EVs, Late Spring, 2022

By John Benson

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1. Introduction

I started collecting information for this post shortly after I completed my last post on this Subject in March. However the one thing that I didn't have is a main theme. In mid-April I found one, or actually decided to continue with one that I started at the beginning of 2022 (first post below) and continued through my post in March (second post below).

Electric Trucks & Buses, Early 2022:

https://energycentral.com/c/ec/electric-trucks-buses-early-2022

Electric Vehicles, Spring 2022:

https://energycentral.com/c/ec/electric-vehicles-spring-2022

My theme is the continued staking-out submarkets in the U.S. Electric Vehicle (EV) Market. This is a complex market that includes both the final assemblers of EVs, EV-component manufacturers, and charging infrastructure developers.

In the first post described and linked above, I suggested that Ford was taking a strong position in the light truck sub-market, and Tesla had a long-developed strategy to avoid the same supply-chain problems being experienced by other U.S. manufacturers.

In the post directly above I said that LG Chem had developed a new EV battery technology, Tesla was continuing to dominate their current market, and Cummins was well positioned to dominate the medium and heavy truck component submarket.

In this post we will look market dynamics and the compact EV submarket (read: EV cars less expensive than Tesla), broadly look at the battery submarket, how Tesla is continuing to consolidate and expand their submarkets, and some new information on the U.S. public EV charging infrastructure.

2. High Gas Prices and Public Opinion about EVs

Gas prices may have tailed off a bit recently after hitting new highs in early March, but they're still taking a toll on consumers' wallets — and they're changing the way people feel about buying an electric vehicle.[1]

Online auto research site Cargurus.com has new data, first seen here at Yahoo Finance, that shows a big boost on the impact of high gas prices on behaviors and attitudes surrounding EVs in general.

CarGurus conducted an online survey of 2,176 automobile owners in the U.S. on their sentiments toward electric vehicles.

[1] Pras Subramanian, Yahoo Finance, "High gas prices boost electric vehicle buying sentiment," April 23, 2022, https://finance.yahoo.com/news/exclusive-high-gas-prices-boost-electric-vehicle-buying-sentiment-150449276.html

The survey was done in three waves: on February 28, as gas prices in the U.S began to climb, then a second wave on March 14 as gas prices climbed higher, and finally, a third wave was conducted on April 8, as gas prices leveled out.

Looking at consumer sentiment towards EVs in general, 40% of respondents said they expect to own an EV in the next 5 years, versus 34% from a year ago. Looking further out, 60% said they would own an EV in the next 10 years versus 40% from last year. Overall, those "excited about development" in the EV space climbed to 51% from 45% from a year ago…

3. Hyundai & Kia

The two manufacturers in the section title (and Genesis) are both owned by the same company, the Hyundai Motor Group. Hyundai Motor's 2021 global sales totaled 3.89 million units, up 3.9% Y/y. Hyundai Motor Group's EV strategy in the U.S. appears to be, go where Tesla isn't. Below are Hyundai's and Kia's EV models in the U.S.

2022 Hyundai KONA Electric: Base price: $34,000, Range: 258 Miles, Type: 5-Passenger FWD Crossover SUV

2022 Hyundai IONIQ 5: Base price: $43,650, Range: 303 miles, Type: 5-Passenger RWD or AWD SUV

2022 Kia Niro EV: Base price: $39,990, Range: 258 Miles, Type: 5-Passenger FWD Crossover SUV

2022 Kia EV6: Base price: $40,900, Range 310 Miles, Type: 5-Passenger RWD or AWD SUV

As a point of comparison, the base price of a Tesla Model 3, which is its least expensive car is around $47,000. Also, all of the above prices are without tax, license or any incentives. Tesla is likely to have lower federal and/or state incentives than the other vehicles.

Also both the Hyundai IONIQ 5 and the Kia EV6 are new models, built from the ground up as EVs. They are also early adapters of an 800 volt architecture. Their sites are linked below.

https://www.hyundaiusa.com/us/en/vehicles/ioniq-5

https://www.kia.com/us/en/ev6

4. EV Batteries: Good and Bad News

Korean firms are growing as major suppliers of EV batteries. *South Korea's three main EV battery manufacturers, LG Energy Solution Ltd, SK Innovation and Samsung SDI, are moving rapidly to fulfill fast-growing global demand for EV batteries. Together they are estimated to have accounted for around 31% of global EV battery shipments in the first half of 2021, according to South Korean research firm SNE Research. The largest global manufacturer is China's Contemporary Amperex Technology Company Limited (CATL), with an estimated 31% global share of global sales.*[2]

[2] David Leggett, Just Auto, "South Korea eyes major stake in global EV battery market," Oct 5, 2021, https://www.just-auto.com/features/south-korea-eyes-major-stake-in-global-ev-battery-market/

4.1. SK Innovation Company

SK Innovation Company, which spun off its battery business at the beginning of October, is estimated to have a global battery production capacity of 40 GWh at present, but this is being ramped up rapidly.

Author's comment: the new battery business is named SK On Company.

The company, part of the South Korean energy and petrochemical conglomerate SK Group, has just finalized a major EV battery partnership agreement with Ford in the USA. SK Innovation will take a 39% stake in a new joint venture, called BluOvalSK, which plans to build three plants in the USA by 2025 with a combined production capacity of 129 GWh per year. The partnership is expected to be extended to Europe and China, to establish a global capacity of 240 GWh by 2030.

This is in addition to SK Innovation's plans to build its own plants in China, Europe and the USA as part of a mid-term global production capacity target of 125 GWh by 2025. The company counts Hyundai, Kia, Ford, Tesla and Volkswagen as its key customers.

Additional details on the SK On / Ford Partnership:

Ford is building twin lithium-ion battery plants in central Kentucky through a joint venture with South Korea-based SK called BlueOvalSK as well as a massive 3,600-acre campus in west Tennessee, the automaker said Monday night (Sep 27, 2021). The campus will include another a battery plant built with SK along with a supplier park, recycling center and a new assembly plant for electric F-Series trucks, Ford CEO Jim Farley told CNBC.[3]

South Korean battery maker SK On said on Monday it has signed a memorandum of understanding with Ford Motor Co and Koc Holding to form a joint venture to produce electric vehicle (EV) battery cells in Turkey.[4]

The plant is targeted to start by 2025 and aims to have an annual production capacity of 30-45 gigawatt hours (GWh), SK On said in its statement.

4.2. Samsung SDI

Samsung SDI built up its EV battery business following the acquisition of German-based Magna Steyr Battery Systems GmbH in 2015. It is estimated to have accounted for just over 5% of global shipments in the first half of 2021. Its 30 GWh plant, located in Hungary, is being expanded to over 40 GWh and supplies European automakers including BMW, Fiat and Volkswagen.[2]

4.3. LG Energy Solution

LG Energy Solution Ltd is by far South Korea's largest EV battery manufacturer, with an estimated 23% share of the global EV battery deliveries in the first half of 2021 to clients such as Hyundai, Kia, Tesla, Ford, GM, Renault and Volkswagen. The company was spun off from LG Chem Ltd, part of local conglomerate LG Group, at the end of last year

[3] Michael Wayland, CNBC, "Ford and SK Innovation to spend $11 billion, create 11,000 jobs on new U.S. EV and battery plants," Sep 27, 2021, https://www.cnbc.com/2021/09/27/ford-battery-supplier-to-spend-11point4-billion-to-build-new-us-plants.html

[4] Reuters via U.S. News, "SK On, Ford and Koc Holding to form EV battery joint venture in Turkey," March 14, 2022, https://www.usnews.com/news/technology/articles/2022-03-14/sk-on-ford-and-koc-holding-to-form-ev-battery-joint-venture-in-turkey?msclkid=b8bc168bc29b11ec941db5319fb41cb2

to help it focus on expansion and is soon expected to launch an initial public share offering (IPO).[2]

LG Energy Solution's global EV battery manufacturing network includes plants in each of South Korea and Poland and two in China, with a total production capacity estimated at 120 gigawatt hours (GWh) – enough to power close to 2 million electric vehicles. This is expected to at least double in the next five years.

In July of this year LG Energy Solution announced plans to invest over US$12bn to develop next-generation battery technology and to expand domestic production capacity to help meet growing global demand for electric vehicles. The company is also investing heavily in its overseas operations, including a planned investment of US$4.5bn in the USA by 2025 to establish a production capacity of 75 GWh. Here, the company is also building battery plants in partnership with General Motors to power the US carmaker's upcoming range of purpose-built EVs.

Author's comment: Also see section 2 of "Electric Vehicles, Spring 2022," linked in the Introduction, regarding the information in the above paragraph.

EV demand in the USA is expected to grow rapidly following the Biden administration's Green New Deal initiative, with leading US automakers including GM and Ford planning to switch their vehicle ranges entirely to electric powertrains by 2035. In the long term LG aims to have in place a production capacity of some 110 GWh per year in this region.

LG Group companies are under tremendous pressure to secure access to sufficient raw materials and to establish a strong supply chain to match the LG Energy Solution's EV battery ambitions. Earlier this year LG Chem Ltd, the parent of Energy Solution Ltd, said it expects the global market for battery materials will grow from US$34bn in 2021 to US$87bn by 2026.

LG Chem said it is looking to expand annual production of battery cathodes from the current 40,000 tons to 260,000 tons per year by 2026 and in August it agreed to take over LG Electronics' battery separator business for US$444m, as part of US$5bn plan to strengthen its battery supply chain operations by 2025. The company is also set begin construction of a new separator factory in the South Korean city of Gumi at the end of the year with an annual production capacity of 60,000 tons.

In the last year the group has signed deals with mining companies around the world, including China's Great Power Nickel & Cobalt Materials Company, Australian Mines Limited, Chilea's SQM and the Indonesian government to secure supplies of raw materials for the next ten years.

The following is the bad news regarding LG Energy Solution:

Roadshow has covered Chevrolet's Bolt battery recall, as well as LG Chem's role as the manufacturer of the defective cells, but it seems there's more to the story. General Motors is hardly LG's only client, and now, according to a report published on Tuesday by Reuters, the National Highway Traffic Safety Administration is launching an investigation into LG Chem to ensure that it's handled other battery recalls appropriately.[5]

[5] Kyle Hyatt, CNET Road Show, "NHTSA Investigates LG Chem's Recall Response for EV Battery Issues," April 5, 2022, https://www.cnet.com/roadshow/news/nhtsa-investigates-lg-chems-recall-response-for-ev-battery-issues/

LG's other clients include Stellantis, Mercedes-Benz and Hyundai, all of whom have issued recalls in the past few years for high-voltage battery pack issues that could lead to fires. Needless to say, a pack fire in an EV is nothing to laugh about.

NHTSA believes that upwards of 138,000 vehicles could be affected by the same internal flaws that have caused so many headaches for Bolt owners, and it's working with LG Chem and other vehicle manufacturers to ensure that LG's recall efforts have been suitably extensive and handled with appropriate urgency.

The Chevrolet Bolt recall alone will cost LG Chem an estimated $1.9 billion, and those costs are likely to continue their climb upwards as more models are added to the replacement list...

5. Tesla Major Milestones

Tesla still dominates the EV market, accounting for about 75% of EVs sold during the 2022 first quarter, according to the latest data from Kelley Blue Book (KBB). That's up from a 70% share the previous year. Tesla's Model Y SUV and Model 3 sedan made up 68% of the market all by themselves.[6]

But as KBB noted, "Tesla's rear-view mirror is getting crowded." Americans bought almost twice as many EVs in the first quarter of 2022 as they did in the first quarter of 2021, and EVs made up more than 5% of total car sales for the first time. Perhaps more importantly, consumers bought 32 different models during the first three months of 2022 vs. 18 during the first three months of 2021. KBB expects at least 50 different models to be on the market by the end of the year.

Tesla has reached major milestones with its two new Gigafactories:

Berlin: *Tesla CEO Elon Musk personally delivered the first made-in-Germany Model Ys to their new owners earlier this week (week of March 21).*[7]

Texas: *Tesla has officially delivered the first made-in-Texas Model Y vehicles, but it is still being vague about the new version of the electric SUV, especially regarding the specs and pricing. The Cyber Rodeo event yesterday (April 7) marked the opening of Gigafactory Texas, which was the real star of the show.*[8]

During a presentation at the event, CEO Elon Musk spent most of his time talking about the factory, which he believes will become "the highest-volume car factory in America" with the eventual production of over 1 million vehicles per year.

He said that Model Y will account for over 500,000 of those vehicles, and at the end of the event, he said that Tesla is officially delivering the first made-in-Texas Model Y vehicles that night – rolling some of them on stage as he announced it.

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[6] Vance Cariaga, Yahoo Finance, "Tesla Faces More Competition Than Ever Before as EV Sales Hit Record-High First Quarter," April 26, 2022, https://finance.yahoo.com/news/tesla-faces-more-competition-ever-145528401.html

[7] Darryn John, Drive Tesla Canada, "First Giga Berlin Tesla Model Y involved in accident" March 24, 2022, https://driveteslacanada.ca/model-y/first-giga-berlin-tesla-model-y-involved-in-accident/

[8] Fred Lambert, Electrek, "Tesla delivered the first made-in-Texas Model Y, but it is still being vague about the new version," April 8, 2022, https://electrek.co/2022/04/08/tesla-delivered-first-made-in-texas-model-y-but-being-vague-new-version/

The CEO reiterated that those new Model Ys are "revolutionary" for being built with only three major pieces: a front and back giant single piece casting joined together by a structural battery pack enabled by Tesla's new 4680 battery cell.

Author's note: There was confusion as to the configuration of the Model Y EVs that were delivered and regarding to whom they were delivered. The rest of the story (from later articles) was that (1) this was the version of the Model Y (as described above) with the structural battery element that uses 4680 cells (the first such production EVs), (2) these were delivered to Tesla employees, and (3) the reason they were only delivered to employees, was that this was a new configuration that wasn't available for order through Tesla's website. Also see the post below.

…In the Shareholder Deck document released after market close on April 20, the EV maker revealed plans to build Tesla Model Y vehicles at the Austin plant with both 4680 in-house made battery cells and non-structural battery packs with 2170 cells.[9]

6. Ford EVs

Ford currently has a good selling EV (the Mach E), that is only being held back by continuing supply chain issues, and they are starting to roll out their next EV (F-150 Lighting) as I'm writing this (subsection 6.2 below). They also have a recent agreement with a major battery manufacturer (subsection 4.1, above). They started delivering E-Transit Vans in the U.S.in Feb of this year, more recently started delivering these in the EU, and have several big orders for these e-vans from major corporations.

6.1. International Move

Ford wants to go fast. The automotive group does not hide its ambitions to be one of the largest manufacturers of electric vehicles within five years. The company, run by Chief Executive Jim Farley, has promised to build two million EVs annually by 2026.[10]

Four years before this objective, the company has a long way to go. Ford delivered fewer than 7,000 electric vehicles in the U.S. in the first quarter, mainly the Ford Mustang Mach-E SUV.

But things should change in the second quarter, with the scheduled April 26 start of production and deliveries of the long-awaited F-150 Lightning electric pickup. E-Transit should also make it possible to expand sales. But the company has a global strategy, which, of course, goes through Europe. And probably through India.

The provincial government in Tamil Nadu and Ford are in discussions to explore whether the automaker's factory there can be converted to a plant manufacturing and exporting electric vehicles, the local press reports. Talks are at a very advanced stage and a decision is imminent.

"Keeping the speculations aside, the EV project continues to be in the exploration stage," Ford India's spokesperson, Kapil Sharma, told TheStreet in an email statement. "With discussions ongoing, we don't have anything to share."

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[9] Dan Mihalascu, Inside EVs, "Tesla Will Build Model Y In Austin With Both 4680 And 2170 Cells," April 21, 2022, https://insideevs.com/news/581163/tesla-will-build-model-y-austin-both-4680-2170-cells/

[10] TheStreet via MSN, "Ford Is About to Make a Big Strategic Decision," April 18, 2022, https://www.msn.com/en-us/money/companies/ford-is-about-to-make-a-big-strategic-decision/ar-AAWl0P2?ocid=msedgntp&cvid=21b615143f624f419ad2c61fcbfdab76

Ford has a plan located in Maraimalai Nagar, Tamil Nadu (western India). It's well known as the Chennai assembly plant or the Chennai vehicle and engine assembly plant. It is one of the production plants that Ford owned in the country and proposed to close

"Manufacturing of vehicles for export will wind down at the Chennai vehicle assembly plant by Q2 2022," Kapil Sharma said.

But there is a good chance that this will change by the end of June because, as TheStreet wrote in February, the Indian government had approved the Dearborn, Mich., company's request for its proposal under the production-linked incentive scheme (PLI) for the automobile sector.

The PLI offers considerable advantages of various kinds, including tax rebates, to companies investing in advanced technologies in the auto sector.

Ford is willing to take advantage of these benefits. The PLI offers 13% to 16% incentives for passenger-EV makers based on the company's annual sales value.

In February, Ford told TheStreet it could produce electric vehicles in India, but for export. In particular, it plans to sell these electric vehicles in the U.S., its first market. But the group does not rule out selling the same cars in India.

"As Ford leads customers through the global electric-vehicle revolution, we're exploring the possibility of using a plant in India as an export base for EV manufacturing," Kapil Sharma told TheStreet at the time…

"Following accumulated operating losses of more than $2 billion over the past 10 years and [an $800 million] non-operating write-down of assets in 2019, the restructuring is expected to create a sustainably profitable business in India," the company explained.

At the time of the announcement, Ford's market share was meager at 1.5%.

The electric market could be a second chance for the carmaker in the Indian market, which is difficult for foreign carmakers to penetrate.

Electric vehicles represent only 0.34% of retail cars sold in March, but demand is very strong.

According to the Federation of Automobile Dealers Association, the category of vehicles to which EVs belong recorded a more than tripling (235.5% increase) in retail sales in March compared with the same month in 2021.

And this trend is expected to continue as the Indian government has said that it planned to be carbon-neutral by 2070. Therefore, many companies will receive subsidies and state support to produce electric vehicles.

6.2. F-150 Lightning

Ford Motor said on April 26 that it had produced about 2,000 electric F-150 pickup trucks and planned to begin delivering them to customers in the next week.[11]

The automaker said it was fine-tuning software in the trucks before releasing them to dealers, the company's chief executive, Jim Farley, said at a kickoff event at the factory where the truck is made in Dearborn, a Detroit suburb.

[11] Neal E. Boudette, New York Times, "Ford says it has produced 2,000 electric F-150 pickup trucks," April 26, 2022, https://www.nytimes.com/2022/04/26/automobiles/ford-electric-f150-lightning.html

Ford is also prioritizing its commercial customers:

One in five Ford F-150 Lightning electric trucks produced at the Rouge Electric Vehicle Center in Dearborn, Michigan, is an entry-level Pro trim targeting commercial buyers.[12]

Automakers typically begin production of new vehicles with only the most expensive variants to maximize margins, but Ford is taking a different approach. The carmaker is launching F-150 Lightning production with the $40,000 Pro variant instead of top-of-the-line models that have starting MSRPs as high as $90,000.

Darren Palmer, Ford's vice president of electric vehicle programs, told Automotive News that the carmaker already is building plenty of base models aimed at carpenters, plumbers and other business owners.

"Fleets we will look after; they are the core of our business. Even though we could sell more vehicles, more expensive, it's not about the short-term profit. We launched with them right at the beginning and we're giving them 20 percent all through."

This is in contrast with GMC's decision to launch the Hummer EV with the $112,595 First Edition and with Rivian's upscale R1T pickup, which starts at $67,500 in its most basic form with delivery in 2024.

Since the F-150 Lightning entered production on April 26, Ford has built roughly 2,800 units, Palmer said at a media event for the Lightning. This means that approximately 560 of them are Pro models. With regard to the retail side, he said the Lariat trim gets a "really high mix" of orders; the Lariat starts at $69,269 including shipping.

Palmer did not say how many reservations have translated into firm orders, noting that Ford is dealing with the 200,000+ reservations in waves.

"We've done about three or four waves now, and that was the end of the 2022 model year. We saw a really, really high conversion. At the moment it would be meaningless if I said the number because it wouldn't include those who held on [for the 2023 model year]. But it's pretty good."

Ford would not say how many F-150 Lightnings it expects to make this year either, but it expects to reach an annual run rate of 150,000 in 2023.

As for the global semiconductor shortage, Palmer admitted that Ford continues to face production setbacks, but noted the Lightning would be prioritized.

Mr. Farley and other executives have described the truck, the Lightning, as the most important model Ford has introduced in decades. The company needs the pickup to sell well to take a bigger share of the fast-growing market for electric vehicles.

[12] Dan Mihalascu, Inside EVs via MSN, "Ford: One In Five F-150 Lightning Trucks Made Is A $40K Pro Model," May 9, 2022, https://www.msn.com/en-ca/autos/other/ford-one-in-five-f-150-lightning-trucks-made-is-a-dollar40k-pro-model/ar-AAX4YOX?ocid=BingNewsSearch

7. Biden Charges

WASHINGTON, April 7 (Reuters) - Senior officials in the Biden administration and major automotive leaders agree that charging station infrastructure for electric vehicles should offer an interoperable experience based on any car model.[13]

The White House said a virtual meeting was held Wednesday (4/6) with major automotive leaders, including Tesla Inc Chief Executive Officer Elon Musk and General Motors CEO Mary Barra to discuss electric vehicles and charging.

The administration said in a statement "there was broad consensus that charging stations and vehicles need to be interoperable and provide a seamless user experience, no matter what car you drive or where you charge your EV."

Musk has often been at odds with the White House, frequently firing off harsh tweets directed at President Joe Biden. In February, Biden publicly acknowledged the role of Tesla in U.S. electric vehicle manufacturing, after Musk repeatedly complained about being ignored.

Congress last year approved $7.5 billion in government funding for EV charging stations, but legislation has stalled for new tax incentives to purchase and build EVs.

Biden wants at least 50% of new vehicles by 2030 to be EVs or plug-in hybrids.

Ford Motor CEO Jim Farley, Chrysler-parent Stellantis CEO Carlos Tavares, Lucid CEO Peter Rawlinson and Nissan Americas chair Jeremie Papin were among other auto leaders who took part in Wednesday's meeting, which discussed U.S. funding to "create a national network of 500,000 chargers."

On Thursday, Farley posted a tweet praising the meeting's focus on charging, including for commercial vehicles.

Also in attendance were Transportation Secretary Pete Buttigieg, Energy Secretary Jennifer Granholm, National Climate Advisor Gina McCarthy and Infrastructure Coordinator Mitch Landrieu.

Granholm said Thursday on Twitter that it was a "very productive meeting - as we roll out EVs and charging infrastructure the CEOs were very forthcoming about government's role as a partner in electrifying the transportation sector."

Executives from Hyundai Motor America, Subaru of America, Mazda North America, Toyota Motor North Americ,a Mercedes-Benz USA and Kia Motors America also took part.

Each auto executive received about 90 seconds to talk about their EV plans and spoke about a wide range of issues around EVs, including battery supply chain concerns, one company executive told Reuters. Biden last week invoked the Defense Production Act in a bid to boost U.S. production of minerals needed for electric vehicles.

Last week, automakers backed the Environmental Protection Agency's (EPA) new tougher vehicle emissions regulations in a court challenge brought by some states and ethanol groups…

[13] David Shepardson, Reuters, "Biden administration, auto leaders want 'seamless' EV charging station use," April 7, 2022, https://www.reuters.com/business/autos-transportation/biden-administration-holds-electric-vehicle-industry-meeting-with-musk-barra-2022-04-07/?mc_cid=30ab56099f&mc_eid=d304cfa7fb