Analyzing US Sales Trends of EVs Versus ICE Powertrains Across Shared Models

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Research Overview

Measuring the US national average of EV sales as a percent of total vehicle sales (currently at 1.6%) is a fairly meaningless metric for multiple reasons, including the facts that there are 250 fewer EVs than ICE models, no electric pickups, no electric small SUVs/CUVs (the hottest market currently) and there are no top 20 selling models with an EV option (Ford Fusion was #23 in April).

Another measure is the share of sales of EV powertrain versions of the same vehicle models that are also available with an ICE powertrain. The intent of this research report is to help better gauge the progress and transition to electric vehicles based on when consumers have a clear choice between an internal combustion engine (ICE) and either plug-in hybrid electric (PHEV) or fully battery electric (BEV) version of the same model.

To answer this research question we analyzed 24 different models that are currently available in the US with either a traditional internal combustion engine version or regular hybrid AND plug-in hybrid or full battery electric version. Using sales data from GoodCarBadCar.net and InsideEVs.com, we analyzed March 2018 and Q1 2018 sales data. To present the data more simply, we’ve included just the sales numbers for the month of March in most charts.

Note: At this early stage of EV adoption, most consumers likely know ahead of time when they enter a dealer showroom that they are more interested in an EV than ICE model. As such, the findings of this report’s analysis is not to suggest such a straightforward buyer behavior of objectively comparing ICE/hybrid versus PHEV/BEV versions of the same model. There are many factors that make this behavior unlikely including current consumer demographics of EV buyers, lack of availability of many EVs at dealerships (especially outside of California), significant price differentials as the findings point out, and many dealers’ bias toward selling ICE vehicles of EVs. - Loren McDonald
### Vehicles Analyzed and Summary Data

<table>
<thead>
<tr>
<th>Model - ICE versus EV</th>
<th>Mar 2018</th>
<th>Q1 2018</th>
<th>MSRP Delta</th>
<th>MSRP % Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiat 500e</td>
<td>64.9%</td>
<td>55.8%</td>
<td>$13,605</td>
<td>70.2%</td>
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<td>Toyota Prius Prime</td>
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<td>BMW 530e</td>
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<td>13.4%</td>
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<td>BMW X5 xDrive40e</td>
<td>13.0%</td>
<td>12.3%</td>
<td>$4,250</td>
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<td>Kia Niro PHEV</td>
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<td>Mitsubishi Outlander PHV</td>
<td>8.0%</td>
<td>7.4%</td>
<td>$8,350</td>
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<tr>
<td>Volvo S90 T8 PHEV</td>
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<td>5.9%</td>
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<tr>
<td>Ford Fusion Energi</td>
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<td>BMW 330e</td>
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<td>Mercedes GLE 550e</td>
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<td>BMW 740e</td>
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<td>4.0%</td>
<td>$7,050</td>
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<td>Chrysler Pacifica Hybrid</td>
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<td>Mini Countryman SE PHEV</td>
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<td>6.1%</td>
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<td>VW eGolf</td>
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<td>Kia Optima PHV</td>
<td>1.9%</td>
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<td>Kia Soul EV</td>
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<td>2.0%</td>
<td>$16,150</td>
<td>90.7%</td>
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<tr>
<td>Cadillac CT6 PHEV</td>
<td>1.7%</td>
<td>1.9%</td>
<td>$21,995</td>
<td>40.66%</td>
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<tr>
<td>Ford Focus Electric</td>
<td>0.8%</td>
<td>0.8%</td>
<td>$8,570</td>
<td>41.7%</td>
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<tr>
<td>Hyundai Sonata PHEV</td>
<td>0.7%</td>
<td>1.9%</td>
<td>$12,550</td>
<td>56.9%</td>
</tr>
<tr>
<td>Mean</td>
<td>9.8%</td>
<td>8.8%</td>
<td>$10,310</td>
<td>32.2%</td>
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<tr>
<td>Median</td>
<td>4.2%</td>
<td>4.8%</td>
<td>$8,608</td>
<td>29.9%</td>
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</table>

**Data Sources:** GoodCarBadCar.com, InsideEVs.com, Research: EVAdoption.com

**Vehicles Analyzed**

24 different models that were available in the US for the months of January through March of 2018 with either a traditional internal combustion engine (ICE) version or regular hybrid AND plug-in hybrid (PHEV) or full battery electric (BEV) version.
Key Finding #1. EVs Have a Near 10% Mean Share of Total Model Sales

The mean EV share across the 24 models analyzed was 9.5% (March) and 8.5% (Q1), while the median was 4.2% (March) and 4.8% (Q1). When consumers have a choice between a more expensive PHEV or BEV version of the same ICE model, on average (mean) they purchase EVs nearly 6 times the rate of the overall EV sales purchase rate (1.6%) in the US. (See larger Chart 1 on page 12.)
Key Finding #2: Median Price Differential Was $8,608 and 30%

We looked at the difference in manufacturer’s suggested retail price (MSRP) of the EV versions versus their sister ICE or regular hybrid models. The median difference was $8,608 and mean was $10,310. (See chart 2, page 13.)

Those are pretty significant differences, but as you might expect the delta varied widely. The smallest difference in price was the roughly $1,000 premium for the BMW 530e over BMW 530i. The biggest difference was $22,050 for the Volvo XC90 T8 PHEV versus the regular XC90, followed by the Cadillac CT6 PEV over the regular CT6.

10 of the 24 EV versions had a difference in MSRP of more than $10,000 and only 3 of the 24 had a delta of less than $4,000.

Next we looked at the percent delta of the price difference between the EV and ICE versions of the 24 models. The mean difference was 32.2% and median was 29.9%. The EVs with the lowest percentage of sales also had some of the highest percent differences in MSRP, including the Hyundai Sonata, Ford Focus, Cadillac CT6 and Kia Soul. (See chart 3, page 14.)

In charts 4 (page 15) and 5 (page 16) you can see that there is a fairly strong correlation between the price premium (in both dollars and percent delta) and the percent of sales the EV version achieves. There are two notable exceptions to this which are explored further: Fiat 500e (page 17) and the Porsche Cayenne E-Hybrid (page 18).
Key Finding #3: Range, Price Differential and Distinction Matter

The lowest sales shares among the 24 models are the Hyundai Sonata PHEV at 0.7% and Ford Focus Electric at 0.8%. The Cadillac CT6 PHEV (1.7%), Kia Soul (1.8%) and Kia Optima (1.9%) do a bit better, but are only slightly above the overall new EV US sales market share of 1.6%.

These four EVs with the lowest sales share not coincidentally also have significant price and price percent deltas over their sister ICE vehicles:

- Cadillac CT6 PHEV ($21,995 / 41%)
- Kia Soul EV ($16,150 / 90%)
- Hyundai Sonata PHEV ($12,550 / 57%)
- Focus Electric ($8,750 / 42%).

The Kia Soul BEV (110 miles range) and Ford Focus Electric (100 mile range) all suffer from relatively low EV range, a lack of any real distinctive differentiation or green signaling benefits. Their cost differential is simply not justifiable, especially for non-luxury buyers. It is revealing that 4 of the lowest share EVs are non-luxury cars and 3 of the 5 lowest are from Kia and Hyundai.
Key Finding #4: Low Lease Payments Trump Range

The Fiat 500e has the highest share of sales for the same base model at 65% in the month of March 2018 and 56% for Q1 2018.

Despite a very low all electric range of 81 miles, the 500e tops the charts because of very low-cost lease deals often of less than $200 a month.

Similarly, we saw huge sales of the Nissan LEAF in Georgia several years ago because of state incentives that made the LEAF “almost free” until the state incentives went away.

Fiat 500e: Can You Really Drive A Brand New Car For A Total Cost Of $120 A Month? Yes, You Can

Karl Brauer, CONTRIBUTOR
I am the Executive Publisher at Autotrader and Kelley Blue Book. FULL BIO
Opinions expressed by Forbes Contributors are their own.

SMARTPHONE OR FIAT 500E? DISCOUNTS MOUNT ON FIAT’S COMPACT EV

Tax credits and incentives galore mean double-digit lease payments
Key Finding #5: Prius Buyers Are “Primed” To Go Electric

The Toyota Prius Prime had the second highest EV share at 35.5% (March) and 29.1% (Q1) of the total Prius model sales.

More than one-third of Prius buyers are opting for the Prime, the plug-in hybrid version, which is not the surprising since the decision to go with a PHEV is not much of a leap for someone already considering a hybrid.

The price differential between the two versions of the Prius is the third lowest among the 24 vehicles at $3,535.

Many buyers likely assume they can make up much or all of the difference in monthly payments through lower fuel costs and the various available state, federal and utility incentives.

The price differential between the two versions of the Prius is the second lowest among the 24 vehicles at $3,535.
Key Finding #6: Luxury Buyers Are Not Deterred by EV Price Premiums

The relatively high share of sales for the Porsche Cayenne E-Hybrid, BMW 530e and BMW X5 xDrive40e is not surprising since upper income consumers tend to be earlier adopters of new technologies. Secondly their higher-income levels and desire to be seen as an early adopter affords them the ability to pay a price premium, in this case of a comparable PHEV model.

The Tesla brand and mystique has also done a great job of making this customer segment more aware of EVs and in turn we are likely seeing luxury brand dealers like BMW being more aggressive in pushing their EV models to reduce losing loyal customers to Tesla.
Key Finding #7: Desperately Seeking Electric SUVs

In the US, SUVs, crossovers (CUVs), minivans and pickup trucks now comprise nearly two-thirds of vehicle sales. Five of the top 9 EVs analyzed in this report were SUV/CUV versions of ICE vehicles, which speaks to the strong interest in electric SUVs, despite often significant price differentials.

The Mitsubishi Outlander PHEV has been a strong seller in Europe and just arrived in the US in December 2017 and quickly jumped into a top 15 ranking in EV sales.

The Kia Niro PHEV also arrived in the US recently in January 2018. Expect to see the share of sales for these and other models increase at a strong rate in the coming 12 months.

### US Vehicle Sales 2010-2017 Cars Versus Trucks*

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<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars</td>
<td>48%</td>
<td>47%</td>
<td>49%</td>
<td>48%</td>
<td>46%</td>
<td>42%</td>
<td>38%</td>
<td>35.5%</td>
</tr>
<tr>
<td>Trucks</td>
<td>52%</td>
<td>53%</td>
<td>51%</td>
<td>52%</td>
<td>54%</td>
<td>58%</td>
<td>62%</td>
<td>64.5%</td>
</tr>
</tbody>
</table>

Data Source: WardsAuto; Chart: EVAdoption.com

*Trucks = pickups, SUVs/Crossovers, minivans and commercial vans
Chart 1: EVs as a % of Total Shared Model Sales – March / Q1 2018

Data Sources: GoodCarBadCar.com, InsideEVs.com, Chart: EVAadoption.com
Chart 2: Price Difference in MSRP

Data Sources: GoodCarBadCar.com, InsideEVs.com, Chart: EVAdoption.com
Chart 3: Percent Difference in MSRP

Data Sources: GoodCarBadCar.com, InsideEVs.com, Chart: EVAdoption.com

EVAdoption.com – US Sales Trends of EVs Versus ICE Powertrains Across Shared Models
Chart 4: EV Version % of Sales to % Price Premium Over ICE Version

Data Sources: GoodCarBadCar.com, InsideEVs.com, Chart: EVAduction.com
Chart 5: EV Version % of Sales to $ Price Premium Over ICE Version

Data Sources: GoodCarBadCar.com, InsideEVs.com, Chart: EVAdoption.com
Exceptions: Fiat 500e

The Fiat 500e has the highest percent of sales of any of the vehicles analyzed at 65%, but its $13,605 price difference was also the second highest percentage price premium at 70%.

The explanation for this is simple - the lease cost of the 500e was extremely low.

In California several dealers have offered leases under $100 per month but most have been under $200. Despite the 500e’s limited range of 81 miles and high price differential, the low monthly lease payments make it an extremely affordable EV as a second car.

The Fiat 500e has the highest percent of sales of any of the vehicles analyzed at 65%, but its $13,605 price difference was also the second highest at 70%.
Exceptions: Porsche Cayenne E-Hybrid

A check of the Porsche website showed a $400 monthly difference in lease payments - $1,129 for the E-Hybrid versus $729 for the regular Cayenne. The MSRP price differential was also a substantial difference of $14,200.

In theory, the likely explanation for the Cayenne E-Hybrid’s strong sales is that California buyers in particular rationalize the price and lease payment difference by using the Federal EV tax credit, the California tax credit, and various utility rebates to reduce the price gap.

Because of Porsche buyers’ higher incomes, however, they may not qualify for many of these incentives and in fact almost no Porsche buyers used the California rebate (see chart above).

It may simply be a form of conspicuous conservation, in that many Porsche buyers want to convey their attempt at being green and are willing to pay handsomely for the honor.
Do the BMW 530e and X5 xDrive40e Portend the Future?

The BMW 530e and X5 xDrive40e were 2 of only 6 EVs with greater than a 10% share of sales. They were also 2 of the only 5 EV versions that had a price delta of less than $5,000 - the others being the Prius Prime, Kia Niro PHEV and Hyundai IONIQ PHEV.

The strong showing (13% share) of the X5 xDrive40e is probably largely driven by Americans’ appetite for SUVs and a reasonable price difference that can be made up with incentives and lower gas costs.

With only 14 miles of electric-only range, this sales success is especially impressive. If BMW can increase the X5 xDrive40e range to a more respectable 25-30+ miles and maintain a less than $5,000 price differential, we could probably see a 25% share of X5 sales in the future. This strong demand also portends well for the expected launch in 2020 of the all-electric iX3 with 200+ miles of range.

On the other hand, we would have expected the 530e to do even better than it did with its very strong sales percentage of 15.7% and roughly only $1,000 price differential. The likely reason the 530e does not do even better than nearly 16% is that it is a direct competitor with the Tesla Model S. A large percentage of buyers of electric mid-to-large luxury/performance sedans would have to consider and eventually may opt for the Model S over the 530e.

By contrast, the other 2 BMW EVs analyzed only had a share of sales of roughly 4%, but price deltas of $6,345 for the 330e and $7,050 for the 740e. The relatively poor sales percentage is likely due to the 330e competing with the Tesla Model 3 and the 740e with the Tesla Model S and their relatively low electric ranges of 22 and 14 miles respectively. BMW clearly has to step up its game with more competitive offerings for the 3 and 7 series model markets.
Takeaways for Automakers

Analyzing the EV model market share data validates the theory that when given a choice between ICE and EV, consumers are perhaps farther along the adoption curve than the general EV sales trends suggest. Range and price differential are still key challenges to mass adoption, but consumers with the financial means to pay a bit more for an EV version of an ICE model are increasingly making that purchase decision.

The key lessons from this analysis are not surprising - for the next 5-7 years automakers should focus on marketing electric SUVs/CUVs primarily to early-adopter demographics (multi-car households, homeowners, upper income, “green”).

Because there is still a fairly significant price premium on EVs versus similar ICE models, inadequate range on many models and limited charging infrastructure in some markets - it is too early to worry about trying to convince mass consumers to make the leap to an EV.

That time will come beginning likely around the 2024-2025 time frame when EVs should be cost competitive and have an average range of 300+ miles.

The second lesson is that automakers need to launch more standalone EVs. Models such as the Chevrolet Bolt and Volt, Nissan LEAF and BMW i3 continue to rank in the top 10 for EV sales in the US. These models benefit from being EV-only models where potential buyers cannot compare pricing for a similar model. They also have a distinct EV brand perception in the mind of buyers which is also important to those consumers who want to signal their greenness.
Background / Research Notes

**Models not included in the analysis:** The following models were not included in our analysis:

- smart fortwo: While there is still inventory of ICE versions, this model is now sold only as a BEV.
- Mercedes Benz S550e: While InsideEVs lists 24 sold in Q1, including 11 in March and 9 in April, the US Mercedes-Benz does not list a PHEV version of the S-class.
- Hyundai IONIQ BEV: The IONIQ is available in 3 versions - hybrid, PHEV and BEV. We decided to analyze the IONIQ PHEV sales as a percent of total sales, MINUS BEV sales. While not a perfect solution, this allowed us to keep the charts and analysis more straightforward and simpler to present – especially for the price differential.

**Price Calculations:** The difference in prices between EV and ICE/hybrid models in the analysis ignores various available federal, state and utility incentives that would close the price gap. We have not incorporated these incentives for a few reasons, including: 1) They vary based on where you live in the US.; 2) Many or most are either tax credits or rebates that are received AFTER vehicle purchase which means in both cases the actual purchase price of the EV is not reduced (The exception being when the EV lessor applies the Federal tax credit to the loan amount, reducing monthly lease payments).; 3) Many of these incentives have household income caps, which means many consumers may not qualify for them.; 4) Finally, whether a consumer qualifies for or calculates the amount of incentives they may receive, EVs have to stand on their own competitively in our opinion and it is important to understand the delta between model versions BEFORE applying any potential incentives.

Secondly, on the manufacturer’s suggested retail price (MSRP), we included ICE version pricing for similarly outfitted EV versions. For example, the Ford Fusion SE and Mitsubishi Outlander SEL were similarly equipped as the base Fusion Energi and Outlander PHEV respectively.
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