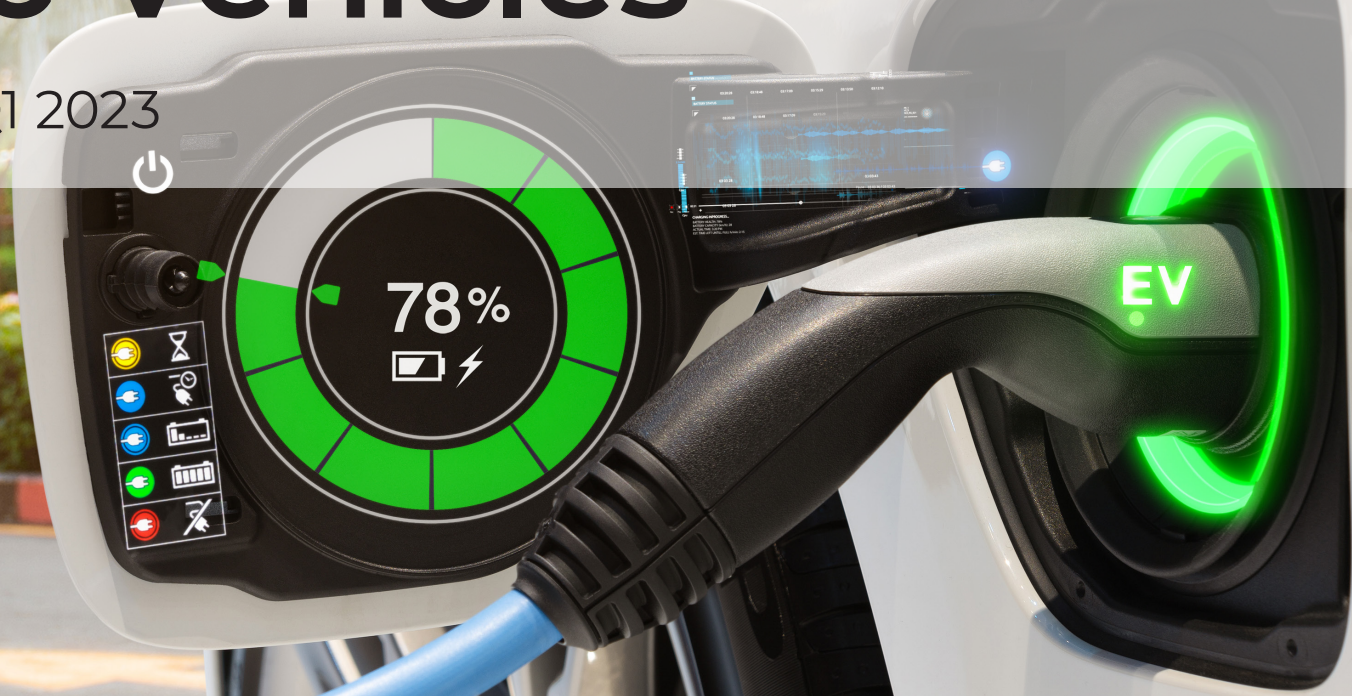


MARKET MOVES

Electric Vehicles



Highlights from Q1 2023



From the ENDEAVOR Business Media library
A compilation of technical articles from EBM



FROM THE EDITOR

FROM BATTERIES TO CHARGING STATIONS TO THE ACTUAL VEHICLES, WE TAKE STOCK OF OUR SWITCH TO ELECTRIC MOBILITY AS IT PICKS UP EVER MORE SPEED.

By Geert De Lombaerde



Geert De Lombaerde
Senior Editor
Endeavor Business Media

Welcome to this Market Moves eBook, our first of its kind specifically about the massive electric vehicle transition now well underway. On the following pages, you'll find a wide range of articles from teams across Endeavor Business Media that touch on the many successes, challenges and questions around our collective switch to EVs.

Works from ten Endeavor brands are included here, delivering insights on the tightrope the automotive sector's biggest names are walking, the new business models being tested by plastics and chemical manufacturers and the mountains of dollars being dedicated to vehicle and charging infrastructure. The broader economic outlook continues to be murky as we head into the middle of 2023 but the EV picture is clear as day: All these investments and advancements are crucial even if they don't all pan out. There's a massive market to build and supply.

Many of the stories included here have been featured in recent Market Moves email newsletters dedicated to tracking Endeavor's coverage of EVs. You can sign up for that newsletter and other Market Moves products focused on energy, manufacturing, infrastructure and cybersecurity [right here](#).

Thanks for your time and good luck on your own electrification journey. Hopefully, we'll have the opportunity to share your learnings in a future eBook such as this one.

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AUTOMAKERS WILL BURN THE EV, ICE CANDLE AT BOTH ENDS FOR YEARS

Having plenty of gas-powered and hybrid vehicles available on the lots will be a competitive advantage for OEMs for the foreseeable future.

By Warren Browne

Battery-electric offerings will increase dramatically over the next several years. Fleet and retail customers will benefit from the broader spectrum of choice. Fortunately, there will be enough capacity to satisfy all of their needs, and then some.

BATTERY-ELECTRIC SALES CONTINUE TO CLIMB, SLOWLY

This year will mark a meaningful change in the mix of battery-electric vehicle sales. Mainstream brands are launching 13 new entries, boosting share already captured by Nissan Leaf, Chevrolet Bolt/EUV, Ford Mach-E, Kia EV6, Hyundai Ioniq5 and VW ID.4. The new offerings will improve the image of the sector that is currently viewed as way too expensive, and for rich innovators.

I see North American sales of battery-electric models (BEV) increasing to 1.2 million in 2023, capturing 7% of the

light-vehicle market. This represents a substantial improvement from 2022 performance. Yet consumer acceptance will remain relatively low for many reasons, most notably: driving range, high base MSRP and the time it takes to recharge and get back on the road.

Additionally, inventory will be low, restricting the opportunity to roam the dealer's lot for trim and color alternatives.

BUILT-IN SALES DETERRENTS FOR EVS

There are also brand portfolio deterrents, not widely covered in the automotive press, that will keep BEV acceptance low through the 2025 business cycle.

First, legacy brand showrooms will be filled with gasoline inventory that is lower-priced and with reasonable incentives. Shoppers will have the ability to choose a Chevrolet Equinox as a gasoline version immediately,

or wait a few months for an Equinox EV and pay more. This showroom dilemma will also exist at Ford, where shoppers can choose between a Lightning pickup and the best-selling F-150 gasoline version.

Sure, there will be BEV test drives. That is critical, but final choice will favor the gasoline version. Shoppers could also be swayed to competitive hybrid versions that offer great mileage and solve the range-anxiety issue.

Nationwide coverage is also an issue. Start-ups, like VinFast, Rivian and Canoo, just don't have the 50-state distribution system (let alone 10 Canadian provinces) that generates higher volumes. Legacy brands have an advantage here.

SALES ADVANTAGES FOR EVS

The recently approved Inflation Reduction Act will help increase sales of BEV and hybrid models produced in North America,

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assuming customers know the incentives exist and the sales force can explain how to get them. The sales boost will take time to develop due to the complexity of the incentive requirements. These requirements increase in complexity after 2023 and could result in vehicles dropping off the approved list during 2024 and 2025. This uncertainty is not good for closing deals.

BEV sales will also be helped by any leasing deals offered on imported models. Leasing and subscription services could reach 35% of sales on models like Kia's EV6, if finance companies pass along the full \$7,500 federal incentive to the customer. This "clean commercial vehicle" loophole, where IRA Made-in-America requirements do not apply to leased vehicles, could generate a sales lift for USMCA-produced vehicles as well.

There will be quite a bit of advertising and PR hype during the next few years, but sales of BEV models will remain fragmented. For example, consumers will have 37 new entries to choose from by the end of the year. However, only six models will sell more than 30,000 units during the year, and Tesla will have three of them.

Model-brand identity is difficult for marketing mavens to develop when annual sales are this low. All in, the sales forecast for battery-electric vehicles will reach 2.1 million units by 2025 and be spread over 139 different models, up from 87 in 2023. Not everybody will survive here, folks!

North American Market (USMCA) Model Output of Demand and Implied Production Requirements (mil.) Feb. 2023

	2019	2020	2021	2022	2023 F/C
Demand, Model Output (*)	19.17	16.15	19.40	17.10	16.10
Additions to Model					
Parts / Logistics Issues	0.00	-0.50	-2.28	-1.46	-0.10
Incentives + Pent-up Demand	1.18	0.88	0.62	0.83	1.18 #
N. American Sales (USMCA)	20.35	17.08	17.74	16.47	17.18
Actual Production	16.37	13.26	13.19	14.74	15.25
Production Requirements (*)	15.82	13.65	15.91	14.02	13.36
Variance	0.55	-0.39	-2.72	0.72	1.89
Inventory Change	-0.50	-1.00	-1.70	0.90	0.72

Pent-up demand is .4 million in 2023.

Historical N. American sales & actual production data from Automotive News. Other data, RFQ Insight proprietary estimates

BEV EXCESS CAPACITY IS A GOOD STRATEGY

Manufacturing executives are hard at work creating a new production landscape. Manufacturing is pushing (versus customer pull) increased capacity for battery-electric production. Everybody is chasing the same vision and loudly explaining it. However, do not get confused with announcements of capacity increases and assume they are reflections of underlying demand.

Production capacity for battery-electric vehicles will increase significantly over the next few years to 3 million units, ensuring enough supply to meet demand. In fact, there will be excess capacity, with

utilization around 60%. And that is a good thing! Any sector that is going through a transformation needs enough capacity to get there without bottlenecks, and to allow for marketing and product flexibility. Otherwise, you never get to the vision.

Manufacturers also need a return on their investment. Sure, battery manufacturing incentives will mitigate some of the pain. Just don't expect any significant reductions in vehicle prices, or additional incentives, through the forecast window. Manufacturers will rely on incentives provided by taxpayers (versus shareholders) to bolster sales. A wider range of inventory at the dealer would really help. Yet,

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this seems problematic given that many manufacturers are chasing the Tesla distribution model.

Here is what will not happen over the next few years: a reduction in capacity required to meet the demand for gasoline and hybrid vehicles. While they provide competition to battery-electric models, sales of gasoline pickups, utility vehicles and vans are essential for profitability. Getting to the vision and losing money is not an option.

Steve Carlisle, President of GM North America, said it best back in 2020: "We don't know how long the transition will take, so we're in a good spot to continue to grow the business and fund the business with our internal-combustion portfolio while we work on ramping up on the battery-electric side." That strategy makes sense.

Consumers will decide how long the transition will take, not the government. They will also dictate the shopping process for battery-electric models. If the dealer's salesforce can't close the deal due to lack of battery-electric inventory, then legacy OEMs will shun the Tesla distribution model. In fact, having the right levels of battery-electric and hybrid inventory may be a strategic advantage for GM, Ford and Toyota.

The transition will also put additional stress on automotive suppliers. They will be required to have battery-electric parts

capacity that will line up with assembly requirements. At the same time, they will have to be ready to meet the requirements of gasoline and hybrid model production. No small task.

Currently, suppliers are gearing up to bid on supplying parts for battery-electric models that will be launched after 2026. When suppliers ask this question during the RFQ negotiation process: "What gasoline light trucks will be dropped when this model is launched?" they shouldn't be surprised when the answer comes back, "None, we need both versions." The result: engineers and product strategists will be working overtime for the foreseeable future.

Warren P. Browne is President of RFQ Insights. He is also an adjunct professor of economics, global business, and international trade at Lawrence Technological University. He is an automotive forecasting expert, is quoted in the press, and occasionally writes automotive articles.

Browne retired from General Motors in 2009 after 39 years of service. From 1991 to 2009, he held senior executive positions at GM.

In Brazil, he was responsible for developing and submitting over 10 investment programs for strategy board approval. GM do Brasil completely updated their vehicle portfolio when he was director of product and strategic planning. GM significantly increased their volume and profitability based on the portfolio changes. He also provided the GM government relations team in Brazil the overall policy changes required to increase automotive demand in the country. These changes were discussed with the Brazilian government, and many were implemented.

After executive assignments in Brazil, Poland and Germany, Browne was Managing Director of GM Russia, and led the company during a profitable, tenfold sales expansion. Mr. Browne was also the lead director on the Board of the GM-

Avtovaz joint-venture. He successfully developed a multi-faceted production strategy that included building a new plant in St. Petersburg.

Before leaving Europe and General Motors, Mr. Browne negotiated the return of Cadillac, Corvette and Hummer distribution rights from a European distributor.

After retiring, Browne established his own consulting firm, focusing on new vehicle program forecasting, market analysis and research. His company provides market insights for automotive suppliers looking to bid on major automotive programs. Quantifying their risk is an important part of the analysis.

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CHEMICAL PROCESSING

CHEMICAL INDUSTRY LENDS SPEED TO EV MARKET

By Jonathan Katz

From mining-extraction fluids to heat-resistant components, the chemical industry is gearing up for an increase in demand related to the growing electric vehicle (EV) market. In the past year, the sector has closed several deals to capitalize on opportunities in the EV supply chain.

This includes Celanese Corp.'s \$11 billion purchase of DuPont de Numours Inc.'s mobility and materials business, a move that the company referred to as an "attractive automotive opportunity" in an investor presentation. The company highlighted the deal's market potential for EV battery applications, including thermal management, power electronics, infrastructure, and vehicle weight reduction. A year earlier, Celanese acquired Exxon Mobil Corp.'s Santoprene business for \$1.15 billion. Santoprene produces thermoplastic vulcanizates (TPV), a sealing or gasket material that resembles rubber and has weight-reduction properties.

Celanese expects EVs and hybrids to require up to twice as much Santoprene



content versus internal combustion engines. Shortly after announcing the deal in 2021, Brandon Ayache, Celanese's senior director of investor relations said Santoprene's added content in EVs "is due to increased electrical infrastructure, greater noise isolation requirements and expanded under-the-hood applications."

In the U.S., the chemical industry will play a key role in President Biden's efforts to secure a domestic EV supply chain through

his American Battery Materials Initiative. On Jan. 13, The U.S. Energy Department offered a conditional \$700 million loan to Ioneer, a lithium and boron producer based in Sydney, Australia, to develop a domestic supply of lithium carbonate for EV batteries from its Rhyolite Ridge project in Esmeralda County, Nevada. The project could potentially support production of lithium for about 370,000 EVs a year, according to the Energy Department.

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As *Chemical Processing* columnist Barry Perlmutter noted, it's expected that lithium demand will rise from approximately 500,000 metric tons of lithium carbonate equivalent (LCE) in 2021 to 3 million to 4 million metric tons by 2030.

To gain a better understanding of the EV market potential for the chemical industry, CP spoke with Al Greenwood, deputy news editor for ICIS, a global commodity market intelligence service.

LIGHTWEIGHT SOLUTIONS

EVs can weigh hundreds of pounds more than a comparable gasoline-powered vehicle. Also, as the Associated Press reported, heavier vehicles could pose safety risks, warned Jennifer Homendy, the head of the National Transportation Safety Board. The chemical industry supplies resins that EV manufacturers can use to replace heavier metal parts, Greenwood says.

"Batteries are the single-most expensive component for an electric vehicle," he says. "Companies want to lighten the weight of the vehicles, so they can use smaller batteries and cut down the production costs."

Polyurethane, nylon, polypropylene compounds, polycarbonate and acrylonitrile butadiene styrene are some of the materials that OEMs are looking to for EV weight reduction, according to Greenwood.

Another possibility is the use of adhesives as a light-weight alternative to bolted

parts. Greenwood notes that Dow has a line of adhesives that can replace metal bolts and welds in vehicles.

HEAT MANAGEMENT

EVs generate heat from the additional wiring that they require. They also spin at speeds as high as 20,000 RPMs, which also generates heat. That means automakers will need resins to withstand high temperatures, Greenwood says. They will also need lubricants that can tolerate hotter temperatures and, in some cases, manage heat.

MOISTURE CONTROL

EVs have many more electrical components than internal combustion engines, so OEMs need to think about protecting those parts. This means they will need sealants and coatings to shield their electrical systems from moisture — in some cases this might include specialized types of nylon. Also, wiring and cables will require insulation to protect against arcing, Greenwood says.

CHEMICALS IN EXTRACTION

The chemical sector can expect to see increasing demand for sulfuric acid used in lithium ore mining to leach out the minerals, Greenwood says. He points to Ecovyst as a player in the sulfuric acid market. In a Sept. 23 company update, Ecovyst CEO Kurt Bitting noted that the

company's challenge with lithium mining is keeping up with the fast pace of demand.

THE ROAD AHEAD

In the near future, chemical companies will likely introduce new EV-specific products, Greenwood says. For example, many of the early-model EV transmissions used the same lubricant mix as an internal combustion engine vehicle. Chemical companies are developing lubricants that are only for EV. Expect that trend to continue in the near term, Greenwood says. Also, existing chemical products, such as ultra-high-molecular-weight polyethylene, may be repurposed for the EV industry.

"We see companies increase capacity for that material, specifically to address electric vehicles," he says.

Chemical Processing offers daily and weekly news and feature roundups geared toward operators and engineers in the chemical industry.

Jonathan Katz, executive editor, brings nearly two decades of experience as a B2B journalist to Chemical Processing magazine. He has expertise on a wide range of industrial topics. Jon previously served as the managing editor for IndustryWeek magazine and, most recently, as a freelance writer specializing in content marketing for the manufacturing sector. His knowledge areas include industrial safety, environmental compliance/sustainability, lean manufacturing/continuous improvement, Industry 4.0/automation and many other topics of interest to the Chemical Processing audience. When he's not working, Jon enjoys fishing, hiking and music, including a small but growing vinyl collection. Jon resides in the Cleveland, Ohio, area.

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EVOLVING FOR EVs

With the prominence of EVs on the rise, lift manufacturers have been modifying and creating new shop equipment to meet the industry's needs.

By Emily Markham

**VEHICLE
SERVICE
PROS**.com

The auto landscape is changing – more and [more EVs are entering the scene](#), and that means shops need to take a look at their equipment and see if it's still meeting the needs of all their customers' vehicles. Lifts and lift tables are essential equipment for every shop, but is it really necessary to upgrade this expensive equipment just to accommodate EVs?

TO UPGRADE OR NOT TO UPGRADE?

Whether your shop should or shouldn't upgrade depends on this one very important question – what are you using the equipment for? If you've set up your shop in a small town in a rural state chances are you're not seeing many, if any, electric vehicles. However, if your shop is in a bustling city in California, EVs may be a more common occurrence.

Although, even if your shop does see some electric vehicles, upgrading your equipment still may not be necessary if you choose to outsource the work.

But, if you're looking to expand your shop's repertoire, then you'll need to ask yourself the next most important question – what's the wheelbase on your vehicles?

Carl Boyer, Midwest regional sales manager for [Stertil-Koni](#), says, "We're always kind of surprised that the customer hasn't considered things like, 'What's the wheelbase of my vehicles? What do they weigh?' Typically, they want to maximize their lift to get the widest variety of vehicles on the lift."

To [find the right lift to suit their customer's needs](#), Boyer notes, they want to know the customer's shortest and longest wheelbase vehicles. From there, they also take a look at what work the shop will be doing on the lift – oil changes, quick maintenance, etc. – as that also factors into the decision of what style of lift the shop will need. However, Boyer cautions that not every lift manufacturer will have what's best for your shop's needs. Each company can only speak to the styles of lifts they manufacture, so it is in your best

interest to do the proper research before settling on which lift to purchase.

LIFT MODIFICATIONS

Though the job of a vehicle lift remains the same whether it's lifting an electric vehicle or a vehicle with an internal combustion engine (ICE), the equipment needed to lift each type of vehicle varies quite a bit. When it comes to electric vehicles, they are much heavier than the average car. With the battery alone weighing around 1,000 lbs, EV lifts must have an increased lifting capacity. Aside from the weight of the battery, its location has also created a need for lift modifications.

"The lift market is expanding to meet unique EV needs," says Brian Spikes, vice president and general manager at [Challenger Lifts](#). "OEs have made lifting points more specific to accommodate delicate wiring and EV battery locations."

It's important the lift can hit those specific points otherwise the equipment could cause interference with the

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vehicle's battery, notes Jason Matthews, product manager, automotive lifts for [Rotary Lift](#). This interference could lead to vehicle damage or an inability to do the required repairs.

Lift manufacturers trying to stay ahead of the curve are working on modifying their lifts and lift accessories to cater to the electric vehicle market. Here are four EV lift manufacturers creating products to help shops prepare for the future of the industry.

STERTIL-KONI

With EVs becoming more and more prevalent in the market, many lift manufacturers, such as Stertil-Koni, are looking at the equipment they currently offer and trying to find ways to adapt it, so it not only works with electric vehicles but also the legacy vehicles on the road and the vehicles being transitioned from internal combustion to electric.

Just as important as the EV lift itself are the EV lift tables used for lowering the battery from the vehicle. Getting the vehicle off the ground is just step one – shops need additional EV lift accessories to finish the job, such as Stertil-Koni's [SKTJ Hydraulic Transmission Jack](#).

"What we have right now is actually a transmission jack, that's on swivels, and it has its own hydraulic piston that would come up to meet the batteries, and then

lower [them] down safely," says Tim Kerr, engineering sales support manager for Stertil-Koni. "So that's currently what we're trying to work on and expand the capabilities [of]."



Stertil-Koni is currently working to expand the capabilities of their SKTJ Hydraulic Transmission Jack, so it can function as more of an EV lift table.

Kerr notes that they are looking to potentially add a large battery table to the jack, and with the equipment's 3,500 lb capacity, it would be able to handle lifting and lowering any EV battery.

CHALLENGER LIFTS

Recently introduced at SEMA 2022, Spikes says, "[Challenger Lift's [Medium Duty 5K](#)

[Mobile Columns](#)] will allow shops with limited space to have the flexibility of a mobile column system in a more compact form and at a lower price point."

As a set of four, the wireless mobile columns are able to lift 20,000 lbs and can lift vehicles from the wheels. This gives technicians total undercarriage access on both electric and larger vehicles.

Challenger also offers two EV lift tables – the [BT3000](#) and the [BT3300](#). Though both lift tables can be used to install and remove EV batteries, battery packs, transmissions, etc., the BT3000 offers a higher maximum height at 79.5" and has a rechargeable battery. On the other hand,



Challenger Lifts Medium Duty 5K Mobile Columns

the BT3300 can be easily maneuvered with its pallet-jack-style handle and extending, adjusting, and tilting top plate.

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ROTARY LIFT

One of Rotary Lift's newer lifts, the [Wide SmartLift](#), allows better accessibility to EV batteries. Though Matthews notes that their lifts have always had clearance, he says "the difference between that and our standard smart lift is that the plungers are further away from each other. And



Rotary Lift Wide SmartLift

that provides the clearance needed to be able to remove electric batteries.

He explains that previously if a shop had an in-ground lift, the way they were constructed typically would have interfered with the electric battery.

To complement the Wide SmartLift, Rotary Lift has the [LT33A Air-Hydraulic Lift Table](#). The table can shift in sections with the lift platform extending an additional

8", which eliminates the need to move the entire table when multi-positioning larger loads. Additionally, the tabletop can shift side to side by an inch and can tilt up to 1 degree. The variety of adjustments helps technicians easily line up vehicle components during installations. Rotary's lift table also features foot pedal controls.

BENDPAK

Announced at the 2023 NADA Expo, the [Bendpak](#) Mobi-EVS EV battery and pow-



Bendpak Upgraded EV2400SL EV Battery Pack and Powertrain Lifting System.

ertrain lifting system family includes the [upgraded EV2400SL](#) and the new [EV4000SL](#).

"Mobi-EVS lift tables can handle high-voltage battery packs from a Tesla Model 3 to a Ford F-150 Lighting all the way up to a GMC Hummer EV1," says Jeff Kritzer, president and CEO of Bendpak. "They protect

technicians by eliminating manual lifting, lowering, and positioning of heavy battery packs and making it easy to ergonomically move them around the shop."

Both models feature full-length utility trays on both sides for keeping fasteners



The EV4000SL has a 4,000 lb capacity and the capability to evaluate to more than 6' in less than 20 seconds.

and tools within reach, a stowable steering handle for more walkaround clearance, zero-throw tri-casters, and an integrated slip-plate deck that enables side-to-side shifting up to 1.5" along both axis for adjustability. The EV2400SL has a 2,400 lb capacity, while the EV4000SL has a 4,000 lb capacity and the capability to evaluate to more than 6' in less than 20 seconds.

Emily Markham is the editor of Professional Tool & Equipment News (PTEN) and Professional Distributor magazines. These publications are part of the Endeavor Business Media Vehicle Repair Group.

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FleetOwner AT ALT-TRUCK SUMMIT, 'INFRASTRUCTURE' THE KEYWORD

Starting with Cummins CEO's keynote, speakers urged fleets and C-suites to choose wisely which kinds of alternative fuel vehicles they adopt and to look carefully at feasibility, funding, and the construction of charging and pumping stations.

By **Scott Achelpohl**

INDIANAPOLIS—An estimated 20% of light- and medium-duty fleets could be zero-emission vehicles by 2030—even more for parcel and delivery fleets. The one-day [Green Truck Summit](#) ended up focusing more on how fleets

will power electric and other ZE trucks years from now.

Much of the March 7 summit was spent reminding fleets in attendance to pick the propulsion that best fits their use case: hydrogen fuel cell, hybrid, natural

gas, propane, biodiesel, and, yes, electric. Presenters included the keynote speaker, [Cummins](#) President and CEO Jennifer Rumsey, Giorgio Rizzoni, director of [The Ohio State University Center for Automotive Research](#), and Andrew Wrobel, director of auto and mobility at [Escalent](#), a behavioral research firm that focuses on how commercial vehicles are used.

See also: [More Work Truck Week 2023 news from Indianapolis](#)

The current "hype cycle" is all about battery-electric, Cummins' Rumsey said



Cummins President and CEO Jennifer Rumsey was the keynote speaker at the Green Truck Summit—and the two speakers who followed her riffed off her advice that fleets be "agnostic" and open to every alternative-fuel solution, not just battery electric, and consider that most of the efficiency in the trucking industry these days is being achieved by more efficient (but still diesel-burning) engines like the ones her company manufactures.

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Giorgio Rizzoni, director of The Ohio State University Center for Automotive Research, followed Rumsey and led the first presentation of the Green Truck Summit, "Powering the Future: Challenges and Opportunities in Vehicle Battery Technology."

in an exchange with the summit's returning emcee, John Davis, who is creator, host, and executive producer of [MotorWeek](#). Davis noted trends change, like how "biodiesel, you hardly hear about it today." Several years ago, natural gas was all the rage.

With the hype for electrification comes questions about charging infrastructure: how to finance it, how to locate reliable power in a utility grid that is often strained, how to build power stations, how to and who should maintain and repair them, and how to expand stations when a carrier's electricity needs grow. No fewer than four "Electric Foundations" breakout sessions during the March 7 summit, which kicked off [NTEA's Work Truck Week 2023](#), got into the weeds to find these answers.

See also: [Bottlenecks, infrastructure undermine alternative fuel trucks](#)

Much of [last year's Green Truck Summit](#) was spent on which electric vehicles fit fleets' needs, or their use cases; this year

was much about the "I" word. Rumsey, Rizzoni, and Wrobel all discussed infrastructure, careful not to favor one propulsion platform over another.

"We don't see a single solution, we see all solutions," noted Wrobel, whose presentation later at the summit was titled "The Electric Vehicle Balancing Act."

"There is not one solution that will meet all these applications at the same time," Rumsey added during her keynote address. Last year, Rumsey became the first [woman to lead the power technology company](#) in its more than 100-year history. Perhaps the three biggest recent announcements out of her company, which had revenue of more than \$28 billion in 2022, all dealt



Andrew Wrobel, director of auto and mobility at Escalent, during the Green Truck Summit session on March 7 that he hosted, "The Electric Vehicle Balancing Act."

with decarbonization and sustainability: its [New Power](#) business; its [next X10 fuel-agnostic engine for 2026](#); the [acquisition last August of commercial vehicle component maker Meritor](#), which in turn bought [Siemens' Commercial Vehicle Business](#) to aid Meritor in developing electric powertrains.

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'FUEL-AGNOSTIC' SUMMIT, WITH FOCUS ON ELECTRIC

Aside from the fuel-agnostic engine, Cummins has positioned itself to be a fuel-agnostic company, said Rumsey, who was introduced for her keynote March 7 by Davis, who noted that 800,000 light- and medium-duty commercial vehicles have been sold since this time last year, adding that “this conference will cover a great deal more than electrification, but you’ll hear a great deal about it.”

See also: [A framework for choosing powertrains in the 'messy middle'](#)

“Decarbonizing our industry is an important obligation we all have,” Rumsey said later, adding that “our broad portfolio is key to decarbonizing. This is where Cummins can help, to bring all these different solutions to customers.”

Much of the sustainability ink about Cummins lately has been about its fuel-agnostic platform, “which is interesting in that [it] has a lot of components common to multiple platforms,” she said, so the company is planning “different scenarios because no one can predict how adoption with these technologies will go.” The president and CEO added that most Cummins revenue still derives from traditional diesel-burning power technologies, but “there’s been a lot of growth in these new technologies. We’re continuing to evolve these new technologies in our portfolio.”

I'm back to the trucking and transportation track of my career after some time away freelancing and working to cover the branches of the U.S. military, specifically the U.S. Navy, U.S. Marine Corps, and the U.S. Coast Guard. I'm a graduate of the University of Kansas and the William Allen White School of Journalism there with several years of experience inside and outside business-to-business journalism. I'm a wordsmith by nature, and I edit FleetOwner magazine and our website as well as report and write all kinds of news that affects trucking and transportation.

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INDUSTRY FOCUS ON EVs SHIFTS LANDSCAPE FOR PARTS MAKERS

Consultant says the transformation could create opportunities for some manufacturers, but slower rollouts of new platforms and fewer models mean less variation in parts.

By Karen Hanna

The mechanics of how cars operate isn't the only thing that's changing as the automotive industry embraces battery-electric vehicles (BEVs) and autonomous vehicles. For manufacturers of auto components, the cycle of new-model introductions also is undergoing a transformation, according to a consultant who studies the industry.

"More of that differentiation is driven by software and other over-the-air capabilities," said Michael Robinet, executive director at S&P Global Mobility Consulting, referring to technologies that update software or firmware wirelessly. "What I'm really getting at is, the exterior's probably going to change just as often as it did before, but the platform or the structure underneath, definitely not as often; we think it's probably more of a 7- or an 8-year cadence."

S&P Global Mobility Consulting provides services to Tier 1 and Tier 2 suppliers. It projects that automakers will continue to pare down the number of trim levels they

offer, as software capabilities — rather than physical features, like tire rims and higher-octane powertrains — gain more influence over pricing.



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Rather than offering 10 or 12 different versions of the same vehicle, an automaker like General Motors eventually might offer only three or four, said Robinet, who noted that, traditionally, automakers have revamped models about every five years.

A move to longer cycles will simplify the supply chain, but could put a crimp in the prospects of smaller-volume parts manufacturers accustomed to supplying various permutations of the same part. Instead, Robinet said, “economies of scale become even more important.”

“The battery electric [design] does make it more difficult for small suppliers, a small OEM, to be competitive, because more of the differentiation of future BEVs is not really driven by mechanical components. It’s going to be more driven by software, standardization and bringing costs down through standardization,” Robinet said.

He characterized the transition to BEVs as more of a revolution than an evolution. It could take 20 to 25 years before BEVs completely rule the roads, with mold makers poised at the vanguard of the movement, Robinet said.

“The word transition doesn’t do it justice. It’s really a transformation,” he said.

But with all that change come potential opportunities.

The elimination of mechanical features related to the internal combustion engine

(ICE) frees up space for car designers to reimagine the look of their offerings.

“We [have] got to remember that just because a vehicle is going from ICE to BEV, it does drive a whole new thought process. And that’s where the opportunity for plastics may come in, is that it’s given the vehicle manufacturers a new thought of, ‘No longer do I need to package an engine in the front; no longer do I have to work with a tunnel. Now I’ve got this battery, this battery case underneath the passenger space, I’ve got to deal with. I now have to heat and cool the vehicle differently;” Robinet said.

The “tunnel” — the hump between the driver and passenger seats in ICE vehicles—isn't a feature in BEVs, creating additional space for new-look innovation.

Along with an emphasis on interior styling, the new vehicle layout could create new uses for plastics, especially as automakers look for ways to make their vehicles more aerodynamic. Self-driving vehicles, too, will have special need for plastics, as “Lidar and radar [signals] kind of work [their] way through a piece of resin versus a ferrous or non-ferrous material,” he said.

“There’s lots of new uses for plastics, and some that are going away, to be completely honest,” Robinet said.

Just days before the 57th Super Bowl, Robinet conceded he’s not sure how it will all play out for plastics parts manufacturers.

“How do I best put this?” he asked. “There’s no sort of playbook as we get into Super Bowl week. There’s no playbook in terms of, ‘Hey, this is how you should design a BEV.’ Virtually every OEM is doing it a little bit differently, and that’s good and bad.”

Senior Staff Reporter Karen Hanna covers injection molding, molds and tooling, processors, workforce and other topics, and writes features including In Other Words and Problem Solved for PMM, Plastics Recycling and The Journal of Blow Molding. She has more than 15 years of experience in daily and magazine journalism.

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FUTURE-PROOFING EV CHARGING STATIONS

Know what's coming down the road – and be ready to address it

It's happening now: More and more companies and consumers are choosing electric vehicles (EVs). This mass market penetration means that more energy and power will be required as more drivers switch to electricity. In turn, this is going to require a tremendous amount of charging infrastructure and electric power that's currently not being generated where it is needed.

Consider these statistics from the [Edison Electric Institute](#) (EEI) that recently released an updated report that details new insights into the coming wave of EV sales and the charging infrastructure needed to support projected EV growth: The number of EVs on U.S. roads is projected to reach 26.4 million in 2030, up from the projected 18.7 million as projected in the 2018 report. Annual sales of EVs will be nearly 5.6 million in 2030, reaching more than 32 percent of annual light-duty vehicle sales in 2030. Compared to the 2018 forecast, this is an increase of more than 1.8 million in annual sales in 2030.



Adobe Stock, courtesy of Xendee

Big questions arise around how millions of new EVs will be charged. The EEI report notes that nearly 12.9 million charge ports will be needed to support the projected 26.4 million EVs that will be on U.S. roads in 2030. And approximately 140,000 Direct Current (DC) fast charging ports will be needed to support the level of EVs expected to be on U.S. roads in 2030.

POWER UP TO MEET NEW FUELING DEMANDS

The pressure is on as utilities, developers, and fleet managers gear up to prepare for this rapid growth and begin building adaptable systems to better meet changing requirements.

A lot is needed. If we're talking about utilities only, they require massive new

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plants and distribution systems to meet increased demand with generators and utility lines, not to mention new substations, new transformers, new everything. Of course, new utility plants and utility upgrades, accompanied by new infrastructure, are expensive and time-consuming and very long-term investments. Securing building permits alone requires time and money. What's more, many of the costs get passed on to taxpayers.

All these requirements and costs support the case for alternative power sources for EVs, such as distributed energy resources (DER)-supported EV charging stations.

KEEP PACE WITH EVER-CHANGING LEGISLATION AND TARIFFS

In particular, it's critical to be aware of the most current terms of the [U.S. Inflation Reduction Act](#) as they relate to EV tax credits and other policies with very specific requirements. For example, right now new clean vehicles are eligible for up to \$7,500 depending on battery size until further guidance is released in the coming months, and used clean vehicles are eligible for a tax credit of up to \$4,000.

BE READY FOR NEW TECHNOLOGIES

The pace of new EV charging technologies arriving on the scene is increasing. This includes evolving charger capabilities

such as higher level capacity chargers for industrial trucks and wireless charging that allows EVs to charge without plugging in.

BE SMART TODAY AND TOMORROW

Smart future-proofing starts now with innovative, new EV charging solutions.

Instead of just relying on the utilities, alternative options include enabling EV drivers to charge their batteries via remote distributed energy resources like batteries or solar photovoltaic (PV) solutions and microgrids.

When planning fast-charging EV stations, you also want to ensure you have the ability to apply tariffs directly to charging and EV infrastructure instead of the building as a whole. You also want to design fast-charging EV stations with the flexibility to expand as the need for power increases. For example, make sure you can conduct multi-year analyses to project and understand how needs are likely to evolve over time. Most importantly, you want to generate the energy where it is needed to avoid the expected high costs of a utility system upgrade.

NOW ON THE HORIZON: DER-SUPPORTED FAST-CHARGING STATIONS FOR EVS

DER-supported fast-charging stations can deliver optimal electric vehicle fast charging, grid interaction, and value-added

grid services as well as provide a foundation for a reliable and sustainable nationwide EV charging network.

An EV project completed by [Xendee](#) and [Idaho National Laboratory](#) demonstrates how a DER-supported microgrid fast-charging station design platform can allow the EV industry to address, calculate, and assess the lowest cost technology mix for fast charging of EV and truck fleets, as well as optimal capacities for PVs, electric storage, generators, combined heat and power (CHP). The platform also provides insight into the net present value (NPV) or the return on investment (ROI) for the project including the EV fleet loads.

TWO TEST CASES HELP SHARPEN THE FOCUS ON THE FUTURE

As part of this EV fast-charging station project, the team identified charging requirements, load profiles, and power requirements that are particular to fast-charging heavy duty trucks and EV charging at scale. To simulate and validate vast-charging microgrid capabilities, the team defined two cases in California that also assured compliance with functionality and inter-connection standards.

One case study represented a grid connected microgrid fast-charging station with 5.83 MW of fast charging capacity. This second one represented an island station with 3.75 MW of fast charging capacity.

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As its conclusion, the project integrated three key components:

- The development and evaluation of a technical planning and economic analysis tool for the design and implementation of microgrid fast-charging stations
- The design of the microgrids' underlying electric infrastructure
- The appropriate testing algorithms to interpret the results

WHAT MAKES DERS A GOOD SOLUTION FOR EV CHARGING STATIONS

A holistic design and validation framework for DER configurations holds the promise of delivering optimal EV fast charging, grid interaction, and value-added grid services. It also creates a foundation for a reliable and sustainable nationwide EV charging network with a viable financial model for financiers.

The optimal EV fast-charging station incorporating DERs provides:

- System operations to minimize costs and maximize revenue
- Efficient charging and discharging of electric storage and the EV fleet to minimize overall costs.
- Optimized management of EV fleet charging times
- Strategic placement of fast-charging

stations and local generation resources to mitigate bottlenecks in the utility system

- Analysis of the impact of grid outages on the EV charging, costs, and equipment oversizing
- Sales of excess energy back to the utility as a revenue stream
- Proper electrical engineering for cables and transformers.

This sponsored article was written by Michael Stadler, PhD - CTO & Co-Founder, Xendee

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SCOUT MOTORS TO BUILD \$2 BILLION EV PLANT NEAR COLUMBIA, SC

The 1,600-acre facility will be the Virginia-based company's first.



Scout Motors Inc., Tysons Corner, VA, is establishing its first manufacturing plant near Columbia, SC, where it will build next-generation trucks and SUVs. According to the company press release, the \$2-billion investment has the potential to create 4,000 or more permanent jobs. At full capacity, more than 200,000 Scout vehicles may be produced annually at the facility.

The release said South Carolina already has more than 500-plus automotive-related companies and 75,000 automotive industry employees, and that the state is No. 1 in the U.S. for export sales of both completed passenger vehicles and tires. In Oct. 2022, Governor Henry Mc Master issued an executive order that prioritized building EV infrastructure, preparing the state workforce for advanced manufacturing jobs, and strategically organizing EV planning under a centralized state working group.

The site for the Scout EV factory spans approximately 1,600 acres, with the plant itself occupying 1,100 less than 20 miles

north of Columbia. The press release said this proximity gives Scout access to major highways, ports of Charleston, SC, and Savannah, GA, and universities focused on automotive engineering. Groundbreaking is planned for mid-2023 and production is projected to begin by the end of 2026.

International Harvester produced Scout utility vehicles from 1960 to 1980.

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TRAVELCENTERS OF AMERICA CONNECTING EV FAST CHARGING AT 200 STATIONS

The Electrify America-managed network will offer fast charging speeds of up to 350 kW for almost all EV brands, providing range confidence to EV drivers traveling long distances

By Rod Walton



Image credit: TravelCenters of America

One of the nation's largest fuel and rest stations is partnering with Electrify America to locate approximately 1,000 direct-current (DC) fast chargers for electric vehicles utilizing its TA/Petro locations.

According to TravelCenters of America (TA), the collaboration is aimed at meeting the evolving needs of motorists and moving towards a more sustainable future.

"TA's large locations with expansive

amenities are attractive to EV motorists and we are committed to expanding our EV charging infrastructure to accommodate this growing number of EV drivers over time," said Jon Pertchik, CEO of TravelCenters of America.

Under the deal, TA will buy about 1,000 DC fast chargers from Electrify America to be deployed at 200 locations along highways over a period of five years. The first stations are expected to be launched in 2023.

Electrify America will be responsible for designing, installing, operating, and maintaining the charging stations. Additionally, it will also manage the permitting, maintenance, and 24/7 customer support services. TA will be part of the Electrify America charging network, enabling customers to access and pay for charging via the Electrify America app.

The network will offer fast charging speeds of up to 350 kW for almost all

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EV brands, providing range confidence to EV drivers traveling long distances.

“Electrify America is pleased to collaborate with an industry leader like TravelCenters of America to provide the critical infrastructure needed for EV drivers of today and tomorrow,” said Giovanni Palazzo, President and Chief Executive Officer of Electrify America. “Our combined strengths allow us to take bigger steps toward our shared vision of a more sustainable future.”

Headquartered in Westlake, Ohio, TravelCenters of America operates in 281 locations in 44 states, principally under the TA, Petro Stopping Centers and TA Express brands.

The company is working to be ready for a growing electrification of the U.S. transportation sector, although that rollout may be uncertain when it comes to commercial and industrial fleets. In a TravelCenters survey released last summer, about 20 percent of respondents said they had an EV in their fleet, while close to half expected to add them by 2030.

TA also has a deal with [heavy-duty vehicle maker Nikola to install hydrogen stations](#) in Ontario, California. Many see hydrogen-powered fuel cells as a better option for Class 8 trucking and large buses because of higher energy density and longer range with H2, according to reports.

[H2 to the Future: Hexagon Purus banks on Fuel Cell Transport future with new Hydrogen Cylinder plant](#)

Electrify America, a Virginia-based open DC fast charging network and subsidiary of Volkswagen Group of America, is investing more than \$2 billion in zero emission vehicle infrastructure, education and access.

Electrify America and Electrify Canada expect to have more than 1,800 total charging stations with over 10,000 individual chargers in the U.S. and Canada combined by 2026. Currently, Electrify America estimates about 3,450 fast chargers across the U.S.

Walton has spent 14 years covering the energy industry as a newspaper and trade journalist. He formerly was energy writer and business editor at the Tulsa World. Later, he spent six years covering the electricity power sector for Pennwell and Clarion Events. He joined Endeavor and EnergyTech in November 2021.

Walton earned his Bachelors degree in journalism from the University of Oklahoma. His career stops include the Moore American, Bartlesville Examiner-Enterprise, Wagoner Tribune and Tulsa World. EnergyTech is focused on the mission critical and large-scale energy users and their sustainability and resiliency goals. These include the commercial and industrial sectors, as well as the military, universities, data centers and microgrids. The C&I sectors together account for close to 30 percent of greenhouse gas emissions in the U.S.

Many large-scale energy users such as Fortune 500 companies, and mission-critical users such as military bases, universities, healthcare facilities, public safety and data centers, shifting their energy priorities to reach net-zero carbon goals within the coming decades. These include plans for renewable energy power purchase agreements, but also on-site resiliency projects such as microgrids, combined heat and power, rooftop solar, energy storage, digitalization and building efficiency upgrades.

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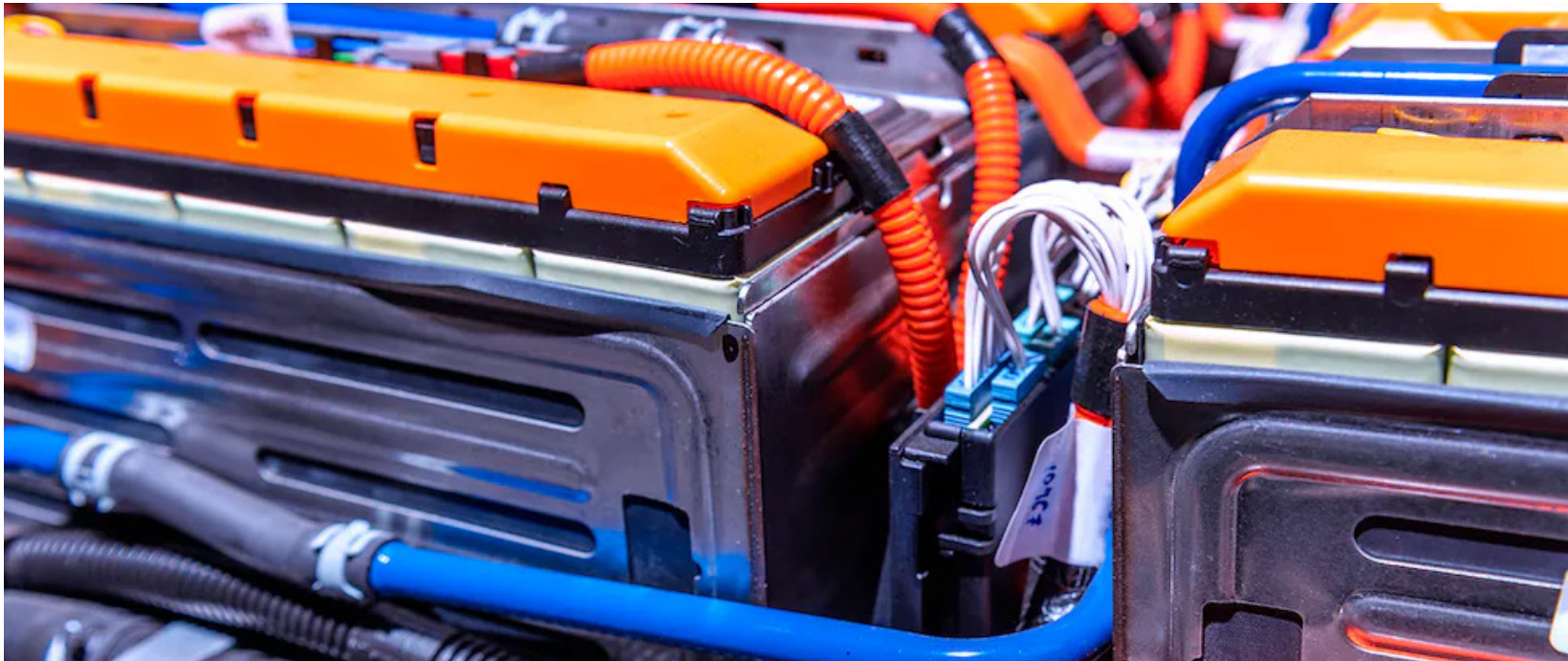
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**AMERICAN
MACHINIST**

HONDA EV BATTERY VENTURE DRAWS MORE FUNDING

A \$3.5-billion start-up that will mass-produce lithium-ion batteries for Honda's North American vehicle output is due for another \$237 million from Ohio's economic development agency.

Honda Motor Co. and LG Energy Solution have drawn \$237 million more in assistance for their joint-venture EV battery plant announced in January and scheduled to begin development soon southwest of Columbus, Ohio. In addition to the new plant, one of the grants will provide \$87 million to Honda for retooling its Ohio automotive plants for electric vehicle production.

The three grants from JobsOhio, an economic development agency, will be paid over 10 years. Along with the aid for Honda's

retooling, the largest of the three grants is worth \$140 million for economic development at L-H Battery Co., the new manufacturing business. A \$10-million grant will cover workforce development.

The state previously pledged \$156.3 million in tax incentives and infrastructure improvements for the L-H Battery project.

"LG Energy Solution has all the right assets to make this joint venture a success, including the financial stability, quality, competitiveness, and production capacity with global operational

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expertise,” L-H Battery CEO Robert H. Lee stated in January. “With two companies’ expertise combined, we will provide top quality batteries to ensure the successful launch of Honda EVs in North America, and grow with the community here in Ohio by creating high value jobs.”

Honda operates two vehicle assembly plants in Ohio, at Marysville (Honda Accord Sedan and Coupe, and Acura TLX and ILX) and East Liberty (Acura RDX); and an engine casting and manufacturing operation (four-cylinder, V-6 and turbo engines) at Anna, Ohio.

In January Honda (49%) and LG (51%) announced their plan for L-H Battery Co. to mass produce advanced lithium-ion cells by the end of 2025, with an estimated annual capacity of 40 Gwh. All the batteries to be produced will be supplied exclusively to Honda’s North American plants, for battery-electric vehicles to be sold in the U.S. and Canada.

The partners committed to invest \$3.5 billion in the project, though their overall investment is projected to reach \$4.4 billion.

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HOW ELECTRIC VEHICLES CAN ENABLE GRID RESILIENCY AND REAL DECARBONIZATION

“There is a whole network of connected assets that can be aggregated and optimized with AI-powered software to create what the industry calls virtual power plants.”

By Ruben Llanes, CEO of AutoGrid Systems

With electric vehicle (EV) sales projected to exceed **50% of total auto sales by 2030**, utilities are facing both a rapid rise in electricity demand and an enormous opportunity to tap flexible capacity. Although we’ve made impressive inroads over the past decade, the US still faces the critical need for solutions to its strained and inefficient electric grids, which significantly impact the world’s carbon output. Today’s power providers have questions about EV-charging insights, demand forecasting, the ability to shape load and manage demand peaks, while providing a seamless customer experience.

The answers to those questions are found in smart-grid technologies.

Smart-grid technologies are in the midst of a global boom, with the market size to reach an **estimated \$846 billion** by the end of 2030. EV charging touches on several aspects of utility



regulation, including utility treatment of distributed-energy resources. The truth is, there are resources to support the energy grids around us, yet we’re not utilizing their availability. By further leveraging software and AI within our grids, we’ll be able to find and create a resource that can be used to balance the supply-and-demand equation.

There is a whole network of connected assets that can be aggregated and optimized with AI-powered software to create what the industry calls virtual power plants (VPPs). These VPPs are not real, physical power plants, but act as such. While serving the same function that a traditional fossil fuel-based power plant provides, a virtual power plant is, in fact, a superior solution. VPPs are cleaner and more cost effective, because they monetize the long tail of assets, which are largely underused.

A key example of this: EVs. Within California, there are more than one million electric cars registered, though most of those electric vehicles are not in use 90% of the time—they are parked in a garage at homes and offices. These vehicles can be turned into a grid asset, with the grid tapping into the batteries during

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those times when the system needs it, with the added benefit of creating a new source of revenue for the vehicle owner.

More than ten years ago, the first distributed-energy resource (DER) that we connected was an EV charger. Since then, we have deployed solutions at scale at multiple utilities across North America and globally, leveraging a vast ecosystem of EV and electric vehicle supply-equipment vendors.

We recognize that in order to create a decarbonized and democratized EV-grid infrastructure, innovation must be a constant.

By tapping into the EV value chain to support the grid, we'll be able to play a meaningful role in accelerating the energy transition, which is critical to meeting decarbonization objectives. To date, the industry has underinvested in the means necessary to achieve the energy transition. According to the [International Energy Agency](#), annual investments in energy-sector infrastructure and technologies will need to increase from today's level of \$1 trillion to \$4 trillion by 2030 to accomplish net-zero emissions by 2050.

With these demands in sight, funding for this transition has finally become a top priority. With the [Inflation Reduction Act](#) (IRA) signed into law last year, billions of dollars in incentives, grants and loans became available to support new infrastructure investments in the areas of clean energy, transportation and the environment. Backed by this funding within the next decade, a crucial opportunity to accelerate the modernization of the US energy grid is upon us. When combined with the EV boom, there's an opening for the creation of a connected and resilient grid that can tackle decarbonization at scale.

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Thank you for taking the time to read through our first-quarter wrap-up of the electric vehicle market. Endeavor Business Media's many brands will continue to cover this story from various industry angles, and we invite you to regularly receive updates through our many digital newsletters.

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- [EnergyTech](#) updates readers three times weekly on the rapidly evolving commercial and industrial energy landscape.
- [American Machinist](#) offers a weekly news update and a monthly solutions spotlight that highlights products and services to improve operations. It also participates in Quick Manufacturing News, a daily newsletter with material from American Machinist, IndustryWeek, Plastics Machinery & Manufacturing and several other Endeavor manufacturing publications.
- [Smart Industry](#) updated readers with twice-weekly industry news updates and its monthly Top 5 collection of best-read articles.

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