

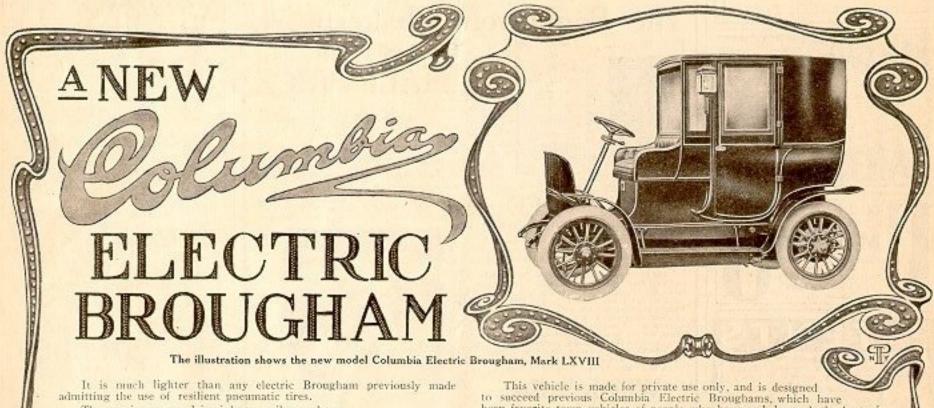
Electric Vehicle Intel Report











The maximum speed is eighteen miles an hour.

There are many important improvements,

Five speeds forward; three reverse, give flexibility of operation,

Its appointments are correct; its conveniences of travel, "de luxe" throughout.

been favorite town vehicles of people who have and demand the best of everything, in New York, London, Paris and other large cities.

To same chassis are supplied Landaulet, Victoria and Hausom bodies,

To secure early delivery orders should be placed now. No less distinctive and preferable among electric vehicles are the lighter Columbias-Surreys, Victoria-Phaetons and Runabouts.

All Columbia Electric Carriages are equipped with Exide Batteries, the only thoroughly efficient and practical vehicle batteries developed to date

Electric Carriage Catalogue on request; also separate catalogues of Columbia Electric Commercial Vehicles and Columbia Gasolene Cars

ELECTRIC VEHICLE COMPANY

HARTFORD CONN

New York Branch: 234-126-138 West 20th Street. Chicago Branch: 1323-1334 Michigan Avenno. Boston: Columbia Motor Vehicle Co., 74-25-78 Staubone Street,

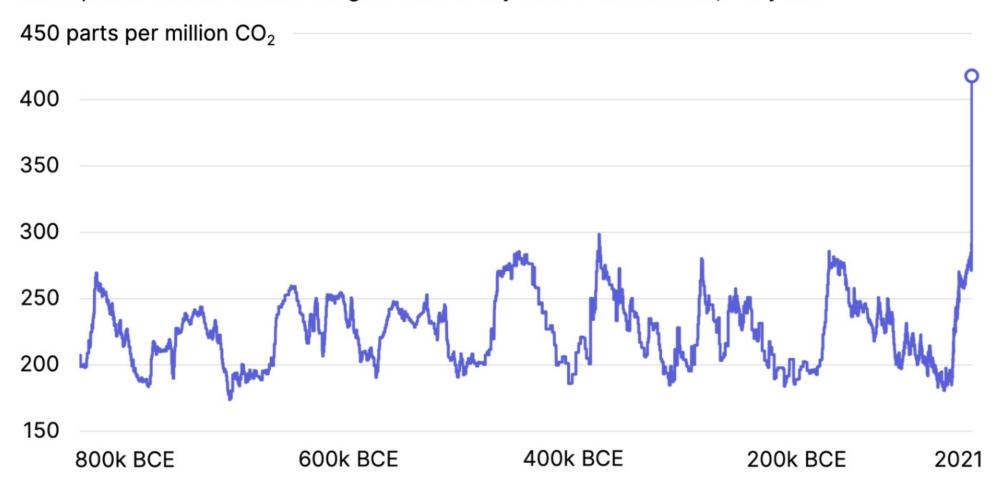
Philadelphia: Penusylvania E. Vehicle Co., 250 N. Broad St. Washington: Washington E. V. Transportation Co., Etch St. and Ohio Ava. Paris: A. Blanchi, [94 Boulevard Malosherbea.

Member Association of Licensed Automobile Manufacturers

Source: EPA

CO₂ levels are the highest in human history

Atmospheric carbon dioxide is higher than at any time in at least 800,000 years



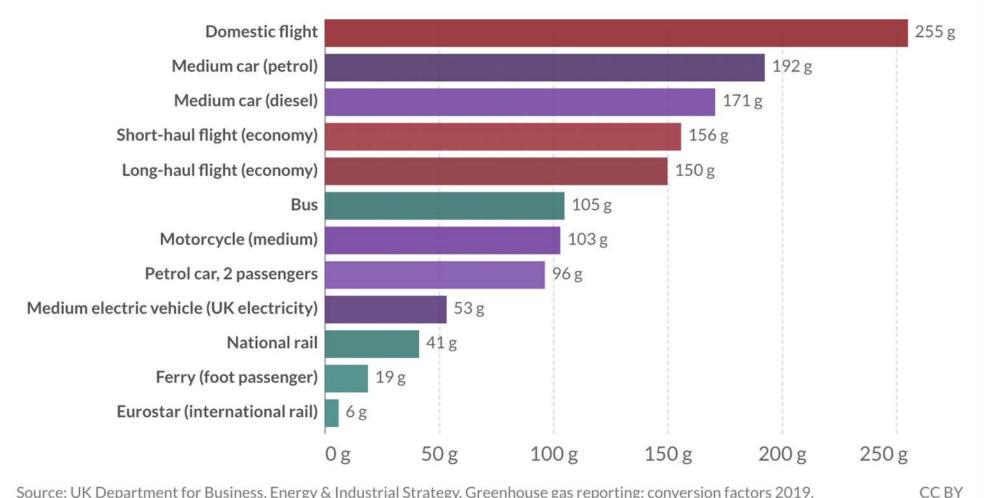


Carbon footprint of travel per kilometer, 2018



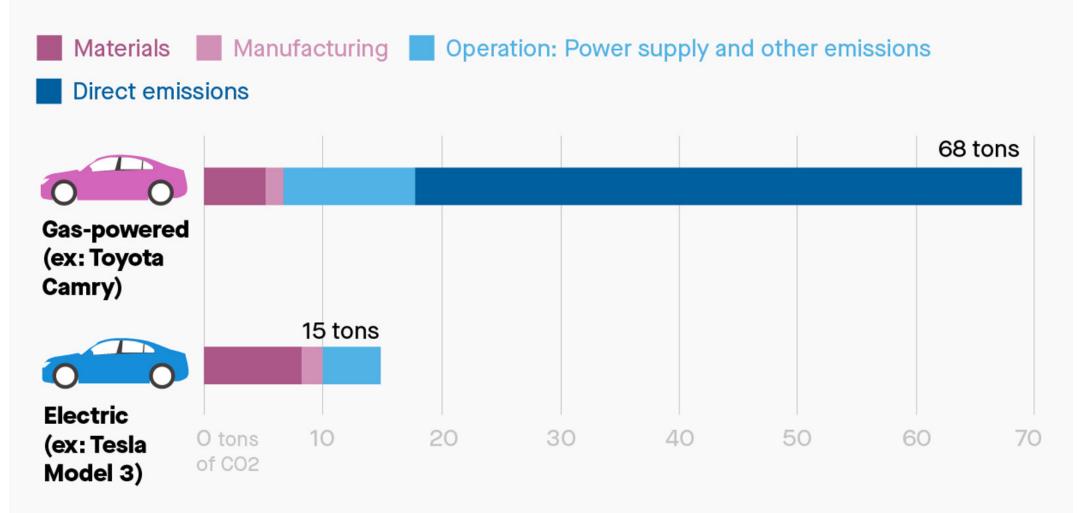
The carbon footprint of travel is measured in grams of carbon dioxide equivalents per passenger kilometer. This includes carbon dioxide, but also other greenhouse gases, and increased warming from aviation emissions at altitude.





Source: UK Department for Business, Energy & Industrial Strategy. Greenhouse gas reporting: conversion factors 2019. Note: Data is based on official conversion factors used in UK reporting. These factors may vary slightly depending on the country, and assumed occupancy of public transport such as buses and trains.

Life-cycle carbon emissions intensity of internal combustion engine vehicles vs. electric vehicles

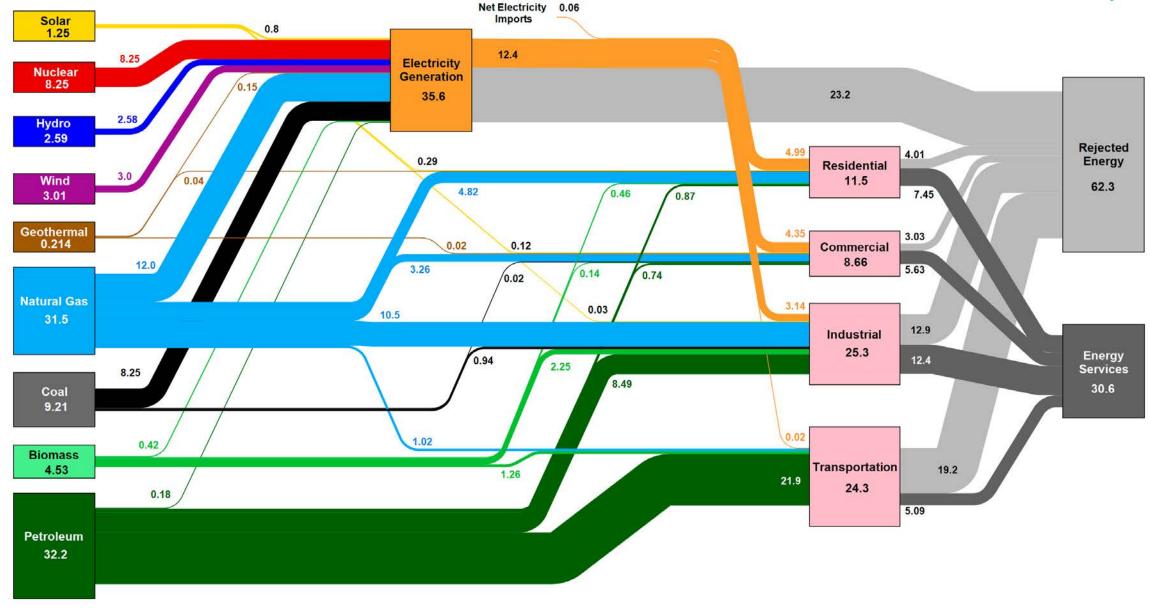


Quartz | qz.com | Data: International Energy Agency 2021, Hoekstra and Steinbuch et. al | Note: A direct emission is tailpipe exhaust from gas-powered cars. EVs do not have direct emissions but emit carbon through the production of electricity required to charge the battery.

42

Estimated U.S. Energy Consumption in 2020: 92.9 Quads





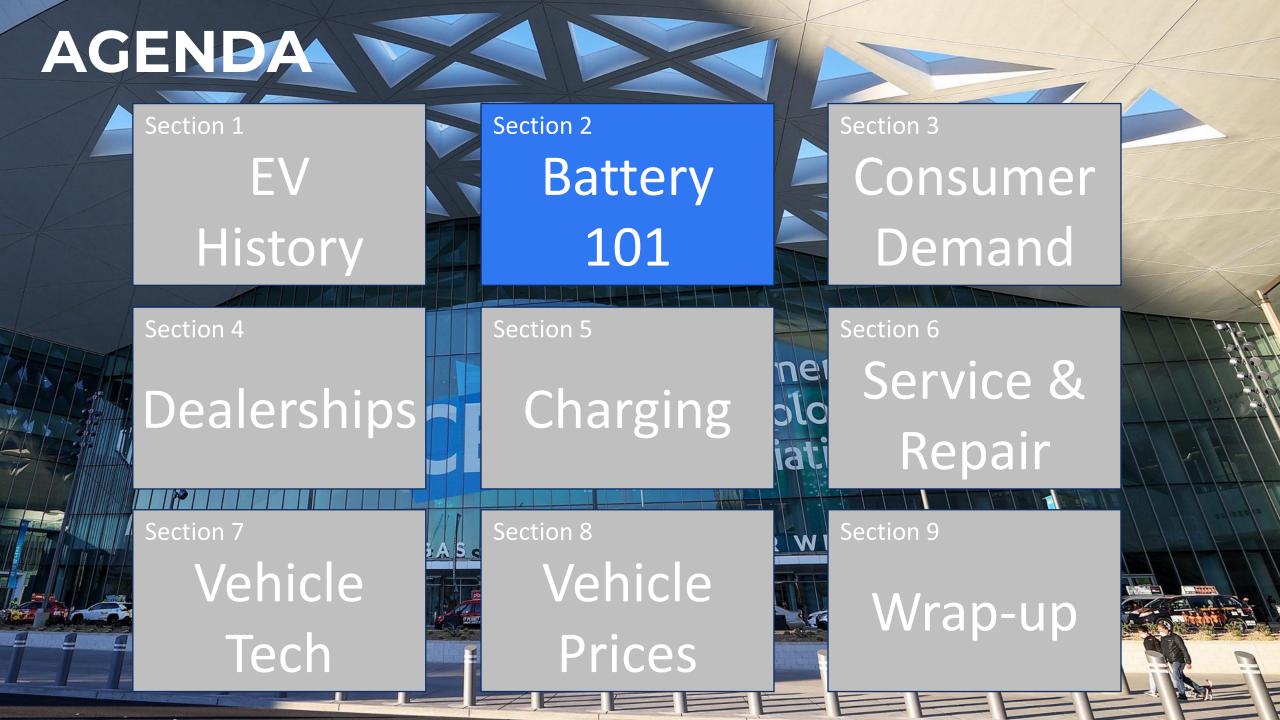
Source: LLNL March, 2021. Data is based on DOE/EIA MER (2020). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, which was updated in 2017 to reflect DOE's analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

EVs Are Essential Grid-Scale Storage > Before long, there will be more EV battery capacity than the grid can use

BY CHARLES Q. CHOI | 20 JAN 2023 | 2 MIN READ | 🗔

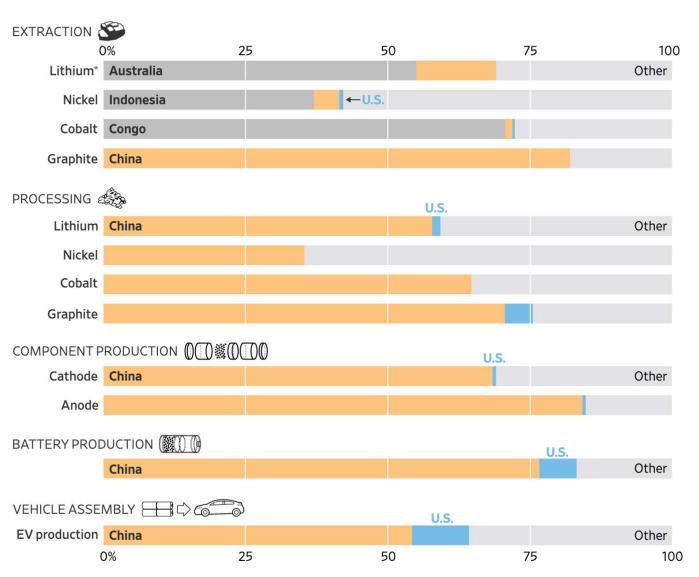






THE WALL STREET JOURNAL.

EV battery-supply chain, production, by source country



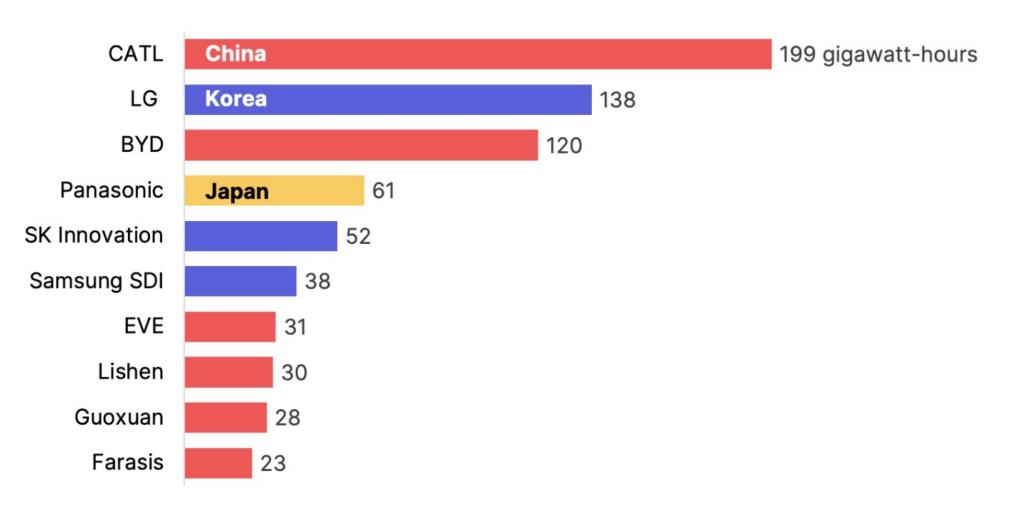
^{*}The U.S. mines a relatively small amount of lithium and its production isn't visible on this chart.

Source: International Energy Agency analysis of data from EV Volumes, U.S. Geological Survey, Benchmark Mineral Intelligence and BloombergNEF

Source: Volta Foundation

Batteries are Asian

No European or US lithium-ion battery maker cracked the top 10 in capacity in 2022





January 2023 47

The Cost of an EV's Battery

The actual cost of an EV battery can vary depending on composition and metals used.

2025 CADILLAC Escalade IQ



\$22,540 Battery Cost

Cells from
Cells from
Cells from



Total Cost of Vehicle \$130,000*

Battery Type: Nickel Cobalt Manganese Aluminum (NCMA) **Battery Capacity:**

200 kWh

2023 T ≡ 5 L ⊓ Model S Most EV batteries last up to 200,000 miles and replacements can cost anywhere from \$5,000 to \$20,000.



\$12,030 Cells from Panasonic

13.6%

Total Cost of Vehicle \$88,490

Battery Type: Nickel Cobalt Aluminum (NCA) **Battery Capacity:**

100 kWh

2025 **RAM** 1500 REV Limited



\$25,853 Cells from @LG Energy Solution

31.92%

Total Cost of Vehicle \$81,000*

Battery Type: Nickel Cobalt Manganese (NCM) Battery Capacity: **229** kWh

2022 �� RIVIAN Amazon Delivery Van



\$13,298 Cells from Gotion

25.2%

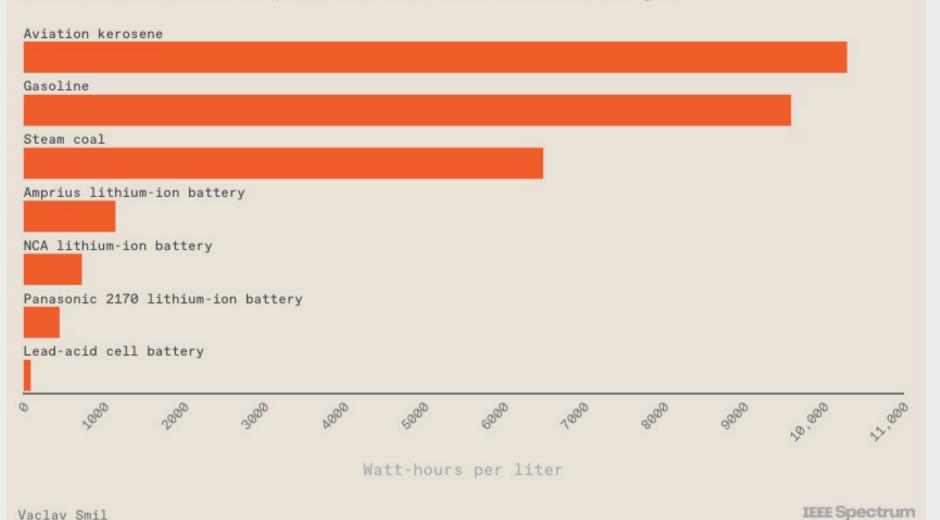
Total Cost of Vehicle \$52,690

Battery Type: Lithium Iron Phosphate (LFP) **Battery Capacity:**

135 kWh

Batteries' Energy Density as Compared to Other Energy Sources

Over the past 50 years, the highest energy density of mass-produced batteries has roughly quintupled, far short of the power necessary for intercontinental flight.



FINANCIAL TIMES

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Batteries



Toyota nears mass production of solid-state batteries

World's biggest carmaker says stacking speed needed for full manufacturing is 'almost there'



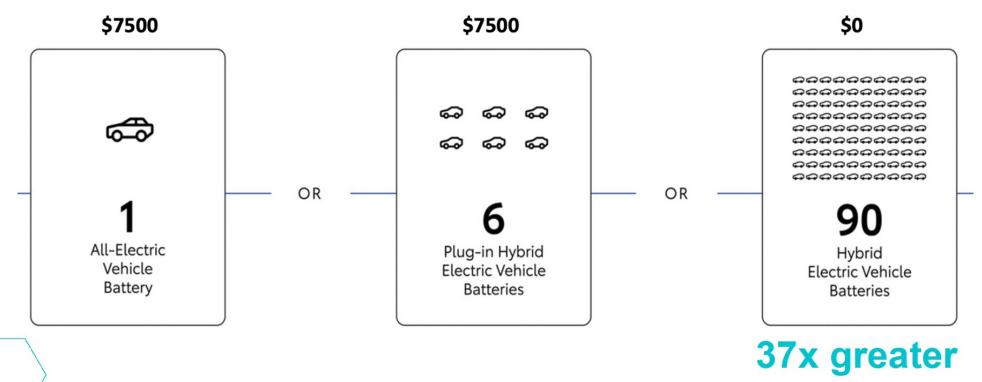
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Toyota's bZ4X electric car on display in Los Angeles last month. The company aims to more than double the range and reduce the charging times of its batteries with solid-state technology © George Rose/Getty Images

Maximizing the Use of Limited Resources





impact on the environment



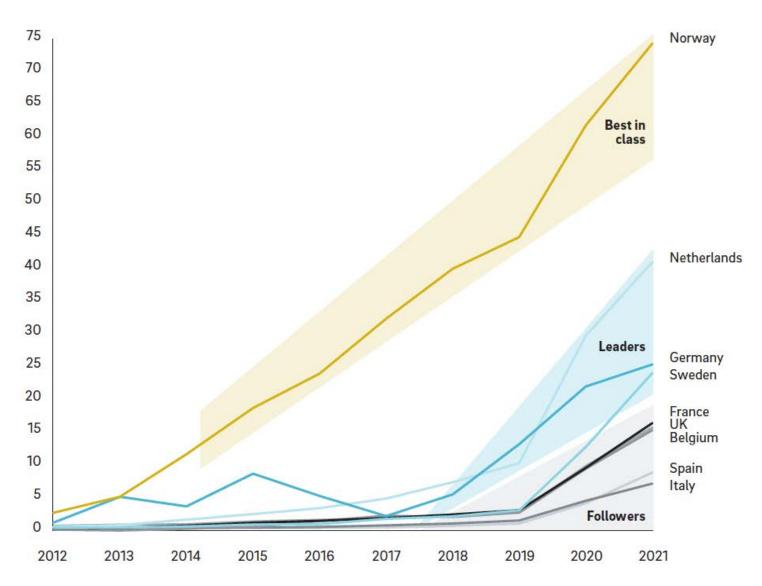
Electric car sales, 2010-2023



IEA, CC BY 4.0.

Note: 2023 sales ("2023E") are estimated based on market trends through the first quarter of 2023. Source: IEA analysis based on EV Volumes.

EV SALES vs. TOTAL CAR SALES (%)

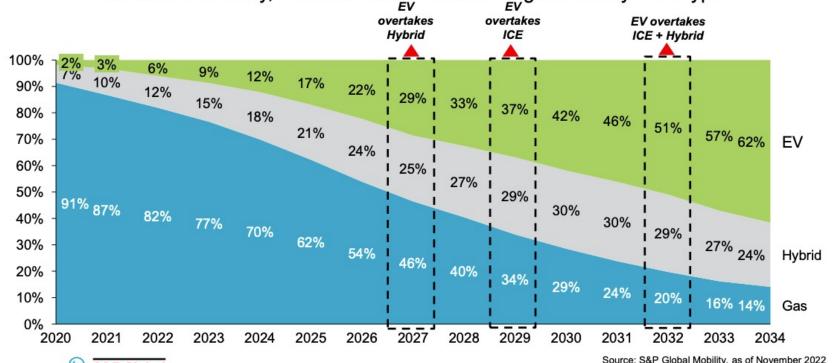


Source: EV-Volumes, IHS

Source: Roland Berger

The growth of new EV offerings will help EV share of new vehicles to overtake ICE in less than 10 years

S&P Global Mobility, Forecast of New Vehicle Registration by Fuel Type



S&P Global TransUnion. Mobility

Source: S&P Global Mobility, as of November 2022

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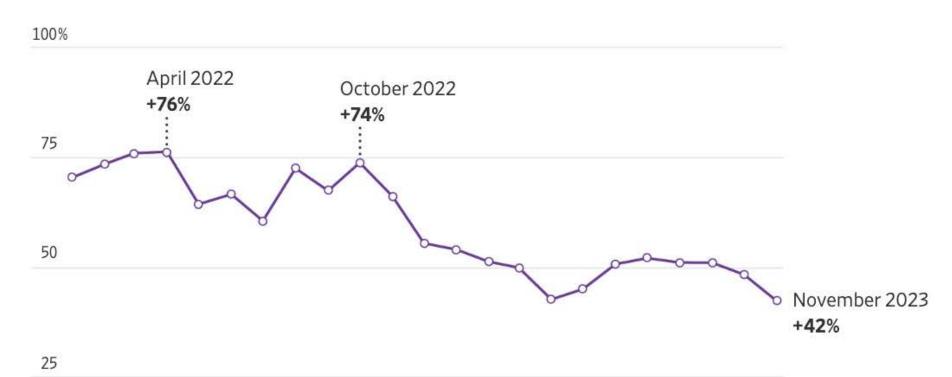
THE WALL STREET JOURNAL.

BUSINESS AUTOS

How Electric Vehicles Are Losing Momentum with U.S. Buyers, in Charts

EV sales grew nearly 50% this year but have plateaued in recent months

U.S. electric-vehicle sales, change from a year earlier



Are Americans Falling Out of Love With EVs?

Manufacturers need to cut costs as electric-vehicle inventories pile up, but this is easier said than done

By Stephen Wilmot Follow

Nov. 17, 2023 5:43 am ET











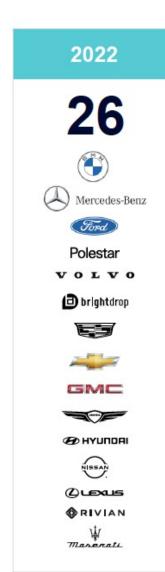




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Wave of new EVs is on the way









130

NEW VEHICLES COMING IN 3 YEARS



THE WALL STREET JOURNAL.

Steve Greenfield ▼

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The EV Question for Auto Executives: How Fast to Make the Shift?

Some companies are racing to convert entirely to electric vehicles, but others see caution flags







• • • < > Q





Exclusive: Automakers to double spending on EVs, batteries to \$1.2 trillion by 2030

By Paul Lienert



Ford Is Doing Very Well So Long As You Ignore The \$4.5B They Could Lose On EVs

Also, GM has feelings about ever-tightening fuel economy standards and European carmakers know China's got them beat on EV pricing, in today's Morning Shift.



How EV brands rank

Here are the number of EV registrations in the U.S., listed by brand for the period of January to October 2023.

Tesla	EV registrations 537,622	Market share
		56.3%
Chevrolet	55,952	5.9%
Ford	55,155	5.8%
Hyundai	45,621	4.8%
Rivian	35,751	3.7%
BMW	34,806	3.6%
Mercedes	31,843	3.3%
Volkswagen	30,939	3.2%
Kia	26,032	2.7%
Audi	20,091	2.1%
Nissan	16,984	1.8%
Volvo	12,149	1.3%

OPINION

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State-by-state EV adoption rates show divide

There is a glaring division between EV-friendly and EV-lagging states.

VIDEO

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September 05, 2023 08:00 AM | 4 HOURS AGO

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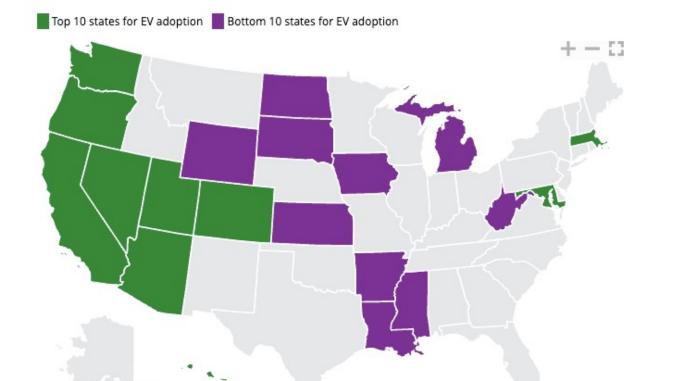
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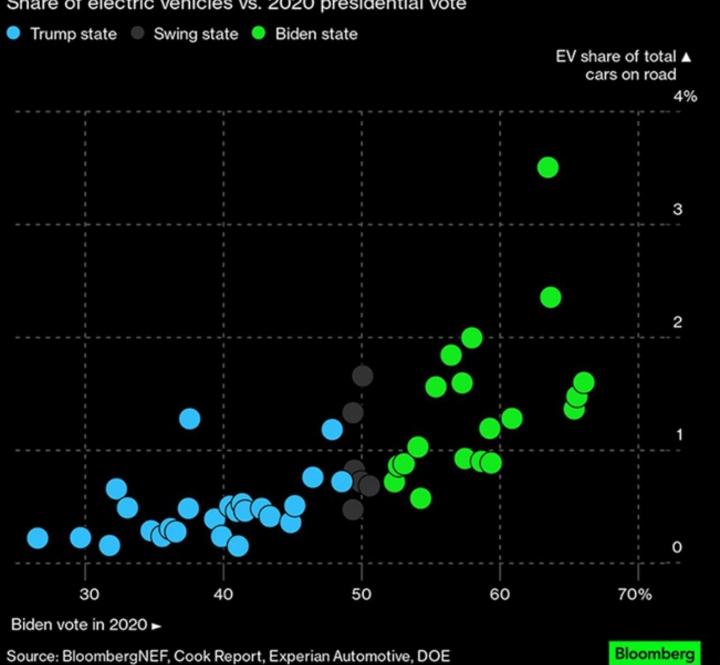
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Top, bottom states for EV adoption



EV Ownership Is Split by Politics in US

Share of electric vehicles vs. 2020 presidential vote





OPINION

DECEMBER 13, 2023 | 3 MIN READ

Electric Vehicle Owners Are Not Driving Enough— And That's Bad

Used car buyers and the U.S. government need to dive into the marketplace to deliver the emissions reductions promised by electric vehicles

BY JOHN PAUL HELVESTON





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Nearly 50% of EV owners chose ICE vehicle for subsequent purchase, S&P Global Mobility study shows

By Michelle Thompson on October 19, 2023 Market Trends

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Nearly half of households with non-Tesla electric vehicles (EVs) made an internal combustion engine (ICE) vehicle their next auto purchase, according to a new analysis.

It doesn't necessarily mean they sold their EV, as it could also indicate they purchased an additional family vehicle that is gasoline powered.



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OPINION | REVIEW & OUTLOOK [Follow]

Car Dealers to Biden: EVs Aren't Selling

Some 3,900 sellers ask for a reprieve from his onerous sales mandate.

By The Editorial Board

Nov. 28, 2023 6:42 pm ET











Gift unlocked article



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Nio starts recruiting dealer partners for its main brand and sub-brand



Nio has started recruiting dealership partners for the Nio brand and a sub-brand, in what appears to be a move aimed at reducing expenses while expanding sales network.





Fisker leans on dealerships to boost EV sales

Reuters

January 4, 2024 8:18 AM EST · Updated 4 days ago







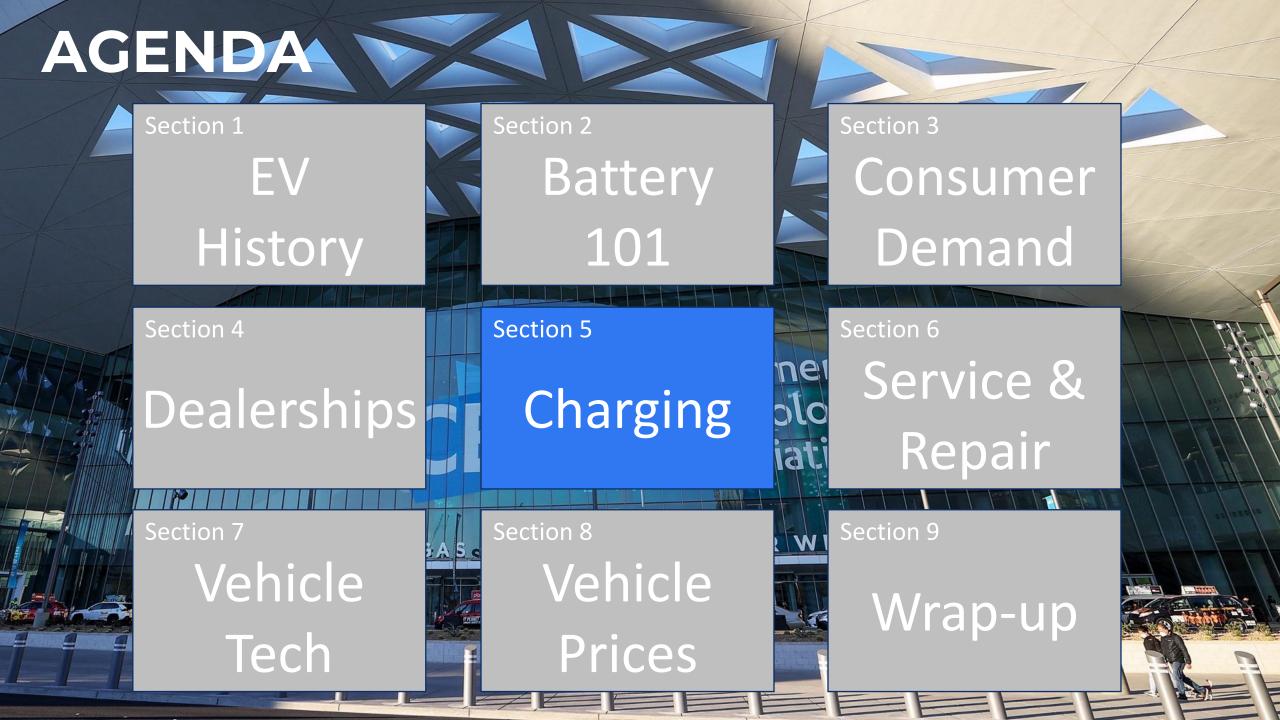


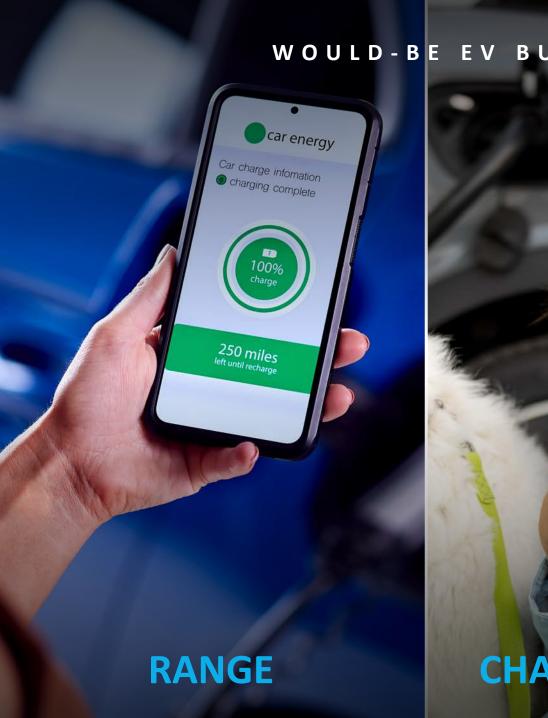
Electric car company Fisker shows off its Alaska pickup truck in Huntington Beach, California, August 3, 2023. REUTERS/Mike Blake/File Photo Acquire Licensing Rights [7]

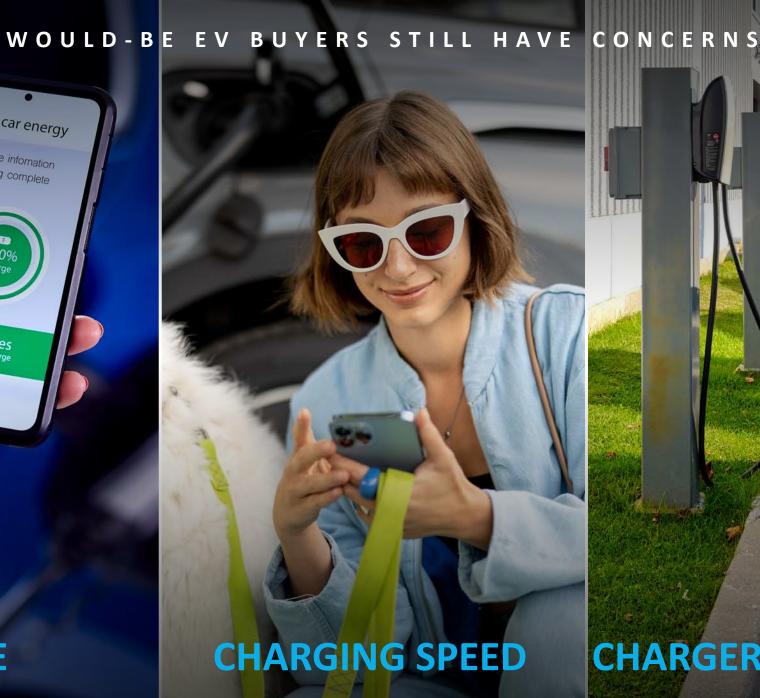
VinFast To Work With Dealerships To Sell Its EVs

Vietnam-based automaker VinFast is currently a direct-to-consumer brand. However, the team is now considering working with dealers.





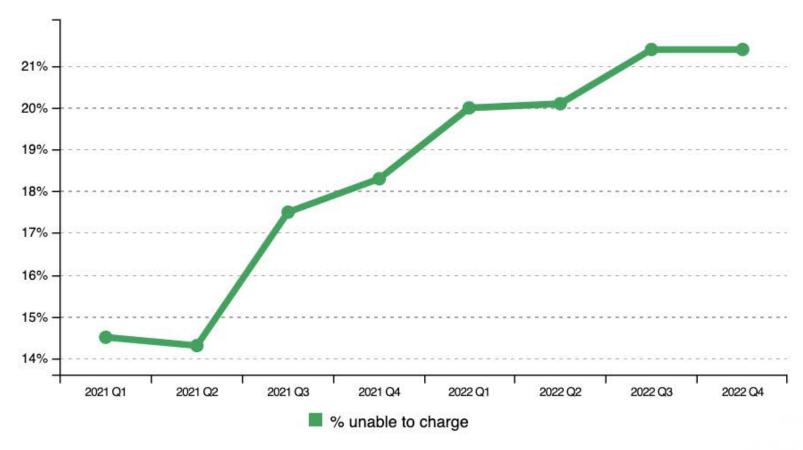






EV drivers unable to charge at public chargers

Hover over or touch chart for a detailed view.







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Volkswagen, Porsche, Audi to adopt Tesla's charging standard

Sean O'Kane @sokane1 / 4:35 PM EST • December 19, 2023



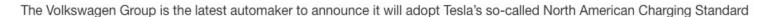


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Autoline Daily 2024: Top Industry News for Jan. 4 ⊙

JAN 04, 2024

WardsAuto Marks 100th Year

JAN 04, 2024



Autoline Daily 2024: Top Industry News for Jan. 3 ®

JAN 03, 2024

Third-Party Digital Providers Call for Connected Car Standardization

JAN 03, 2024

BYD Leads Global EV Makers in Q4 Without U.S. Market...Yet

JAN 03, 2024

FEATURED



Lab synthesizing of compounds aided by Al algorithms.

StoreDot says Al-boosted process allows extreme fast charging without stressing battery packs.

Paul Myles | Oct 31, 2023



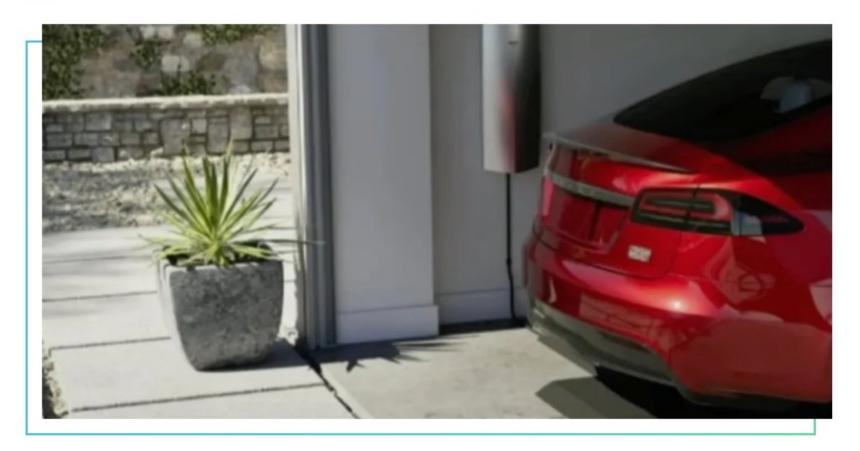
An Israeli fast-charging specialist claims to have made a breakthrough allowing battery electric vehicles to be charged in 10 minutes without stressing the battery pack and shortening service life.



Tesla confirms wireless inductive electric car home charger is coming



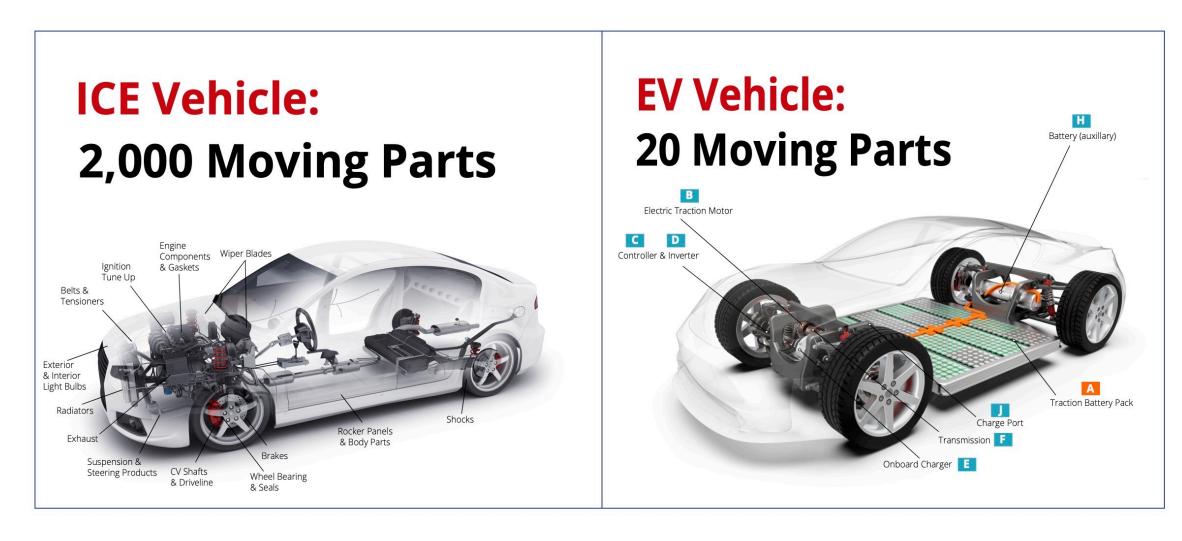
Fred Lambert | Dec 18 2023 - 12:54 pm PT | 🗐 244 Comments



Tesla has confirmed it is working on a wireless inductive home charger for its electric cars after teasing it earlier this year.



REDUCED NUMBER OF COMPONENTS IN EVS



= Fewer parts; less frequent service





Maintenance Schedule for your 2017 Chevrolet Bolt EV

Certified Service	7,500 miles	15,000 miles	22,500 miles	30,000 miles	37,500 miles	45,000 miles	52,500 miles	60,000 miles	67,500 miles	75,000 miles	82.500 miles	90,000 miles	97,500 miles	105,000 miles	112,500 miles	120,000 miles	127,500 miles	135,000 miles	142,500 miles	150,000 miles
Rotate tires, if recommended for the vehicle, and perform Required Services.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Replace passenger compartment air filter (or 2 years, whichever comes first).			1			1			1			1			1			1		
Drain and fill vehicle coolant circuits.																				1

Maintenance Schedule for your 2016 Chevrolet Cruze Limited

Certified Service	7,500 miles	15,000 miles	22,500 miles	30,000 miles	37,500 miles	45,000 miles	\$2,500 miles	80,000 miles	67,500 miles	75,000 miles	12.500 miles	20,000 miles	97,500 miles	105,000 miles	112,500 miles	120,000 miles	127,500 miles	135,000 miles.	142,500 miles	150,000 miles
Rotate fires, if recommended for the vehicle, and perform Required Services. Check engine oil level and oil life percentage. Change engine oil and filter, if needed.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	~	1	1	1	1	1
Replace passenger compartment air filter (or 2 years, whichever comes first).			1			1			1			1			1			1		
Reptace engine air cleaner filter (or every 4 years, whichever occurs first).						1						1						1		
Replace spark plugs and inspect spark plug wires.													1							
Replace spark plugs. Inspect ignition coils boots. (Applies to: 1.4 L.)					П			1								1				
BL Engine Only: Rptace timing belt, idler gulley, and timing belt tensioner (or every 3 years, whichever comes first). (Applies to: 1.8 L)													1							
Change automatic transmission fluid, if equipped if filter is serviceable, change filter. (Applies to: Severe)						1						1						1		
Change manual transmission fluid. (Applies to: Manual, Severe)						1						1						1		
Drain and fill engine cooling system (or every 5 years, whichever comes first).																				1
Change brake fluid (or every 3 years, whichever occurs first).						1						1						1		
Change clutch fluid (or every 3 years, whichever occurs first). (Applies to: Manual)		П				1						1						1		
Inspect evaporative control system.						1						1						1		
inspect engine accessory drive belts for fraying, excessive cracks or obvious damage (or every 10 years, whichever occurs first).																				1

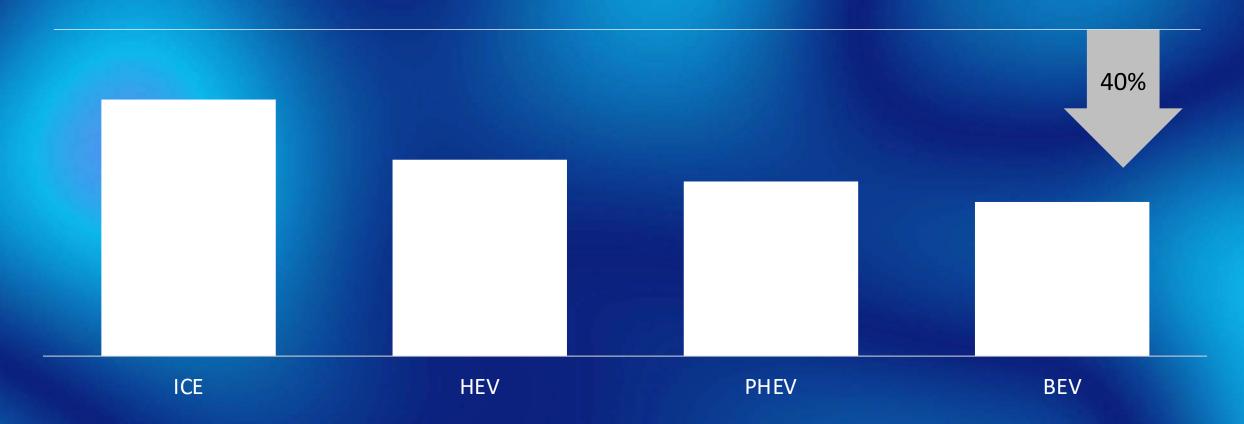
"The rule of thumb is that an electric vehicle is going to require about one-third the service needs of an internal combustion engine vehicle."

José Muñoz Hyundai Motor America CEO



EV OWNERS WON'T SPEND AS MUCH ON PARTS

Car Owner's Aftermarket Spend on Parts: 2030



Note: includes routine replacement parts such as batteries, accessories, and collision costs

Source: McKinsey & Company

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EVs are far less reliable than ICE as automakers launch new, hightech models, Consumer Reports says

EVs had 79% more problems than gasoline vehicles, according to Consumer Reports' 2023 auto reliability survey. Hybrids scored best, with 26% fewer problems than gasoline-powered vehicles.

November 29, 2023 10:00 AM

HANNAH LUTZ 💆 🔊 🖂

☑ EMAIL



EV repair claims rise as costs remain higher than ICE vehicles

Mitchell International projects that the gap will eventually narrow, but is unlikely to close completely.

By **Steve Hallo** November 08, 2023 at 09:48 AM











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Scratched EV battery? Your insurer may have to junk the whole car

For many EVs, even slightly damaged battery packs cannot be repaired, leading to higher premiums and undercutting gains from going electric.

March 20, 2023 06:37 AM | UPDATED 5 HOURS AGO

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Reuters



MORI

Majority of Americans say car insurance is becoming unaffordable

More than 20% of U.S. drivers bought less coverage than they desired as a way to save money in 2023.

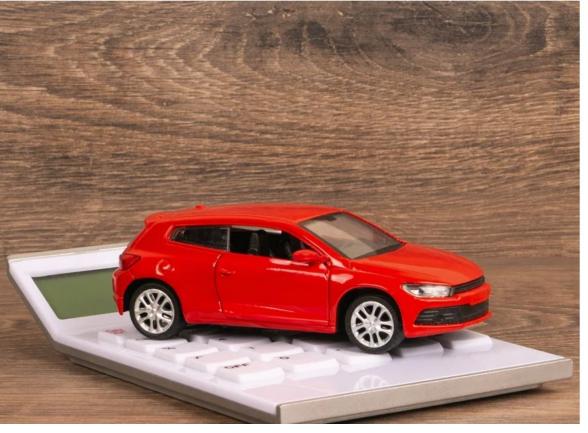
By Steve Hallo | January 04, 2024 at 12:19 AM











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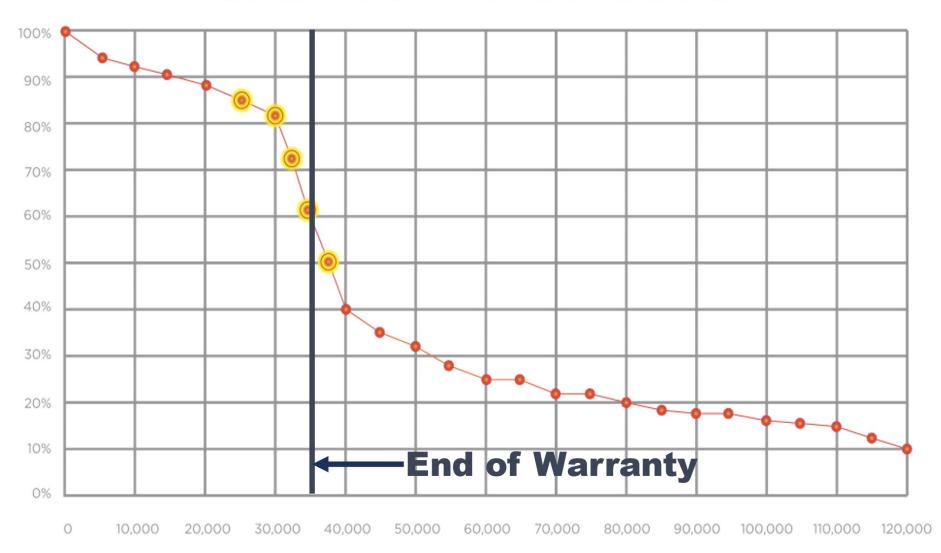


High-Tech Cars Are Killing the Auto Repair Shop

New vehicles are rigged out with sensors and computer chips—and they're costlier for shop owners to fix. Get ready to wait longer for repairs.

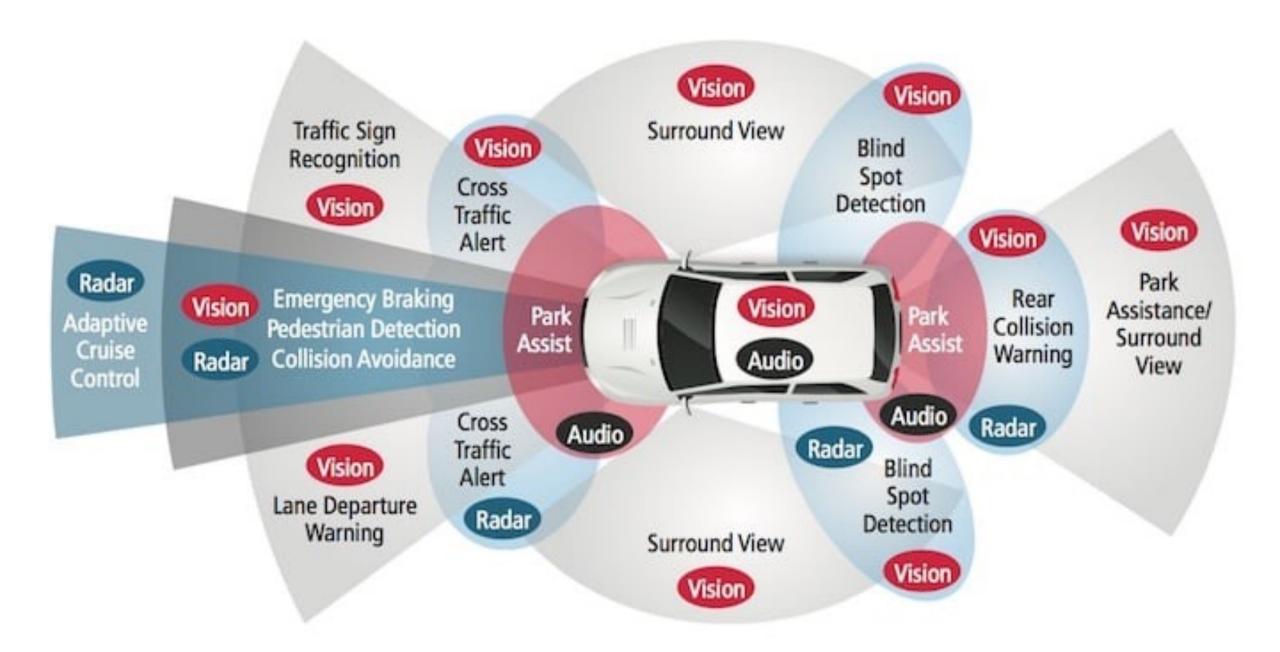


SERVICE DEFECTION



Source: WarrCloud





Tesla is like an 'iPhone on wheels.' And consumers are locked into its ecosystem.

Tesla is bringing the strategies pioneered by Apple to the auto industry. Consumers are learning that's not always a good thing.













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Mercedes Makes Better Performance a \$1,200 Subscription in Its EVs

The \$1,200 yearly fee increases horsepower and torque, while dropping 0-60 times, for all Mercedes EQ electric models.

BY NICO DEMATTIA | PUBLISHED NOV 20, 2022 2:06 PM

NEWS









Tesla's new Models S and X have the same battery pack but with software-locked capacity



Fred Lambert | Aug 15 2023 - 5:50 am PT | 📮 222 Comments



Tesla has confirmed that its new "Standard Range" Model S and Model X have the same battery pack as the Long Range version, but with its capacity being software-locked.



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How Stellantis plans to make \$22.5B a year from software in its cars, trucks and SUVs

Kirsten Korosec @kirstenkorosec / 12:06 PM EST • December 7, 2021





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Wrap-up



Tesla's Many Model S and X Price Tweaks

A recap of changes to the company's highend cars

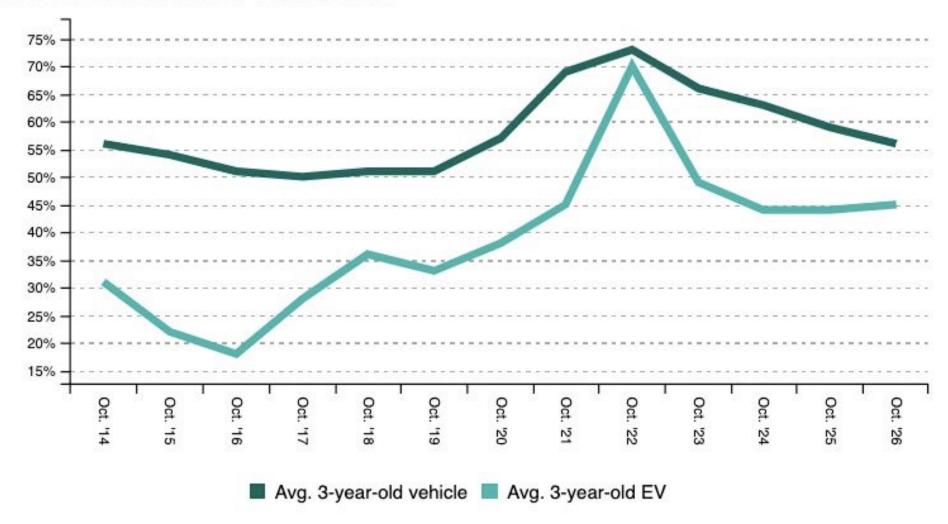
	Model S	Model X
Start of the year	\$104,990	\$120,990
Jan. 12	\$94,990	\$109,990
March 5	\$89,990	\$99,990
April 6	\$84,990	\$94,990
April 20	\$87,490	\$97,490
May 11	\$88,490	\$98,490
Aug. 14	\$78,490	\$88,490
Sept. 1	\$74,990	\$79,990

Source: Tesla's website

Used EV value retention

3-year-old electric vehicles aren't holding their value as well as the average 3-year-old model. Here is Black Book's historical retention data and predictions for the next 3 years.

Hover over or touch chart for a detailed view.



EV Makers Turn to Discounts to Combat Waning Demand

Car companies and dealers are slashing thousands off purchase prices to attract wary shoppers

By Sean McLain Follow

November 7, 2023















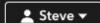


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There's Never Been a Better Time to Buy an Electric Car

As US production volumes catch up with demand, a glut of electric vehicle inventory is leading to decent discounts. But lower prices won't last long.



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HERTZ INCREASED ITS FLEET OF ELECTRIC RENTAL CARS — THEN, ITS PROFITS EXPLODED



Hertz discovered that electric vehicles are between 50-60% cheaper to maintain than

By Brendan O'Leary / January 4, 2023

gasoline-powered cars.





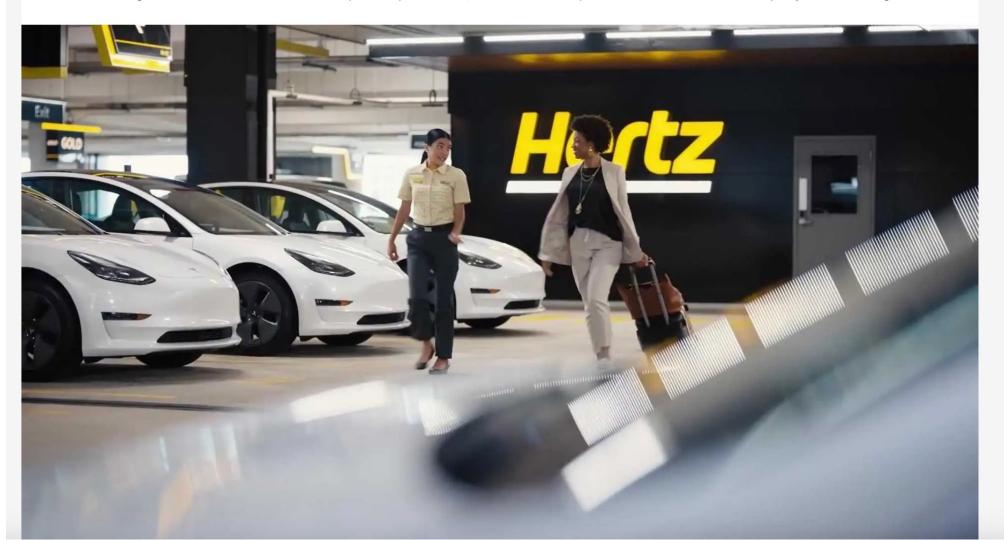
Hertz says Tesla fleet of rental EVs are 50 pct cheaper to maintain than fossil fuel cars

AUGUST 5, 2022 · 15 COMMENTS · 2 MINUTE READ · RIZ AKHTAR



Hertz Slows Down EV Plans As Tesla Price Cuts, Repair Costs Affect Profits

"Our in-fleeting of EVs will be slower than our prior expectations," Hertz CEO Stephen Scherr said on the company's Q3 earnings call.





Europe Effectively Bans Sales of New Gas- and Diesel-Powered Cars by 2035

The 27 member countries of the European Union joined a growing list of states and regions banning new sales of internal combustion cars.

BY AARON COLE | PUBLISHED OCT 28, 2022 8:53 AM

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Canada to Announce 2035 All-EV Sales Mandate, Reports Say



An electric vehicle charges at a station in North Vancouver, British Columbia, Canada. Photographer: Taehoon Kim/Bloomberg











By Christine Dobby

December 17, 2023 at 11:37 AM EST





RESOURCE CENTER

New Jersey joins 10 states in banning sales of new gasoline vehicles by 2035

New Jersey joins at least 10 other states that have adopted the California regulation, including Virginia, New York, Maryland and Colorado.

November 22, 2023 04:41 PM





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BUSINESS AUTOS

Electric Cars Were Already Having Issues. Then Things Got Political.

The 2024 race for the White House reignites debate over EVs

By Tim Higgins Follow

Oct. 21, 2023 5:30 am ET





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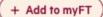




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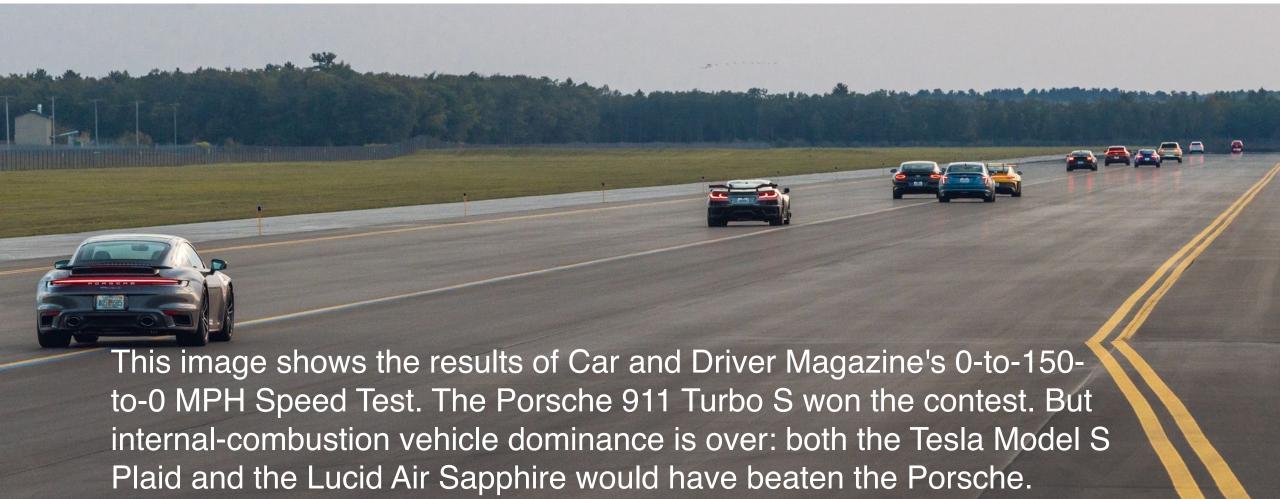
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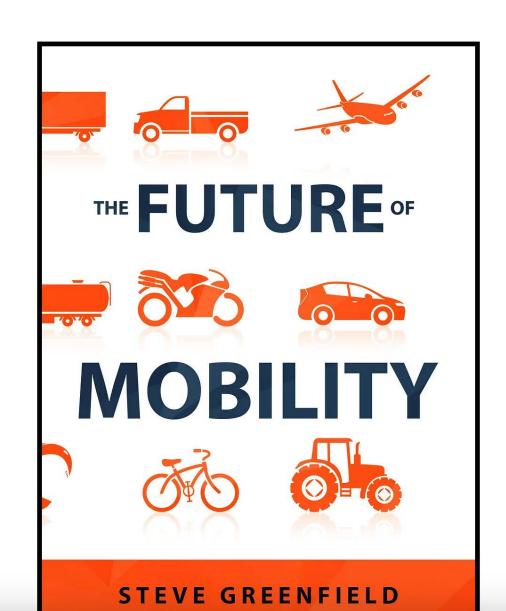
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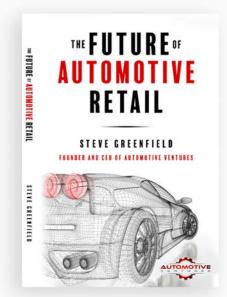




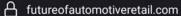
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