EVs Mid-Spring, 2023

By John Benson

May 2023

1. Introduction

My last post for this series was in late April. This is summarized and linked below:

EVs Early Spring, 2023: *This post will cover the following subjects:*

Supply Chain:

- *Tesla borrows a strategy from Ford*

New emerging business model for EV charging networks:

- *Groceries and a Quick-Charge*
- *7-Eleven*

Green Truckin' – Mr. Farley: what is required to make a really green truck?

EV Hosting Futures:

- *PNNL report: the impact of EVs on the grid in the future*
- *Tesla V4 Supercharger – More Power & CCS*

Upcoming EVs:

- *VW's Scout and ID Buzz*

EV's in Alaska?

Highest Performance EV Batteries

Tesla's Q1 Results

https://energycentral.com/c/ec/evs-early-spring-2023

This post will cover the following subjects:

Technology:

- Toyota hydrogen fuel cell conversion for Semi-Trucks approved in California
- High-Silicon Anode Batteries Solve Many Problems
- Another Major Battery Material Advance
- A Modest Proposal from the Author

Business

- Calculating the Fastest Road to an Electric Car Future
- Are EVs Already a Better Deal for Buyers?
- Tesla
    - Musk Bets the House of Tesla on Low Prices and Thin Margins
    - Teslas "Volume" EV
    - Distant Future Plans

    - Parts of Parts of Cybertrucks
- Ford
- Chevy
- Toyota

2. Technology

I've decided to emulate some of my other periodical papers with these "EV…" papers. These are all reports on rapidly evolving technologies and ditto new businesses, like photovoltaic (PV) generation and battery energy storage systems (BESS). EVs certainly are "rapidly evolving," so I will start each issue of "EVs…" with the above subject for section 2, and "Business" for section 3. Thereafter, I will follow with other sections that either don't neatly fit into these categories, or that are very important on their own.

2.1. Toyota hydrogen conversion approved in California

Toyota is often pilloried by the press for investing R&D into hydrogen instead of going all-in on battery electrics. However, their efforts may be paying off. Toyota's Zero Emissions Powertrain, or ZEP, has just been given the go-ahead for commercialization by the state of California. The kit seeks to swap out diesel engines on heavy-duty Class 8 vehicles like semi-trucks and buses for hydrogen fuel cells.[1]

Even the most hardcore evangelists for battery electrics admit that hydrogen fuel cells might make more sense for long-haul trucking. Not only do they allow trucks to refuel faster to maximize all-important uptime, but their lighter weight allows for more payload. A hydrogen fuel cell truck can also out-drag races a conventional diesel.

Toyota's ZEP kit is a hydrogen fuel cell solution that produces electricity and water, not a hydrogen-combustion engine that Toyota has experimented with on some race cars. The kit includes hydrogen fuel storage tanks, fuel cell stacks, batteries, electric motors and transmission, and the latest generation is more efficient in terms of energy use and packaging than previous iterations.

Toyota began testing hydrogen fuel cell trucks at the Port of Long Beach near Los Angeles in 2017. At least some of that fuel was supposed to have been generated via cow poop. Those first- and second-generation trucks covered 14,000 miles of drayage duty at the second-busiest port in the U.S. First-gen trucks were capable of 200 miles per fill, while second-gen trucks had extended the range to 300 miles. Toyota also collaborated with Kenworth to build 10 prototype trucks using the Kenworth T680 as a base, hauling cargo from Long Beach to Los Angeles and San Bernardino.

According to Toyota, truck manufacturers using Toyota's ZEP may also be eligible for other incentives, such as the California Air Resource Board's (CARB) Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), the Clean Truck Fund (CTF) introduced last year by the Ports of Los Angeles and Long Beach, and certain federal incentives.

[1] Ben Hsu, Autoblog via Microsoft Start, "Toyota hydrogen semi conversion kit gets green light in California," April 26, 2023, https://www.msn.com/en-us/autos/news/toyota-hydrogen-semi-conversion-kit-gets-green-light-in-california/ar-AA1an9ia?ocid=msedgntp&cvid=0f33b0ca31104054877bf443f1ae8c6e&ei=30

Now that the ZEP is certified, production is scheduled to begin at Toyota's Kentucky manufacturing plant.

2.2. High-Silicon Anode Batteries Solve Many Problems

…Sila Nanotechnologies has developed a class of drop-in cathode replacement materials to double the energy stored in traditional lithium-ion batteries (LIBs), the most popular battery chemistry used in a wide range of applications, including electric vehicles. The Sila team replaced conventional nickel- and cobalt-based cathodes with a nanostructured composite made from abundant materials that greatly increases the battery's energy density. Sila Nanotechnologies paired their new cathode material with a proprietary silicon-based anode, enabling the battery to outperform current lithium-ion cells while using existing cell assembly infrastructures to reduce the cost and risk of technology adoption. [2]

Titan Silicon™ packs more energy density into a smaller package to deliver more range, faster charge, and design flexibility to the automotive industry... [3]

More miles from the same sized battery: Titan Silicon delivers a 20% increase in range today, which could be up to 100 extra miles for some EVs – giving drivers more freedom and fewer stops to recharge. Future releases will double those gains taking your cars even farther.

Faster charge times efficient: Titan Silicon can recharge a battery from 10% to 80% in just 20 minutes – even if your charge time is currently as long as 60 minutes. Future releases will drop that charge time below 10 minutes for a recharge that rivals a visit to the gas station.

Mercedes-Benz announced that, together with Sila Nanotechnologies, a battery materials company, they achieved a breakthrough with high silicon automotive batteries.[4]

The German manufacturer has been working with Sila for quite some time and even invested in the start-up in 2019, as part of the company's research and development of advanced batteries.

Now, as Sila's silicon anode chemistry matured, Mercedes-Benz officially announced intention to incorporate the technology for the first time in its electric cars.

The plan is to optionally equip the upcoming electric Mercedes-Benz G-Class (image on next page) *with next generation battery cells with silicon anodes, from mid-decade. As we understand, the word "optionally" means that the default solution will be a more conventional lithium-ion battery chemistry, while the Sila cells will maybe offer higher capacity/higher range.*

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[2] Advanced Research Projects Agency - Energy (arpa-e), "Drop-in Replacement Materials from Abundant Resources to Double Energy in EV Batteries," https://arpa-e.energy.gov/technologies/projects/drop-replacement-materials-abundant-resources-double-energy-ev-batteries

[3] Sila, https://www.silanano.com/our-solutions/automotive

[4] Mark Kane, InsideEVs, "Mercedes-Benz And Sila Announce Breakthrough In Silicon Anode Chemistry," May 18, 2022, https://insideevs.com/news/586438/mercedes-sila-breakthrough-silicon-anode-chemistry/

There are no details in the press release, besides the volumetric energy density, which in the case of Sila's silicon anode chemistry is above 800 Wh/l at the cell level. It's a very high result (20-40% more than typically possible, according to the press release) and allows to make the battery smaller (or to place more cells in the same enclosure).

Sila, a California-based EV battery materials startup, announced today that its range-boosting silicon-based anodes, "Titan Silicon," are now commercially available after beginning mass production. The upcoming Mercedes-Benz EQG G Wagon will be the first to feature the new battery material.[5]

In practice, silicon anodes offer the ability to store 10X more charge than graphite ... in the same amount of space, making them an ideal solution for EV batteries…

2.3. Another Major Battery Material Advance

I have frequently commented that when you see a major rapid technology advance come out of nowhere, just go back a few years and you will see the development of new materials that or new material-applications that led to this advance. We are "…back a few years…" right now.

Great news for prospective EV buyers: Scientists at Lawrence Berkeley National Laboratory have developed a new type of polymer coating that could completely change the way electric car batteries are made, making them cheaper and longer lasting[6]

The polymer coating is called HOS-PFM (HOS = hierarchically ordered structures; I was unable to find a definition without the acronym for "PFM polymer")*, and it works by conducting both electrons and lithium ions simultaneously. The specifics are pretty complex for those of us that aren't atomic scientists, but the upshot is that it works really well with electrodes made out of aluminum and silicon, two materials that are cheap and abundant but wear out more quickly than the more expensive graphite electrodes.*

[5] Sila Nano, Electrek, "Mercedes-Benz electric EQG G Wagon will be the first to use this range-boosting battery material," April 4, 2023, https://electrek.co/2023/04/04/mercedes-electric-g-wagon-will-feature-range-boosting-ev-battery/

[6] Jeremiah Budin, The Cool Down via Microsoft Start, "Scientists discover new 'battery coating' that could make electric cars much cheaper to buy," April 29. 2023, https://www.msn.com/en-us/money/technology/scientists-discover-new-battery-coating-that-could-make-electric-cars-much-cheaper-to-buy-it-opens-up-a-new-approach/ar-AA1atnD3

Silicon and aluminum are promising electrode materials for lithium-ion batteries because of their potentially high energy storage capacity and lightweight profiles. But these cheap and abundant materials quickly wear down after multiple charge/discharge cycles.[7]

During experiments at the Advanced Light Source and the Molecular Foundry[8]*, the researchers demonstrated that the HOS-PFM coating significantly prevents silicon- and aluminum-based electrodes from degrading during battery cycling while delivering high battery capacity over 300 cycles, a performance rate that's on par with today's state-of-the-art electrodes…*

The HOS-PFM coating could allow the use of electrodes containing as much as 80% silicon. Such high silicon content could increase the energy density of lithium-ion batteries by at least 30%, Liu said. And because silicon is cheaper than graphite, the standard material for electrodes today, cheaper batteries could significantly increase the availability of entry-level electric vehicles, he added.

The team next plans to work with companies to scale up HOS-PFM for mass manufacturing.

The research was supported by DOE Vehicle Technologies Office. Additional funding was provided by the Toyota Research Institute. The technology is available for licensing by contacting ipo@lbl.gov .

2.4. A Modest Proposal from the Author

As I was considering several articles from my recent EV Posts, a vision came together in my demented mind. Let's start with a recent type of firm that I have not reported on, those that convert classic cars to EVs. I found a site that has links to several of these:

12 Great Electric Car Conversion Companies Reviewed

https://www.hybridcenter.org/electric-car-conversion-companies/

Most of these firms seem to either cater to "do it yourself (DIY)" hobbyists, or provide turn-key conversions. Most of the latter seem to focus on specific models of classic cars and/or use specific conversion hardware (components from wrecked or otherwise seriously compromised Teslas seem to be popular sources). At least one of the firms linked in the above site has "retired."

The other reference for my madness is a recent paper I posted (you will see its relevance shortly):

Hydro-Honda Gets Help from Trains: *In the past Honda has been enamored with hydrogen fuel-cell cars. Although they still are to a degree, they seem to be shifting some of their affection to other products in their corporate network.*

I live in Livermore, CA. A few years ago, the City of Livermore (in Alameda County), the county to the east (San Joaquin) and other governmental agencies started a short commuter rail project (26 miles long) called Valley Link. This rail link will connect the Altamont Corridor Express to the Bay Area Rapid Transit System.

[7] Theresa Duque, News from Berkeley Lab, "Electric Vehicle Batteries Could Get Big Boost With New Polymer Coating," March 7, 2023, https://newscenter.lbl.gov/2023/03/07/ev-batteries-new-polymer-coating/

[8] The Advanced Light Source and Molecular Foundry are DOE Office of Science user facilities at Berkeley Lab.

A major part of Valley Link is a solar powered green-hydrogen production facility in Tracy (Just east of the Altamont Pass in San Joaquin County). This will fuel the Valley Link trains, local hydrogen-fueled busses, and other hydrogen fueling facilities, perhaps including those that fuel light vehicles.

California currently has only 63 operating light duty vehicle (LDV) hydrogen refueling stations, and 29 additionally planned LDV hydrogen refueling stations. None of these are in the Livermore or San Joaquin Valleys.

https://energycentral.com/c/ec/hydro-honda-gets-help-trains

My recent insanity requires hydrogen-fuel, and thus the relevance of the above post. Although California is leading other states in the deployment of hydrogen fueling stations for light vehicles, this is still a work in progress. However, given another five years or so there may be enough fueling stations in our state to make my idea work (initially only in California, but here we have much demand for unique vehicles).

I will call the new vehicle-type a "Clean Hybrid." I haven't seen this term used anywhere (at least not credibly) as all existing "hybrids" that I'm aware of have petro-fueled internal combustion (IC) engines, and these are definitely not clean.

This new vehicle-type will also start out with either a conventional front-engine / rear-wheel drive or all-wheel drive chassis. These chassis would either previously host conventional IC engines, or come straight from an existing chassis manufacturer. The latter might be a replacement chassis manufacturer (mainly for classic cars) or a new vehicle manufacturer that is partnering with a small specialty auto manufacturer.

Starting with the IC Vehicle described in the above paragraph, the following replacements will be made:

- Front engine will be replaced with either a hydrogen IC engine (see the reference below),[9] or a Fuel Cell plus one or more electric motors to drive the front wheels.
- The drive shaft to the rear wheels will be replaced with a small battery in the drive-shaft tunnel (maybe 20 or 30 kWh).
- The gas tank will be replaced with a composite pressurized hydrogen fuel tank (these are currently used in hydrogen fuel-cell cars, and I assume they can be purchased from the OEMs).
- The rear-end/differential will be replaced with two Air-Core Axel Flux Permanent Magnet Motors and supporting structures/linkages.[10]
- A charge-port will be added
- A traction controller will be added
- Other components that need to be added or modified (like a 12 V battery and charging method) to end up with a fully operational vehicle.

[9] Energy Central, "Participants in the Last Clean-Vehicle Segments Emerge." https://energycentral.com/c/ec/participants-last-clean-vehicle-segments-emerge

[10] Energy Central, "Get your motor runnin', Part 2," May 2023, https://energycentral.com/c/ec/get-your-motor-runnin-part-2

One thought for the resulting vehicle is that either the battery + electric motors (operating in an EV Mode) or the hydrogen-ICE / fuel-cell plus electric motors can be alternatively used. Given the possibility that an operational hydrogen refueling station may be hard to find for a while, commercial chargers should be more widely available to keep the vehicle moving towards a destination (albeit with the inconvenience of limited range).

There are many that say the above is a kludge – yes it is. However, it could be a way to allow small specialized light passenger vehicle manufacturers to offer clean vehicles early in the transition to 100% clean vehicles. Also, by tweaking this design a bit it could be more applicable for a given specialized application.

3. Business

3.1. Calculating the Fastest Road to an Electric Car Future

The excerpt below is equally about politics and business, and points out one challenging factor in moving to Electric Vehicles.

Government scientists have spent a year analyzing electric vehicles to help the E.P.A. design new tailpipe rules to trigger an electric car revolution.[11]

Coral Davenport spent a week in Michigan at a government lab in Ann Arbor, at the Ford manufacturing complex and the United Autoworkers Local 600, both in Dearborn.

Inside a government laboratory, behind a tall fence and armed guards, a team of engineers has been dissecting the newest all-electric vehicles with a singular goal: Rewrite tailpipe pollution rules to speed up the nation's transition to electric cars…

The Biden administration wants to use the E.P.A.'s authority to regulate pollution from tailpipes to set a standard so demanding, it would compel automakers to eventually produce only electric vehicles.

But to do that, experts at the E.P.A. laboratory have to first determine how much electric vehicle technology is likely to advance in the next decade, to help the agency set the strongest tailpipe emissions limits that are still achievable.

To that end, government experts in technology, chemistry, toxicology and law at the lab have been working with engineers from the world's biggest car companies. They've been taking apart and testing the innards of new and not-yet-on-the-market Teslas, GMs, Volkswagens and Nissans to figure out which existing technology can go the farthest and fastest; which is the sturdiest and most durable; and which is equipped with the most affordable technology. Different models have different strengths — no single make possesses every component of an affordable, muscular, family-friendly, wide-ranging electric vehicle, researchers said…

One factor weighing heavily on the administration is the effect the new tailpipe limits could have on jobs, like those at Ford's century-old Rouge manufacturing complex, about 40 miles east of the E.P.A. laboratory.

[11] Coral Davenport, New York Times, "Calculating the Fastest Road to an Electric Car Future," April 7, 2023, https://www.nytimes.com/2023/04/07/climate/electric-cars-biden-climate.html access may be limited.

There, autoworkers and their union leaders worry about what the coming regulation means for their future. They have good reason: electric vehicles require fewer than half the number of workers to assemble than cars with internal combustion engines.

"We know we will lose jobs through this at some point," said Mark DePaoli, a vice president of the United Auto Workers Local 600, in a recent interview at the local's headquarters near the Ford plant in Dearborn.

To understand what's at stake, compare the chassis of the Ford F-150 pickup truck — the top-selling passenger vehicle in the United States — with its all-electric version, both built at the Rouge complex. The gas-powered F-150 is composed of thousands of small parts and pieces and is assembled by 4,200 employees in the conventional truck plant. The all-electric Ford F-150 is essentially a giant battery attached to motors and wheels that is built by about 720 workers next door, at the Rouge Electric Vehicle Center.

As the transition from gasoline-powered to all-electric speeds up, one of the roughly 150,000 unionized auto jobs nationwide that could be lost might belong to Steve Noffke, who has built internal combustion engines for Ford for 25 years.

"I'm not opposed to electric vehicles, don't get me wrong," Mr. Noffke, 69, said. "If this transition is going to take place, we understand that; most of us have been through transitions before. But we as workers shouldn't have to pay for it."

Mr. Noffke noted that his industry has seen plenty of disruption to this point. The 1994 North American Free Trade Agreement sent thousands of auto manufacturing jobs to Mexico. The 2008 financial crisis pushed automakers to the brink of collapse. Advances in automation continue to replace people with robots.

But the changes being wrought by electric vehicles are significantly more jarring, Mr. Noffke said. "We've never seen anything like what's coming now," he said…

3.2. Are EVs Already a Better Deal for Buyers?

Sales of electric cars are poised for a boom, spurred by factors such as federal policy, technological advances and environmental concerns.[12]

To that point, 41% of Americans are at least somewhat likely to buy an electric vehicle as their next car, according to a recent poll from the University of Chicago and The Associated Press.

Yet, many consumers view high cost as a deterrent — 60% cited it as a "major reason" they wouldn't purchase an electric vehicle, or EV.

Most new EVs are luxury models with an average sale price of more than $61,000 — roughly $12,000 more than the auto industry average, according to Consumer Reports.

But upfront cost doesn't tell the whole story.

[12] Greg Iacurci . CNBC Personal Finance, "Are gas-powered or electric vehicles a better deal?" April 23, 2023, https://www.cnbc.com/2023/04/23/are-evs-or-gasoline-cars-a-better-deal.html

In many cases, electric vehicles can be a better financial deal for buyers over the long haul relative to their gasoline-only counterparts, after accounting for recurring costs such as maintenance, repair and fuel, i.e., gasoline or electricity…

The typical EV owner saves $6,000 to $10,000 over the life of most such vehicles compared with a gasoline-only model, according to a Consumer Reports study from 2020…

3.3. Tesla

3.3.1. Musk Bets the House of Tesla on Low Prices and Thin Margins

Musk's Tesla Inc. has cut prices of its electric cars at least a half-dozen times already this year, shaving almost a third of the cost off its top-selling model in the US. The strategy has no precedent—nor is there consensus as to whether it heralds more industry disruption or signals Musk's desperation.[13]

The Jobsian theory is that Musk is bringing Silicon Valley tactics to the EV industry. Just as the iPhone rendered Nokia and Motorola devices obsolete, Musk wants and needs to obliterate Rivian Automotive Inc. and Lucid Group Inc…[14]

Musk's latest strategic pivot will determine what happens next in an industry that Tesla already has turned on its head over the past decade. After the pandemic led to the biggest disruption in generations to auto supply-and-demand dynamics, Musk is betting his competitors will have little choice but to respond to his price cuts.

"We are trying to resist," Luca de Meo, CEO of French carmaker Renault, said this week of Tesla's pricing pressure. Speaking in January in his capacity as president of Europe's auto trade group, he said carmakers will need to make money selling EVs. "Otherwise this will become—from the beginning—a not-very-healthy business…"

Investors have always been able to rely on Musk to talk about growth. In its early years, Tesla expanded in fits and starts from a single car plant in California. After opening a second factory in Shanghai in early 2020, the company issued a wildly ambitious forecast: 50% average growth in vehicle deliveries over multiple years, with manufacturing capacity scaled up as quickly as possible.

Tesla made good on part of the plan, opening two new car factories in two months early last year: the first near Berlin and the second in Austin.

3.3.2. Teslas "Volume" EV

I bet you thought the Model 3 and Model Y were Tesla's "volume EVs." Ha! You clearly were not thinking about enough volume.

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[13] Craig Trudell, Bloomberg via Microsoft Start, "Musk Bets the House of Tesla on Low Prices and Razor-Thin Margins," April 26, 2023, https://www.msn.com/en-us/money/companies/musk-bets-the-house-of-tesla-on-low-prices-and-razor-thin-margins/ar-AA1amCP6?ocid=msedgntp&cvid=0f33b0ca31104054877bf443f1ae8c6e&ei=7

[14] Jobsian, in general, is a reference to Steve Jobs at Apple computer, and specifically how his charisma, understanding of customer behavior and the business resulted in an otherwise unexplainable outcome.

Tesla's growth over the past few years has been built on the back of the Model 3 sedan and the Model Y crossover. But for Tesla to reach its self-imposed target of 20 million vehicles per year by the end of the decade, the company needs to come up with a lower-priced car that could be produced at a scale far larger than the Model 3 and Model Y. [15]

This vehicle, if the company's Investor Day presentation is any indication, would be its next-generation car. Produced at Gigafactory Mexico, Tesla's next-gen vehicle is expected to be offered at a lower price point than the Model 3 and Model Y. It would also be the product of numerous innovations that would make it easier and more cost-effective to build (see image below).

From Vince Burlapp, burlappcar.com

Tesla tends to be very secretive about its future products, and the next-gen car is no exception. Few details about the vehicle are known today, though a recent report from China may have provided some new insights about the upcoming car. Citing several industry insiders, tech publication 36Kr recently claimed that Tesla is planning a grand production capacity map for its next-generation car.

"The low-priced model is a smaller version of the Model Y. Tesla is working on building an annual production capacity of up to 4 million units for it," one of the publication's sources reportedly noted.

If the comment from the publication's source were accurate, then Tesla's next-generation vehicle may be a small crossover. This would be quite interesting, as previous hints at the vehicle's design suggested that the affordable EV may be in the form of a compact car. That being said, the crossover market is extremely popular today, so a smaller, more affordable Model Y may prove extremely successful…

[15] Simon Alvarez, Teslarati, "Tesla's next-gen EV is a small crossover, target production at 4M per year: industry insider report," April 4, 2023, https://www.teslarati.com/tesla-next-gen-car-small-crossover-4m-per-year-production-insider-report/

3.3.3. Distant Future Plans

Today as I'm writing this, I just posted a very brief review of "Tesla Master Plan Part 3," but I limited this post to top-level major plans, and didn't get into the planning process. As Maria-Merano from Teslarati noted, there were some interesting details about Telsa's future plans down in these weeds (her article is linked below). The table below is directly from the master plan.

https://www.teslarati.com/tesla-master-plan-part-3-next-bus-commercial-van/

Vehicle Type	Tesla Equivalent	Cathode	Pack Size (kWh)	Vehicle Sales	Global Fleet	Global Fleet (TWh)
Compact	[TBD]	LFP	53	42M	686M	36
Midsized	Model 3/Y	LFP	75	24M	380M	28
Commercial/ Passenger Vans	[TBD]	High Nickel	100	10M	163M	16
Large Sedans, SUVs & Trucks	Model S/X, Cybertruck	High Nickel	100	9M	149M	15
Bus	[TBD]	LFP	300	1M	5M	2
Short Range Heavy Truck	Semi Light	LFP	500	1M	6.7M	3
Long Range Heavy Truck	Semi Heavy	High Nickel	800	2M	13.3M	11
Total	-	-	-	89M	1,403M	112

Table 7: Vehicle Fleet Breakdown

The prior subsection was about the first-row vehicle, and some other rows cover vehicles that Tesla currently offers as indicated in the second column. Other future-vehicles are "Commercial/Passenger Vans" and buses. There is no doubt that these, and probably the "Compact," are years out. Tesla would be silly to have detail plans for these until they are approaching a finalized design (within six months of pilot production) to allow final market research and targeting. Note that all three of these segments already have EV competitors. The "Compact" is the Nissan Leaf et al.

3.3.4. Parts of Parts of Cybertrucks

Typically a final assembly plant for any vehicle is owned by the manufacturer of that vehicle. That same company might also assemble subassemblies for those vehicles, but eventually third party products are used, like the subassemblies in the columns used to attach roofs to the rest of the body (commonly called a-pillars, b-pillars, etc.)

Tesla placed a $227 million order for A, B, and C pillar parts from Seoyon E-Hwa. The pillars will be used to connect the body and roof of the vehicle. The Cybertruck manufacturer signed a three-year supply contract until 2028 with the South Korean company. [16]

[16] Maria Merano, Teslarati, "Tesla places $227M+ order for Cybertruck parts from South Korea," May 4, 2023, https://www.teslarati.com/tesla-cybertruck-production-227-million-parts-south-korea/

Seoyeon E-Hwa rented a factory in Monterrey, Mexico, for about 13 billion won (more than $9 million) to produce Tesla Cybertruck parts. The company plans to dispatch expatriates to make Cybertruck parts in Mexico as early as June.

Of course Elon already spilled the beans on when he plans first deliveries of Cybertrucks.

Tesla Cybertruck preparations have been on hyperdrive lately as pre-production nears. The Texas-based company will hold a Cybertruck delivery event later this year.

"Well, I think we'll save that for the Cybertruck handover, which will hopefully be around the end of Q3 this year," replied Elon Musk to a question about Cybertruck features during the Q1 2023 earnings call…

3.4. Ford

Ford Motor posted $1.8 billion in first-quarter net income, reversing a previous-year loss, as the company rebounded from supply-chain troubles and commanded top dollar for its pickup trucks and SUVs.[17]

The Dearborn, Mich., auto maker said after the close of trading Tuesday that strong recovery in output of F-series pickups and buyer demand for high-end models fueled its bottom line. The company stood by its earlier forecast of $9 billion to $11 billion in pretax profit for the year.

Earlier Tuesday, Ford for the second time this year cut prices on its electric Mustang Mach-E, reducing the sticker by as much as 8% on some versions.

The reduction comes as the U.S. auto maker moves to a lower-cost battery and as rival Tesla also continues to adjust pricing on its top-selling EV models in an attempt to boost sales.

"We are not going to price just to gain market share," Ford Chief Executive Jim Farley said of the Mach-E price cuts.

Under a new reporting structure that breaks out the performance of its EV business, Ford said the unit lost $722 million in the quarter. Executives have said they view the EV portfolio like a startup, which will lose money as it builds scale.

Wall Street has been closely watching pricing dynamics in the car market. Recent price cuts by Tesla have raised concerns about profit margins on EVs getting squeezed.

Unlike softening prices in some parts of the EV market, Ford and other auto makers have been able to maintain historically strong transaction prices for gas-powered cars and trucks amid constrained vehicle supply. But there are signs that investors are worried the muscular pricing power that has been driving the auto industry's profits for nearly three years is easing…

Ford said Tuesday that it expects to reopen order banks for the Mach-E this week (week of May 1), and plans to increase production of the model at its plant in Mexico later this year to meet customer demand.

[17] Nora Eckert, Wall Street Journal via Microsoft Start, "Ford Posts $1.8 Billion Profit, Cuts Mustang Mach-E EV Prices," May 2, 2023, https://www.msn.com/en-us/money/companies/ford-posts-18-billion-profit-cuts-mustang-mach-e-ev-prices/ar-AA1aDtr9

Among those versions getting a price trim are the standard-range Mach-Es that will be powered by a lower-cost lithium iron phosphate (LFP) battery, the company said.

Sales of the Mustang Mach-E—an SUV that made its debut in late 2020—were down about 20% in the first quarter this year with the car company selling 5,407 of them total during the period.

The new sticker prices are about $1,000 to $4,000 less than what the Mach-E versions were priced at in late January, when the last round of cuts took place. The electric SUV will now range between about $43,000 and $60,000 in cost, depending on the trim level.

3.5. Chevy

General Motors will end production of its popular Chevrolet Bolt and Bolt EUV electric vehicles at the end of the year.[18]

CEO Mary Barra told Wall Street analysts Tuesday that the automaker will stop production of the vehicles at Orion Assembly plant in Michigan and starting next year will dedicate production there to the 2024 Silverado EV pickup.

Barra said the move will give GM the ability to build 600,000 electric trucks annually when its plants reach full capacity. The Silverado EV will also be made at Factory Zero in Detroit and Hamtramck, which also builds the GMC Hummer EV and SUV.

3.6. Toyota

Toyota has unveiled its new electrification strategy under the leadership of President Koji Sato who replaced Akio Toyoda on April 1, 2023. While the company plans to continue offering vehicles with various types of powertrains, it has put a greater emphasis on the development of battery electric vehicles (BEVs) compared to the previous management. This "multi-pathway approach" reflects Toyota's commitment to meeting the diverse needs of customers while also advancing sustainable mobility solutions.[19]

During the presentation, Sato announced that Toyota plans to launch 10 new battery electric vehicles (BEVs) by 2026, with the aim of significantly expanding the company's zero-emission range. This move is essential for Toyota to keep up with its rivals, as its current range of zero-emission vehicles lags behind many of them. Although Toyota did not mention its previous target of selling 3.5 million BEVs annually by 2030, the company estimates it will sell 1.5 million BEVs per year by 2026. This represents a significant increase over the 22,500 BEVs Toyota sold in 2022.

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[18] Jamie L. LaReau, Detroit Free Press via USA Today, "Production of Chevrolet Bolt EVs to stop by end of 2023 as GM focuses on electric pickups," April 25, 2023, https://www.usatoday.com/story/money/cars/2023/04/25/chevrolet-bolt-ev-production-ending/11733780002/

[19] Thanos Pappas, CarScoops, "Toyota Unveils New Electrification Strategy And Plans For 10 Next-Gen EVs By 2026," April 7, 2023, https://www.carscoops.com/2023/04/toyota-unveils-new-electrification-strategy-and-plans-for-10-next-gen-evs-by-2026/

Among the new EVs there will be a new 3-row SUV coming in 2025 which will be produced in the US, with batteries sourced from the North Carolina plant. Toyota is also developing two new EVs for China set to be launched in 2024, joining the bZ4X SUV and the bZ3 sedan in the local market. Finally, a small EV and fully electric pickup trucks for Asia and other emerging markets will enter production by the end of 2023. While no further details were provided about the rest of the upcoming models, Toyota has already previewed some of them as concepts, including the Tacoma EV, the Crown EVs, and the bZ Compact SUV.

Hiroki Nakajima, Executive Vice President of Toyota, discussed the company's plans for its next-generation battery electric vehicles (BEVs), which are slated to arrive after 2026. These BEVs will differ significantly from current models, combining greater efficiency with even more exciting driving characteristics. Specifically, Nakajima noted that the next-gen EVs will offer "double the range by using batteries with far greater efficiency." He also promised that their designs and driving performance will be impressive, saying they will "set hearts racing." As a teaser for these forthcoming models, a Lexus-branded sketch appeared on the screen depicting a low-slung fastback with sharp styling cues…