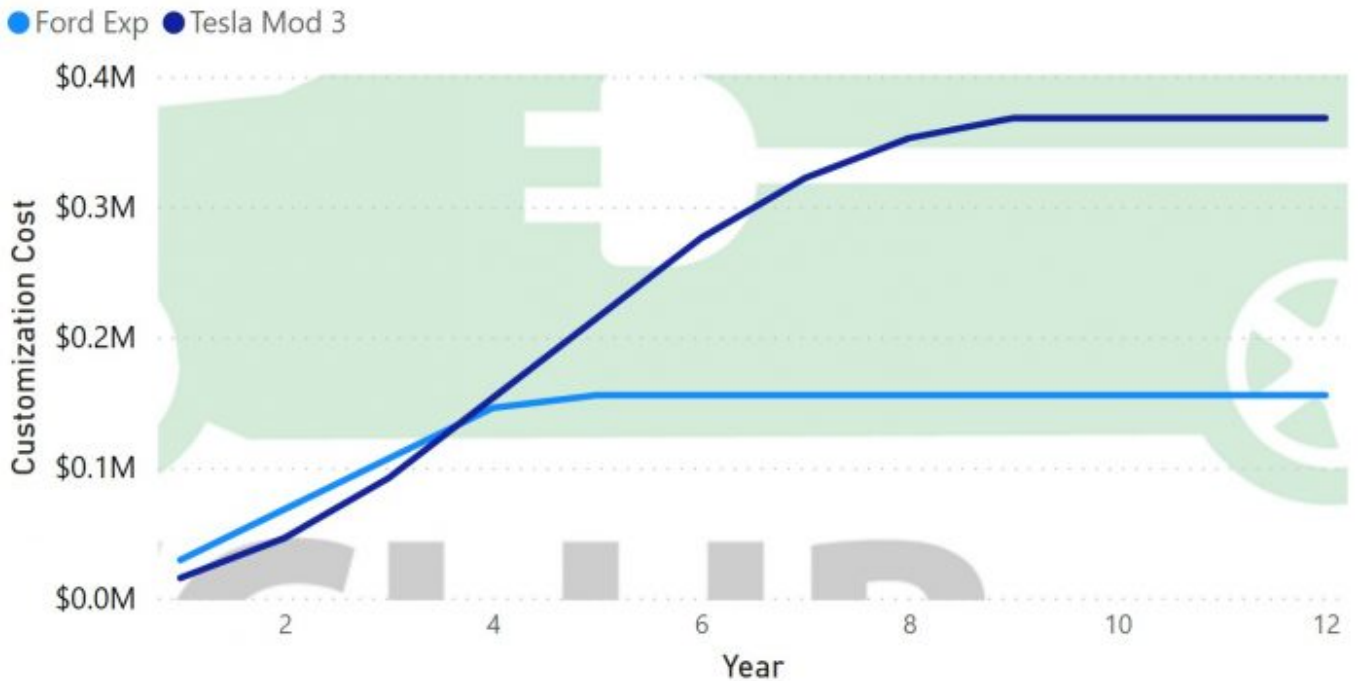
The three charts below break this up into the 3 categories of expense: acquisition, customization, and ongoing costs (fuel and maintenance).

Acquisition – This chart illustrates cumulative acquisition costs. Keep in mind that acquisition is staggered as neither scenario does envisions retiring vehicles before their normal service life ends. The cost curve slightly favors Tesla because, on an amortized basis, the annual cost of a Tesla is slightly lower. The longer this comparison is extended, the greater the differential would be.

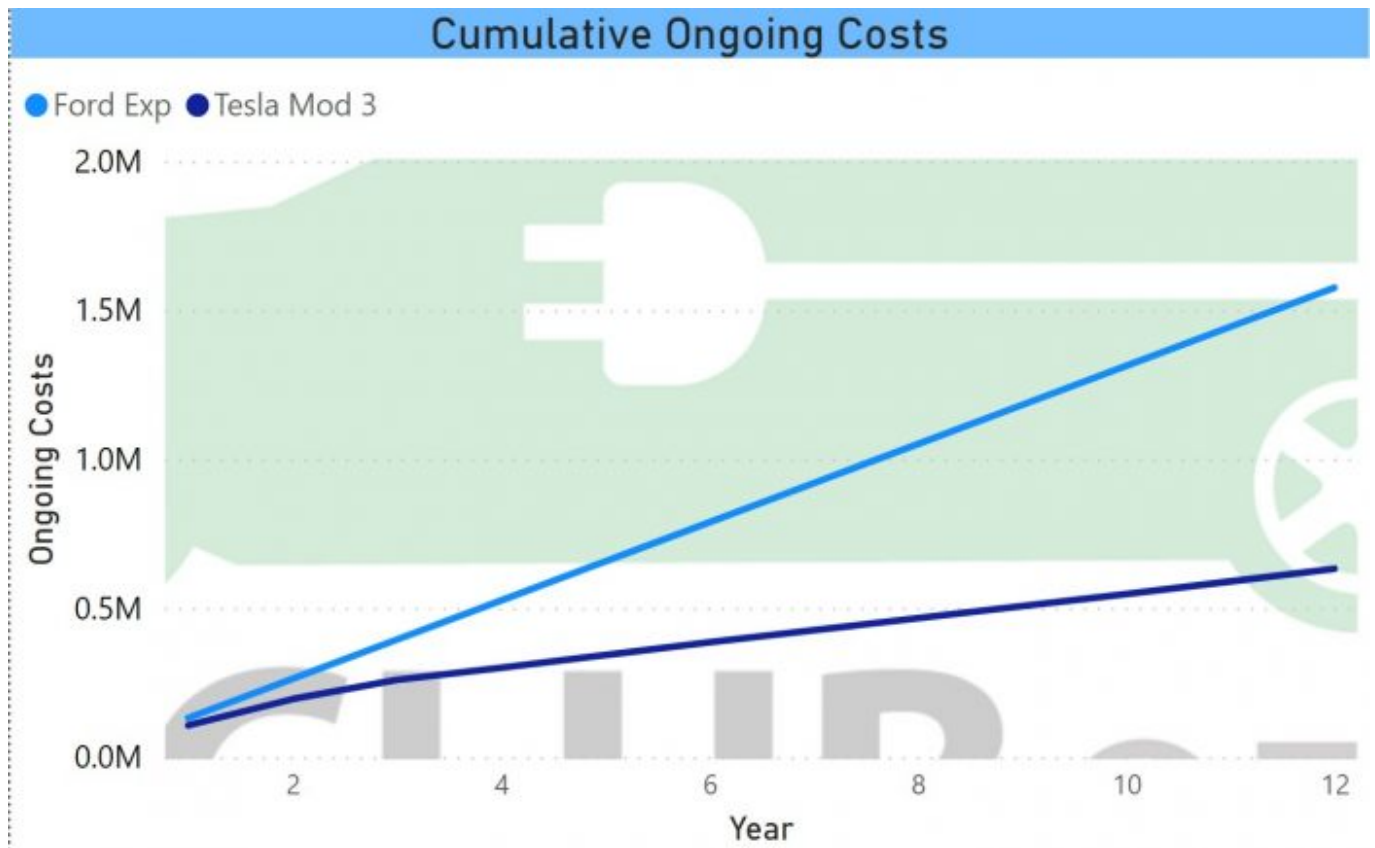


Customization – The customization costs are somewhat lower in the BAU scenario. This is due to the fact that replacing the 8 incumbent Ford Explorers does not incur customization costs in this model. Customization costs are a bit lower for a Tesla, so in the early years as Teslas are customized and Explorers replace Crown Vics and require customization, the Tesla cost curve is lower. It catches up once the Crown Vics are fully replaced. Once the fleet is fully Tesla, that part of the curve flattens out. As noted earlier, if there are any costs incurred in the re-use of customization, it would narrow the differential as the service life is shorter for the Explorers.

Cumulative Customization Costs



Ongoing Costs – As we saw in the earlier Model 3 patrol car analysis, there are large savings in fuel and maintenance for an EV. Electricity is more efficient than gasoline and these vehicles need much less maintenance. This category saves around \$940,000.



This makes manifest the ramifications inherent in the Westport Analysis. There are major savings to be had. This is not to underestimate the complexities of the budget process and the need to deal with upfront acquisition costs. However, as noted in the earlier analysis, the upfront purchase premium is recovered within one year, so it isn't that big a burden.

We have data on the police patrol vehicles, but the same logic applies to other vehicles on the force and for a municipality in general. With savings this substantial, to borrow a Tesla term, it pays to up the pace of acquisition to Ludicrous Mode.

Tesla Police Vehicle Saves

Westport Tens of Thousands of Dollars

Police Chief Foti Koskinas (left) and Officer Charles Sampson. Photo courtesy of Westport Police.

Post by Barry Kresch

Tesla Police Vehicle Brings Large Monetary Savings

- The purchase premium is recouped in one year.
- After four years, the savings are enough to pay for another Tesla.
- One EV saves 23.5 tons of CO2 emissions annually.

This blog post will discuss the financial aspects of the analysis. A subsequent post will describe the avoided emissions and health costs.

A Big Splash

Using a Tesla Model 3 for police duty was a new idea back in Dec. 2019 when the Westport Police acquired one for use as a fully customized police cruiser, going into service in Feb. 2020. This was the second Model 3 to be acquired by a police force (Bargersville, IN was the first), but according to the Westport Police, this was the first one to be fully tricked out for law enforcement. The Model S or X would also be cool patrol cars, but the lower price-point of the Model 3 made it a more financially realistic option.

The purchase caused quite a splash, generating hundreds of inquiries from all over the world. Since then, there have been some other communities that have gone the same route. To the best of our knowledge, nobody has published a dive into the

financials, including the customization.

The police gave us some very positive feedback early on about using the vehicle. This included how its performance enables it to catch up to a speeding vehicle in less time than a gas-powered patrol car, reducing the danger to other motorists, pedestrians, and the police themselves.

When a police vehicle is out in the community, especially at a public gathering, photo ops are common. The usual photo op is with the kids, who like to be photographed behind the wheel of a patrol car. With this car, it is the adults asking for photos.

At the time the purchase announcement was made, much of the attention was focused on the headline purchase price. Sure, the Tesla Model 3 is green. In fact, it is green even by EV standards with a 121 MPGe EPA rating. But is it a prudent use of taxpayer funds to purchase a vehicle costing \$52,290 compared to \$37,000 for a Ford Explorer, the recent mainstay of the Westport patrol car fleet?

This blog reported extensively on the vehicle when it [entered service](#). The story was picked up in other places, too, including local blogger, Dan Woog, who published a story in December 2019 that generated over 50 comments. Most were supportive, but there were doubting Thomases who wrote, "\$52,000 – what a joke." Or "A Tesla is essentially a luxury item and a novelty; what a wasteful and obnoxious mismanagement of our tax dollars."

While EVs are typically more expensive to acquire than a comparable conventional, or ICE (internal combustion engine) car, the total cost of ownership, which factors in fuel and maintenance, is often lower. This car turned out to be an extreme version of the savings on a total cost of ownership basis.

The Westport Police worked with Sustainable Westport before

the purchase to estimate the numbers and there was a high confidence level that the lower operating costs of the Tesla would translate to payback within three years, plus the tantalizing possibility that the native tech in the Tesla would offer savings on the extensive customization that occurs for a law enforcement vehicle. Fortunately, Westport leadership is committed to lowering emissions and they, including First Selectman Jim Marpe and Police Chief Foti Koskinas, had a bias to action.

Fast Recoupment

The new headline is that the payback happens in year one. By year four, there are enough savings to buy a new Tesla. The details get a little more complicated and I will lay them all out. All data regarding the purchase, customization, and operating expenses come from the Westport Police. At my request, the analysis was reviewed by the Finance Department of the Town of Westport, which has confirmed the accuracy of the data and supports the conclusions.

I use actual data, where available, and due to the relatively short time frame, projections based on the data for future years, done in consultation with the police.

This Tesla and The Next

This car was *never* not going to save money. The cost of law enforcement customization is substantial, more than the cost of the Ford Explorer. The Tesla, due to its first-mover status, was given significant discounts from the two companies that Westport uses for this work (Whelen Engineering and Fleet Auto Body, which are both CT companies). Going forward, that free lunch is off the menu. Consequently, when discussing the data, I refer to this vehicle as the Tesla "Pilot," and a second, hypothetical vehicle, as the Tesla "Next," where I don't count the one-time discounts to have a better comparison

with the Ford ICE.

Also, this comparison assumes outfitting a car from the ground up. In real-life operations, if a vehicle is replaced with a like vehicle, much of the customization can be reused. The Westport patrol fleet is made up of Ford Explorers and Crown Victorias. The latter model has been discontinued so reuse is not possible when replacing those.

The Car

This Model 3 was the long-range, all-wheel drive, performance version. The police did not purchase full-self driving (which their insurer would not underwrite, though it was moot because they weren't going to buy it anyway).

Customization

The biggest single item in the customization is the license plate reader, and it is here that there was a savings of \$10,000 (\$8,000 vs \$18,000) due to taking advantage of the technology native to the Tesla. As far as Pilot discounts, there was no charge for added cameras, lights, siren, and the weapons rack. These discounts amounted to just over \$14,000.

The Pilot was not outfitted with a prisoner transport cage/partition since that was not needed for its duties. For purposes of comparison with the Explorer, the partition was included in the Next vehicle.

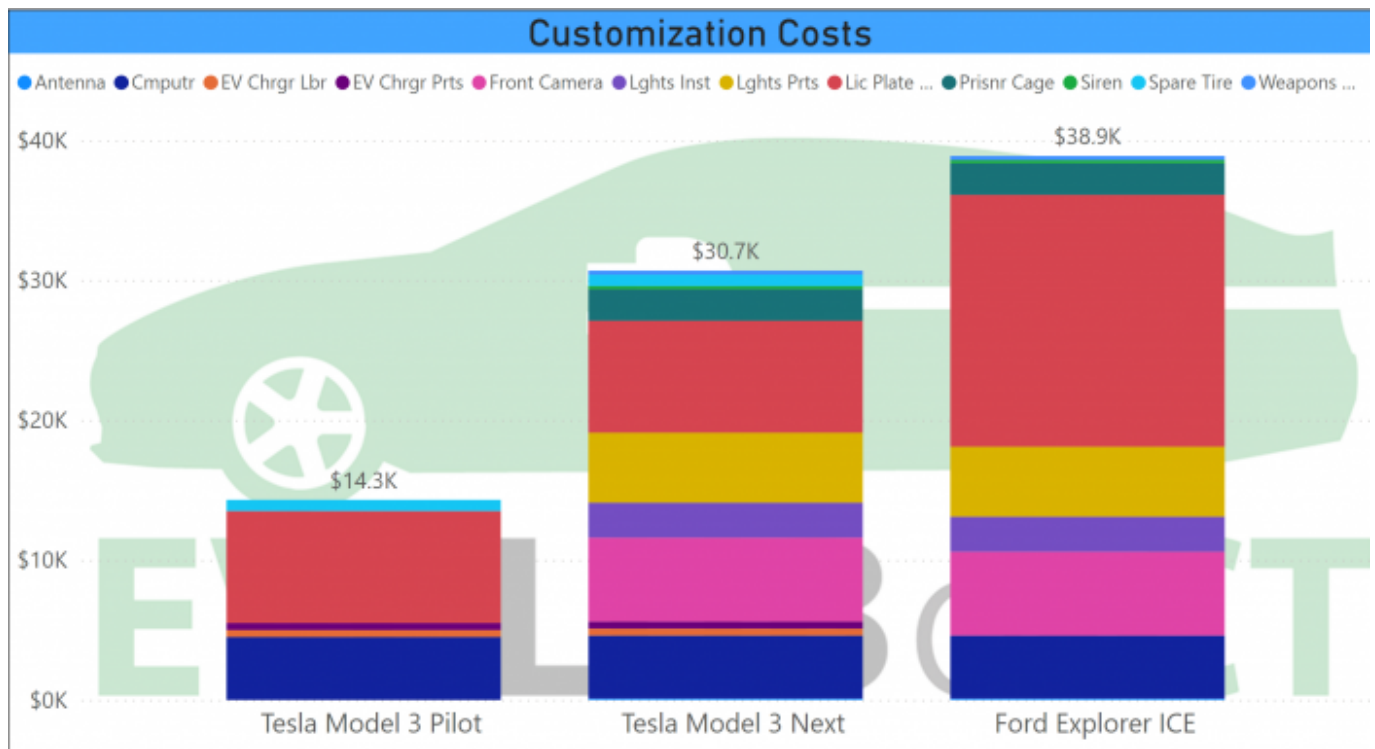
There are two items that applied only to the Tesla. One is a spare tire for \$800. (The Ford comes with a spare.) The other is a charging station at a cost of \$1000 for hardware and installation. These are categorized as "customization" since they come after the vehicle is purchased. The department is getting two shifts per day on a single charge and charging the vehicle overnight. This is assumed to be the usage pattern of

future Teslas, so the conservative assumption on charging is that the charging equipment expense will be required for each Tesla procured and it is included in the Next vehicle. There could potentially be a savings opportunity in the future with a dual-port charger.

The other item, charged to all cars, was a police computer.

Exploiting the native Tesla tech is still a work in progress. There is the possibility of future savings but for this comparison, no further savings are assumed. The customization totals for each vehicle are displayed below. The Pilot vehicle, due to the discounts, cost savings from the license plate reader, and lack of a prisoner partition has a \$24,600 lower cost of customization. In other words, based on the customization alone, the purchase premium has been more than recouped. The Next vehicle, without all the discounts, still has a lower customization cost than the Ford in the amount of \$8200 due to the license plate reader savings, partially offset by the charging station and spare tire expenses.

One thing that Tesla did was enable the wiring of all the electronic accessories (lights, siren, etc.) into the large battery. That made it unnecessary to add a second 12-volt battery (which is how other police departments have handled this item). In the case of the Ford patrol car, a heavy-duty alternator is how the extra load is handled. (The HD alternator is included in the base purchase price of the Ford.)



Ongoing Costs

Aside from fuel, these are the ongoing regular maintenance items that are included in the data.

Both vehicles: brakes and tires.

With electric vehicles, regenerative braking, where the engine slows the car and stores some of that kinetic energy in the battery (instead of its being dissipated as heat), greatly reduces the wear on the brakes. The scheduled brake servicing for the Tesla is once every two years. It is possible the brakes will last longer, but the police use involves hard stops, which will engage the friction brakes, and this is thought to be a conservative estimate. Brake servicing history on the Explorer is twice per year.

The police have remarked that they are pleasantly surprised that the tires are holding up better on the Tesla, which they attribute to a superior suspension. I was surprised, too. Normally, tires are the one area where an EV does not save

money. Most EVs use low rolling resistance tires. These maximize range but are not known for long life. In the case of the Westport PD, they are using the same tire for both the Ford and the Tesla. It is possible there was a slight range-loss because of this. They plan to replace the Tesla tires once every two years, compared to every year for the Ford.

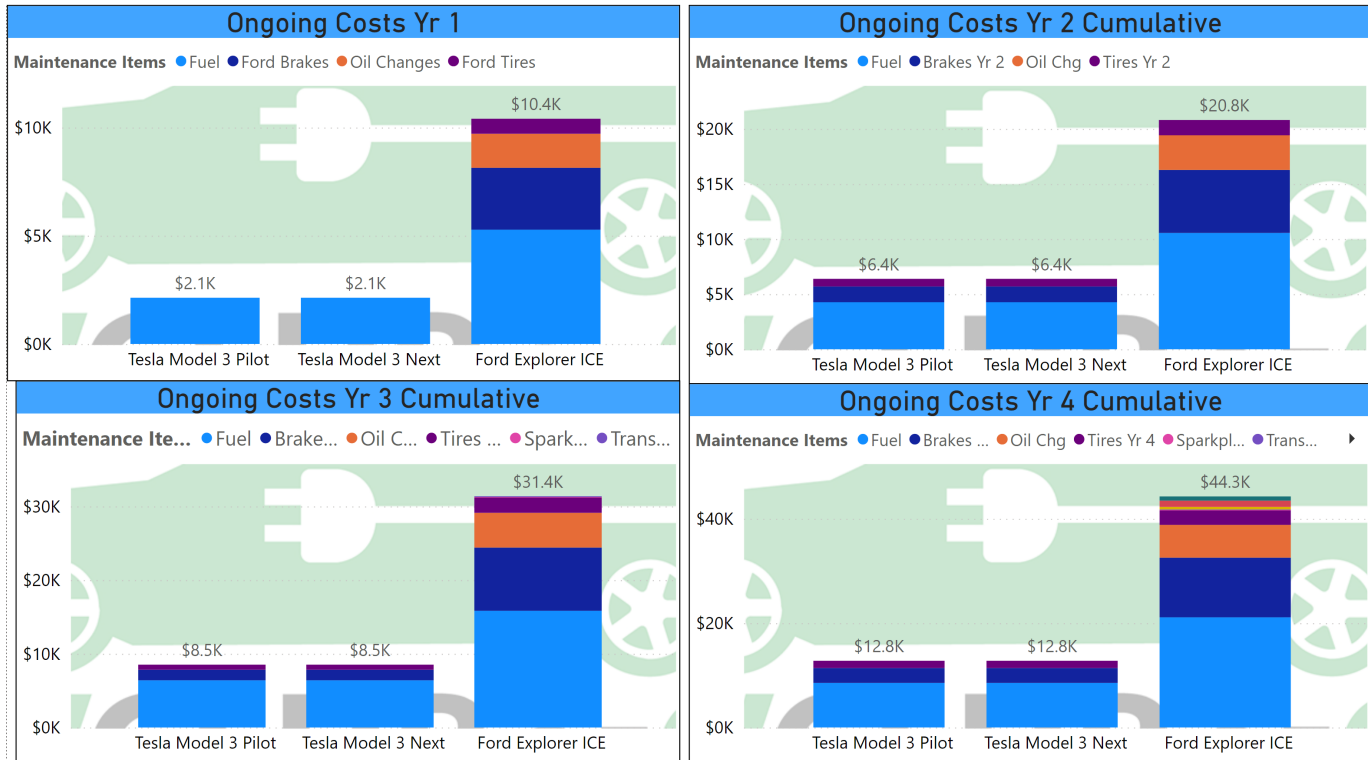
Ford only: oil/filter changes, transmission servicing, catalytic converter, water pump, spark plugs, alternator.

The costs were calculated based on driving 23,060 miles in a year.

The EV charger that was installed by the police is not sub-metered. Tracking electricity consumption was a manual affair of tracking mileage and battery state of charge before and after each day. Going forward, the police have subscribed to Tesla-Fi, so there will be an opportunity to tighten those numbers, plus track battery degradation. Based on the data we have, the cost of electricity was 60% less than it was for gas. Also, keep in mind that this car is a 2020 model year, meaning it was before Tesla began installing heat pumps in its vehicles. This will reduce energy consumption in cold weather. Finally, there is a new EV Rate Design currently being adjudicated by the Public Utilities Regulatory Authority. This has the potential to reduce the cost per kilowatt hour of electricity, depending upon the final rulemaking, how it applies to municipalities, and whether the police could live with a managed charging arrangement. The police would have to install smart chargers, which are more expensive than the dumb charger they have now, but that cost differential would likely be subsidized in this scenario.

The chart below maps the savings from fuel and maintenance on a year by year cumulative basis for 4 years. Bands of color represent items in a consistent way across all 4 panels and all 3 bars and are identified in the legend. In year one, there is already a savings of \$8.3 thousand, due to the lower

fuel costs for the Tesla, along with the cost of quarterly oil/filter changes, brake servicing, and tire replacement for the Ford. From there, the savings accrue even more quickly due to ICE parts (e.g. the catalytic converter) needing to be replaced, so that by the time we get to 4 years, the savings total \$31.5 thousand. This is considerably more than the purchase premium and almost as much as the purchase cost of the Ford.



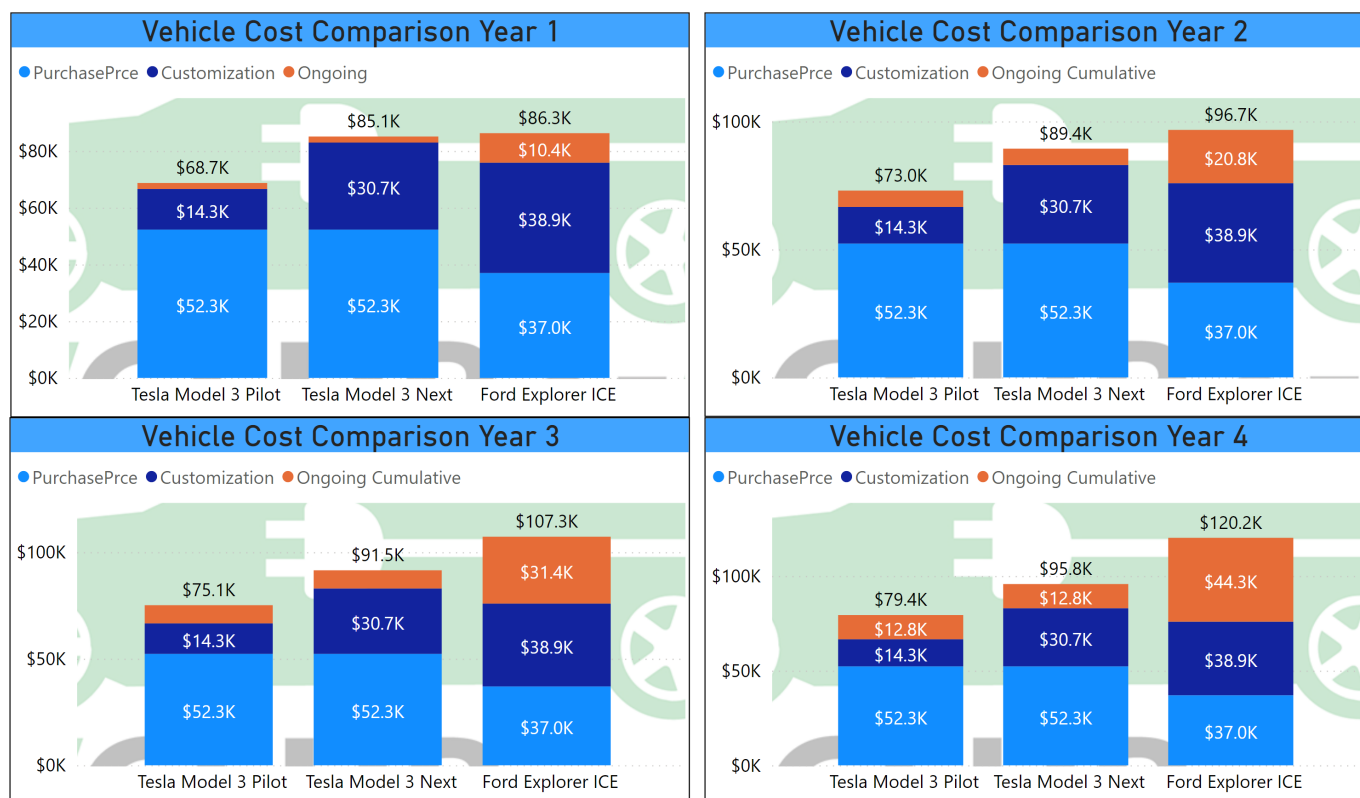
Service Life

The documented service life of the Ford Explorers is four years. Based on what the police have seen to date, they are planning for a six-year service life for the Model 3. This is big. Costs are calculated on both a cash and amortized basis.

Total Costs – Cash Basis

The chart below shows the total cost of each vehicle with subtotals by category (purchase, customization, ongoing) for each of 4 years. This looks at the costs on a cash basis. The

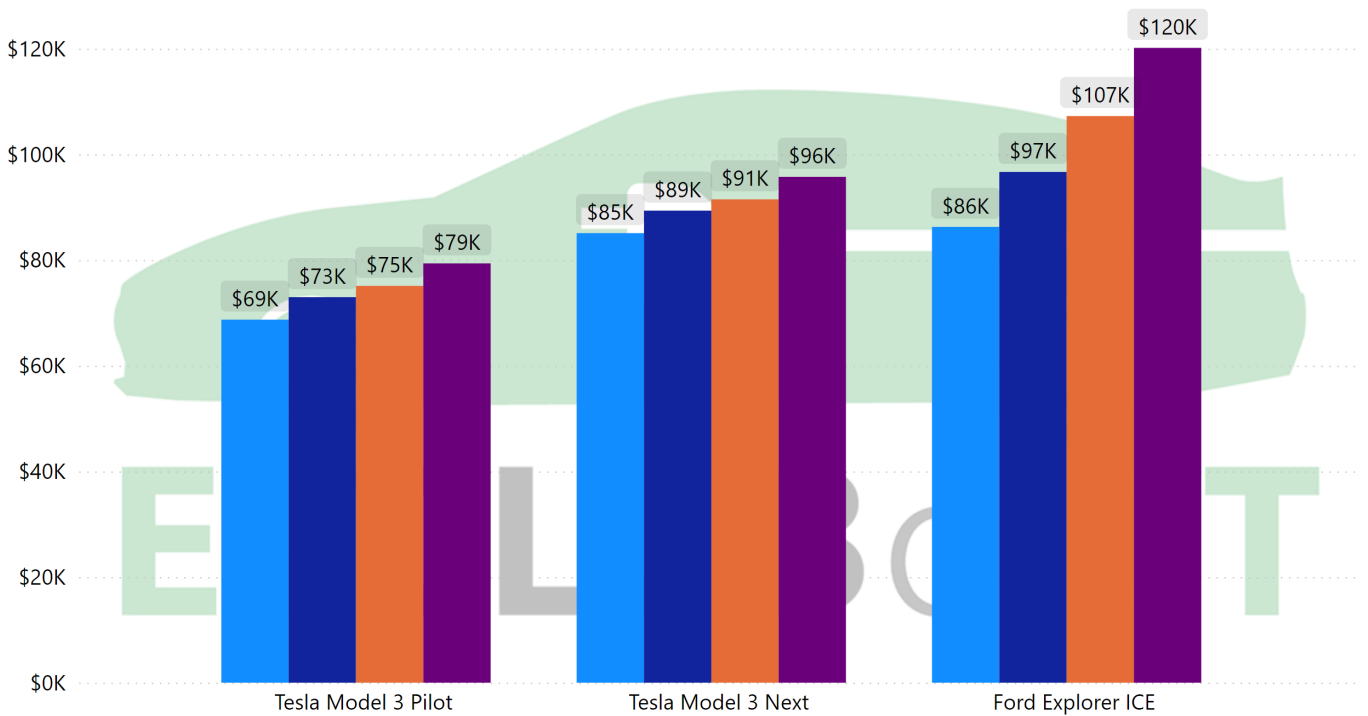
costs are cumulative. Since we are looking at the costs on a cash basis, the 2 blue bands, representing the purchase and customization costs, recognize these expenses in the first year and they don't change. The ongoing cost does increase each year as more fuel is used and additional maintenance items are performed. The maintenance load on the Ford, in particular, gets heavier as the years go by and things like the catalytic converter and water pump need to be replaced. Therefore, the year 4 cost is the total spent on fuel and maintenance to this point. Four years is the chosen interval as it corresponds to the service life of the Ford Explorer.



This next chart summarizes the categories into a grand total and displays the 4-year cost trend for each vehicle. This is still on a cash basis and it ties to the totals in the category chart above.

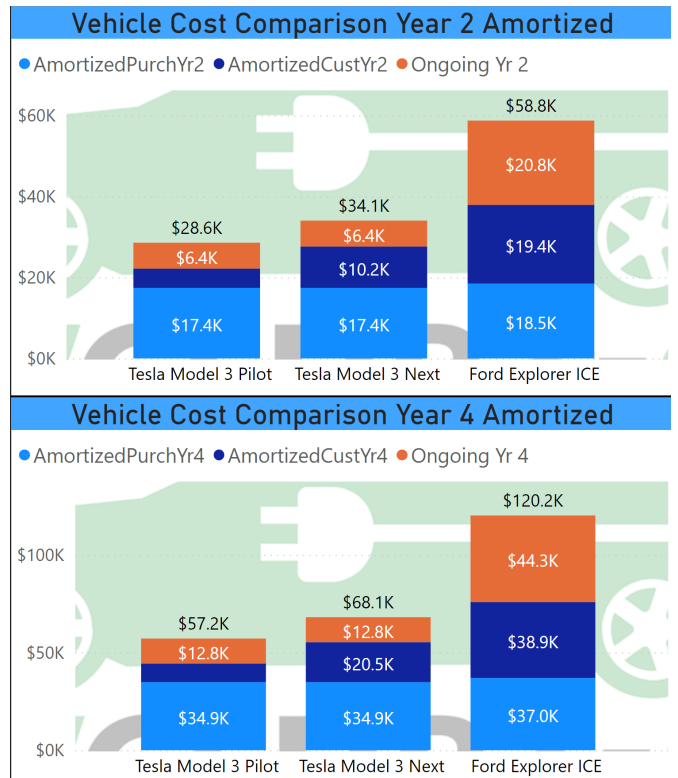
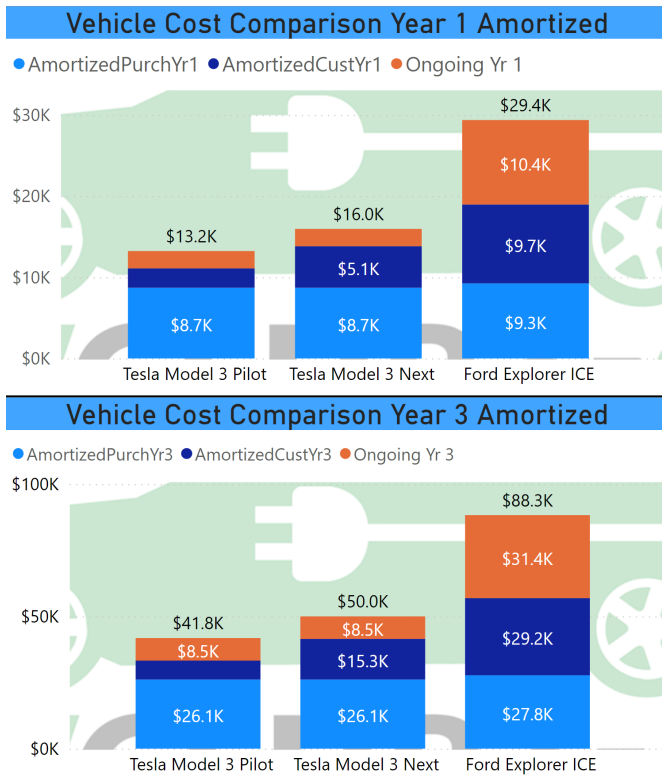
Total Cost By Vehicle By Year With Cumulative Ongoing Costs

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



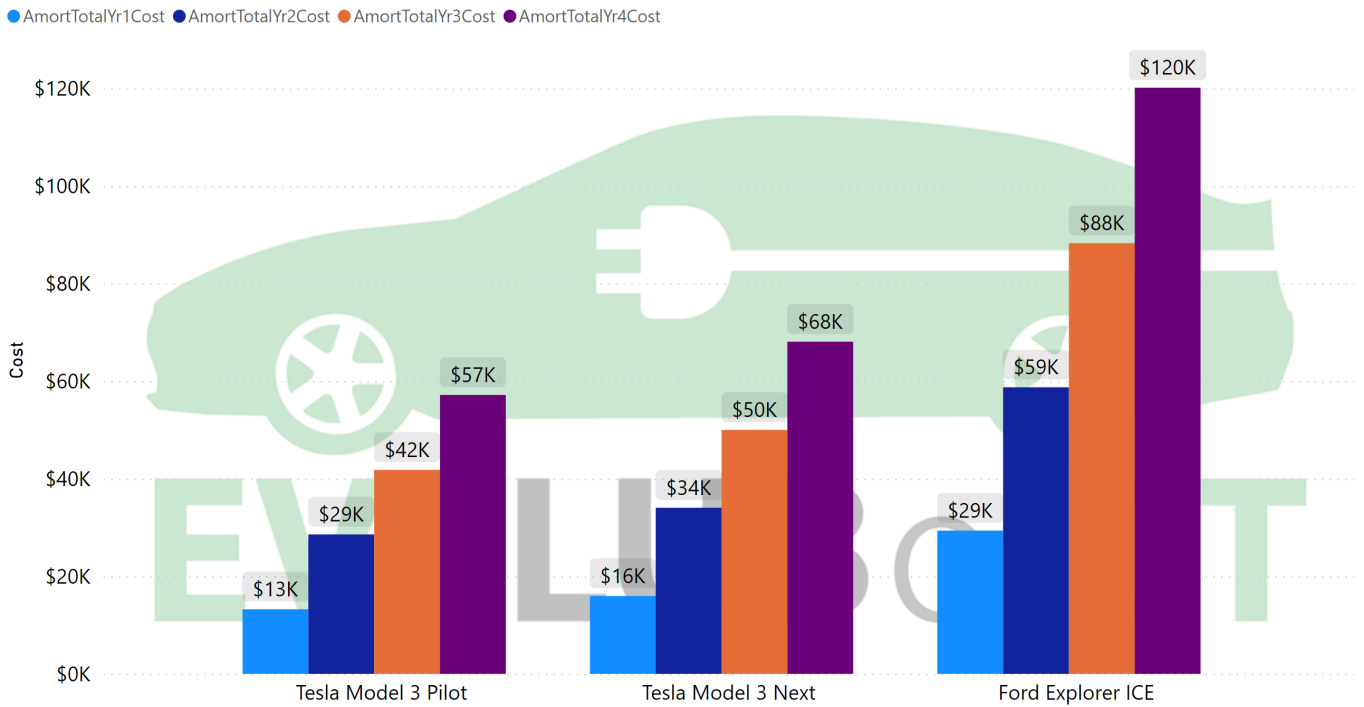
Total Costs – Amortized Basis

None of the charts to this point have taken service life into account. It should be noted that even on a cash basis, the costs for the Teslas are considerably lower. The chart below reprises the category format, except that the purchase and customization costs are divided by the number of years in the service life of each vehicle. This is why the fixed costs increment upwards each year.



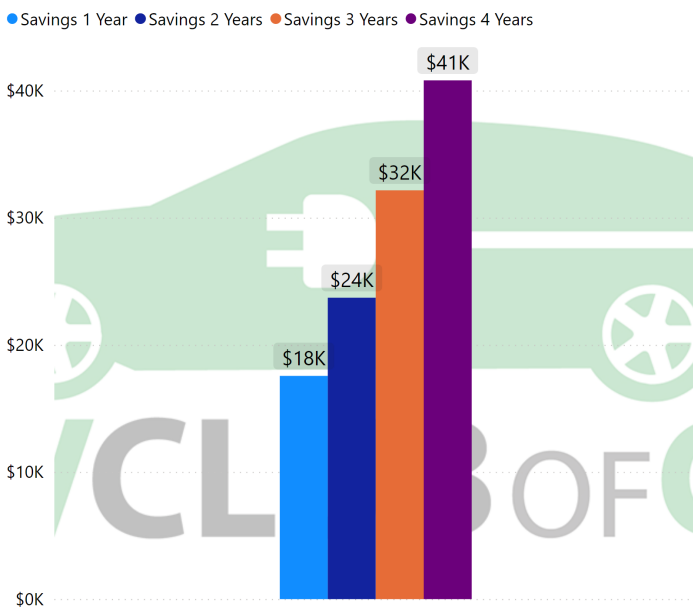
This is what the total costs for each vehicle for each year look like. The magnitude of the difference between the Teslas and the Ford Explorer is greater because, after 4 years, only two-thirds of the Tesla purchase and customization costs are amortized. You will notice that year 4 of the costs for the Ford is the same as it appears 2 charts above, because at that point, the vehicle has been fully amortized.

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

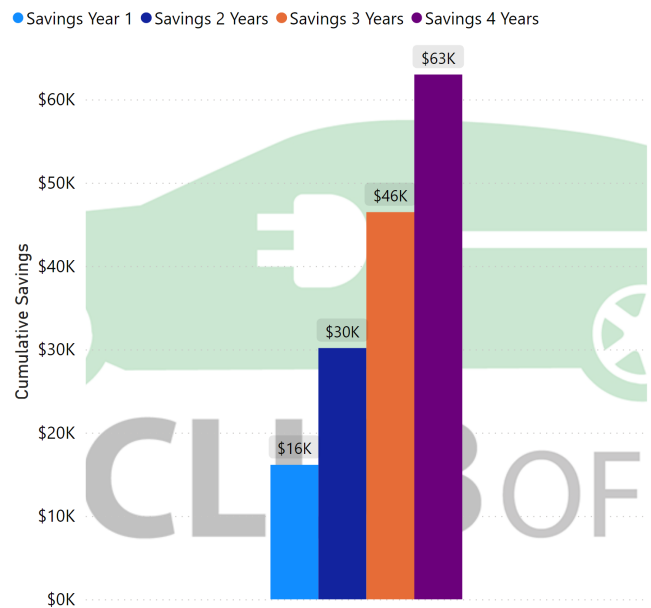


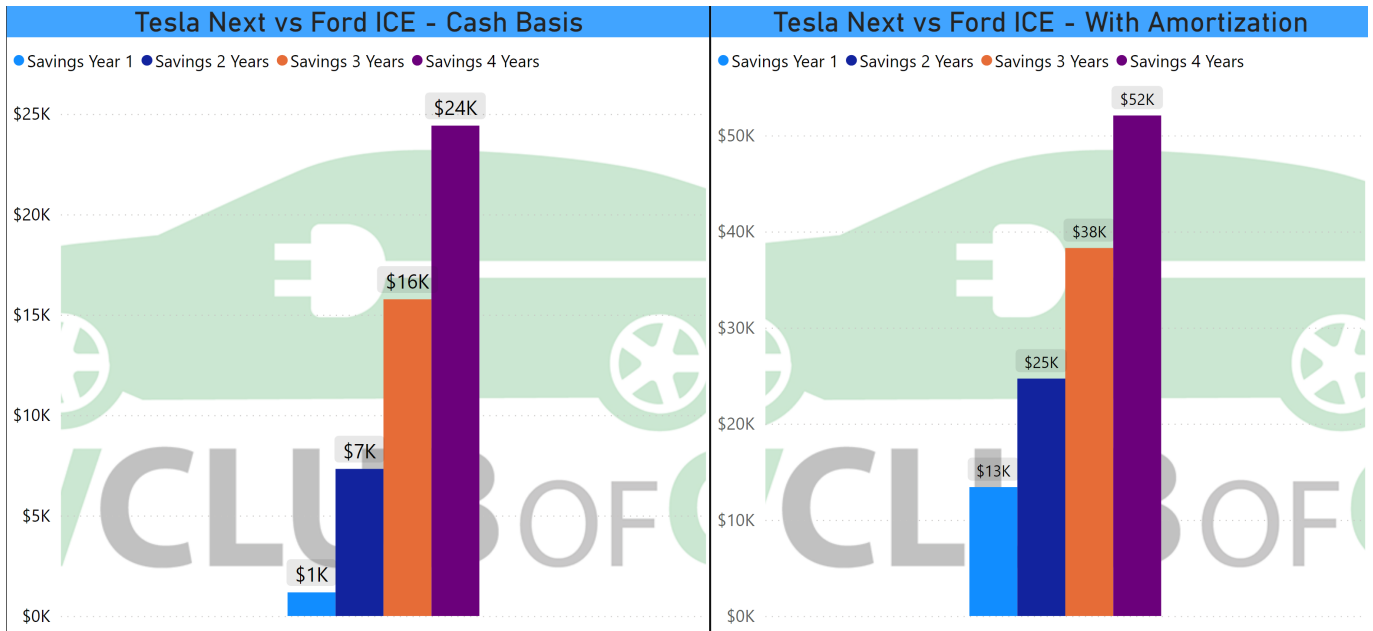
You can easily see the differences are substantial and we have done the math on the savings for you in the two charts below. The first shows the savings for the Tesla Pilot and the second shows the savings for the Tesla Next. Each chart displays side by side the savings on a cash and amortized basis.

Tesla Pilot vs Ford ICE - Cash Basis



Tesla Pilot vs Ford ICE - With Amortization





As can be seen, the extraordinary discounts for the Pilot vehicle generate an enormous savings of \$63,000 after four years on an amortized basis. But even the Next vehicle more garners significant savings even on a cash basis. On an amortized basis, the \$52,000 savings are almost the exact cost of the original purchase price of the Model 3.

The bottom line: This is good for the bottom line!

Closing Note: The police buying a Tesla, was a toe in the water, a pilot. As demonstrated in the data, the payback happens in the first year and the savings are substantial after 4 years. The ramification is very clear: It is possible to move aggressively to replace every ICE vehicle that turns over with an appropriate EV without jeopardizing constrained financial resources. It's not just about Tesla. The Town of Westport recently acquired 2 Chevy Bolts. The police have several other plug-in vehicles such as the Toyota Prius Primes that are used for parking enforcement. It is about reducing emissions while cost-effectively matching the vehicle to the use case. The potential is there to save millions of tons of emissions and millions of dollars over the course of 10 or 15 years.

Even better news is that future savings could be greater. In

the case of the Tesla, making greater use of the native technology is still a work in progress. There could be more savings, but since we don't have anything definitive, I didn't want to be overly speculative.

Something new that is happening is the new EV Rate Design issued by the Public Utilities Regulatory Authority.

Even though the final adjudication was issued on July 14th, there are still working groups filling in the details. We should know everything at some point in Q4. The program takes effect in January 2022. But we do know that it includes subsidies for charging station purchases, make ready, and discounted electric rates.

So I will close by borrowing a Tesla term and say there is no reason not to move forward in Ludicrous Mode.

This is a recent [video](#) that was made with the Westport Chief of Police, Foti Koskinas, at an outdoor press conference where he was speaking about the first year of the vehicle being in service.

Inquiries can be sent to EVClubCT@gmail.com