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CONFERENCE

Emerging Technologies Committee 2021-2022 Roadmap/Vision

PRESENTED BY:

BOB AUGUSTINE-VP BUSINESS DEVELOPMENT-OPUS IVS

CHUCK OLSEN- SR VP AUTOMOTIVE TECHNOLOGY-AIRPRO DIAGNOSTICS

JASON BARTANEN-DIRECTOR OF INDUSTRY RELATIONS-COLLISION HUB

Audience Response Question:

Please indicate which stakeholder group you represent:

1. Repairer
2. Insurance
3. OEM
4. Supplier
5. Salvage
6. Consultant
7. Education
8. Associations
9. Other

Leave this area for
the response results



Emerging Technologies Roadmap/Vision



- Two Subcommittees and Areas of Focus
- Core committee groups with rotation of topics and participants
- Continue liaison activities between industry groups
- Three distinct verticals (Collision, Mechanical, HD)
- Bring industry movers together from each vertical
- SMEs from each (instructors, engineers, technologists)

Subcommittees Areas of Focus

Electrical/Electronics

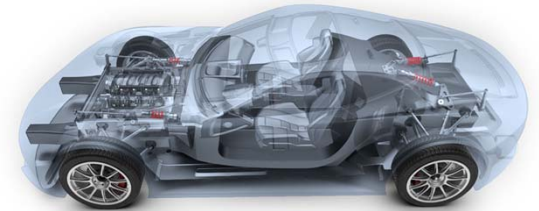
- Electric Vehicles (Hybrid, Plug-in Hybrid, BEV, FCEV)
- Cybersecurity (Secure Vehicle Interfaces, Secure Gateway Modules)
- Telematics (V2V, V2I, communications)
- Driver Assist and Automatic Driving Systems (ADAS)
- Diagnostic Methods and Tools
- Calibration and Programming



Subcommittees Areas of Focus

Structural/Mechanical

- Vehicle Structure and Materials
- Attachment Methods
- Tools and Equipment
- Blueprinting & Required Inspections (Including Restraints & Steering Columns)
- Measuring and Alignment (Including ADAS Considerations)



Emerging Technologies Committee Call for Participation

For more information to participate in Emerging
Technologies Committee or Subcommittees

- Chuck Olsen: chuck.o@airprodiag.com
- Bob Augustine: bob.augustine@opusivs.com
- Jason Bartanen: jason@collisionhub.com



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Questions ?



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EV 101

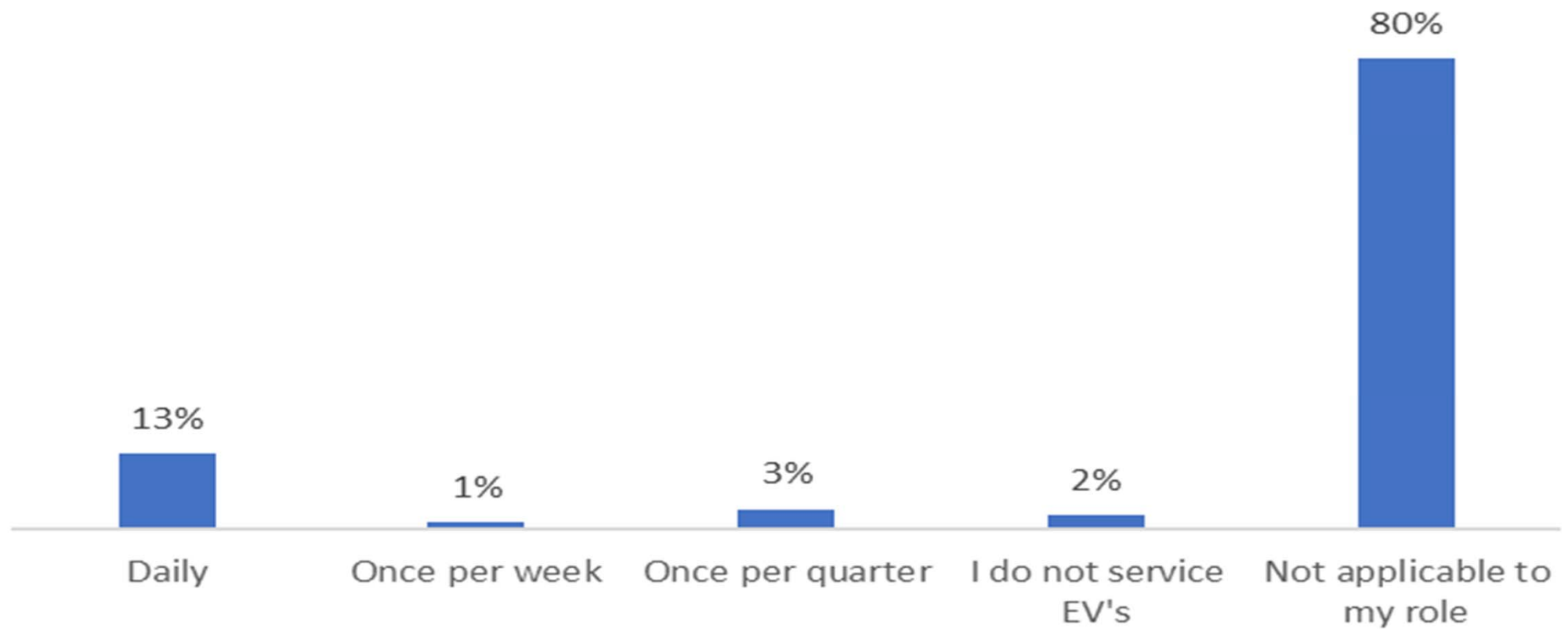
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I currently am repairing EVs today:



The Industry is Full of “Experts”

[Home](#) > [News](#) > [Cars & Auto](#)

The Predictions Were Wrong: Self-Driving Cars Have a Long Way to Go

Removing humans from behind the steering wheel is a tough nut to crack. Before we reach the driverless, accident-free utopia we've been dreaming of for decades, we must overcome several hurdles, and they're not all technical.



By [Ben Dickson](#) February 11, 2019



"From 2020, you will be a permanent backseat driver," [The Guardian](#) said in 2015. Fully autonomous vehicles will "drive from point A to point B and encounter the entire range of on-road scenarios without needing any interaction from the driver," [Business Insider](#) wrote in 2016.

It's clear now that many of these estimates were overblown; just look at the [trouble Uber had in Arizona](#). Driverless cars will surely make our roads safer, but removing humans from behind the steering wheel is a tough nut to crack. Before we reach the driverless, accident-free utopia we've been dreaming of for decades, we must overcome several hurdles, and they're not all technical.

What is the Real Roadmap?

TECHNOLOGY NEWS JANUARY 14, 2018 / 2:32 PM / 2 YEARS AGO

Ford plans \$11 billion investment, 40 electrified vehicles by 2022

Nick Carey, Joseph White

5 MIN READ



In addition to the car, Volvo also made a bold environmental pledge: half of its cars will be electric by 2025, and that it will slash the life-cycle carbon footprint on each car by 40 percent by the same year. The XC40 Recharge is the first vehicle for which Volvo is disclosing the life-cycle carbon footprint — effectively the CO2 emissions the car will produce during its life with both manufacturing and usage taken into account.

BUSINESS NEWS JUNE 6, 2019 / 8:19 PM / 9 MONTHS AGO

Toyota speeds up electric vehicle schedule as demand heats up

Kevin Buckland, Naomi Tajitsu

4 MIN READ



TOKYO (Reuters) - Toyota Motor Corp aims to get half of its global sales from electrified vehicles by 2025, five years ahead of schedule, and will tap Chinese battery makers to meet the accelerated global shift to electricity-powered cars.

February 10, 2020 Automotive News

GM: Fewer choices, more money

Savings on trims, engines will go to EV efforts

Hannah Lutz

hlutz@crain.com

General Motors' need to funnel more capital toward electric vehicles means buyers of the next-generation Chevrolet Equinox and GMC Terrain won't be able to choose from as many colors, engines or other options. Fewer choices allows GM to save significant money by ordering fewer parts.

Last year, GM eliminated about 3,500, or 12 percent, of the parts used in its plants. This year, it aims to eliminate 25 percent more.

"We'll accomplish that by eliminating more trim levels, exterior colors, engines and trans-

missions and by bundling more sourcing options to better serve our customer," GM President Mark Reuss said during an investor day presentation last week.

The compact crossovers' next redesign, which *Automotive News* has reported is likely in 2023, will incorporate more reused and shared parts, Reuss said. GM will cut the number of trims to six from eight, and five engine variants will be offered instead of 11. Overall build combinations will be cut to fewer than 100 per program from 200 today, Reuss said.

see **GM**, Page 69



GM President Mark Reuss: "This action will help us self-fund our electrification programs."



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December, 2020 Automotive News

That sound you don't hear is a rising wave of BEVs

DECEMBER 13, 2020 07:00:01 PM

IN THE LAST TWO YEARS, CONSUMER PURCHASE CONSIDERATION FOR AN ELECTRIC VEHICLE HAS INCREASED BY 24 PERCENT, ACCORDING TO A MCKINSEY & CO. REPORT.



December, 2020 Automotive News

Consumers interested in EVs, but charging still a sticking point, survey shows

DECEMBER 17, 2020 12:10:34 PM

A NEW SURVEY BY CONSUMER REPORTS SHOWS 7 IN 10 U.S. DRIVERS ARE INTERESTED IN GETTING AN ELECTRIC VEHICLE AT SOME POINT, ALTHOUGH COST, RANGE AND CHARGING REMAIN BARRIERS.



December, 2020 Automotive News

'More complicated' than a brake job

DECEMBER 13, 2020 07:00:01 PM

TECHNICIANS ACROSS THE COUNTRY ARE PREPARING FOR A FUTURE DOMINATED BY ELECTRIFICATION.



Updated technician training crucial with new vehicles on horizon

DECEMBER 13, 2020 07:00:01 PM

AS AUTO COMPANIES RAMP UP PLANS FOR MORE ELECTRIC VEHICLES, THE SCHOOLS TRAINING THE TECHNICIANS WHO WILL WORK ON THESE VEHICLES ARE SHIFTING GEARS TO PREPARE THEM FOR A WORLD OF ELECTRIFICATION.

December, 2020 Automotive News

Strategies to keep BEVs from zapping your service lane revenue

DECEMBER 13, 2020 07:00:01 PM

FIXED OPERATIONS PROFESSIONALS ARE GEARING UP FOR WHAT COULD BE ONE OF THE BIGGEST SERVICE DEPARTMENT DISRUPTIONS SINCE WORLD WAR II. HERE ARE SEVEN STRATEGIES FOR OFFSETTING THE REVENUE DECLINES BROUGHT ABOUT BY HIGHER SALES OF LOW-MAINTENANCE BEVS.



Exit Voluntarily

DECEMBER 14, 2020 12:00:01 AM

NEARLY 1 IN 5 CADILLAC DEALERS IN THE U.S. REPORTEDLY HAVE DECIDED TO QUIT THE BRAND RATHER THAN MAKE COSTLY UPGRADES TO SELL AND SERVICE ELECTRIC VEHICLES.

December, 2020 Automotive News

VW explores fixed-price sales model for EVs

DECEMBER 09, 2020 04:34:52 AM

THE AUTOMAKER WILL ALLOW CUSTOMERS TO ORDER VEHICLES AT A FIXED PRICE DIRECTLY THROUGH THE COMPANY WEBSITE, PHONE APP OR FROM AUTHORIZED DEALERS.



GMC steers away from buyouts to non-EV dealers, exec says

DECEMBER 08, 2020 10:23:50 AM

UNLIKE CADILLAC, THE BRAND WILL NOT EXTEND BUYOUT OFFERS TO DEALERS WHO ARE RELUCTANT TO SELL UPCOMING ELECTRIC VEHICLES. ABOUT HALF OF GMC DEALERS HAVE AGREED TO SELL THE 2022 HUMMER PICKUP AND WILL UPDATE THEIR FACILITIES TO SELL AND SERVICE EVS.

December, 2020 Automotive News

Musk says EVs will double electric demand; Tesla would consider merger

DECEMBER 01, 2020 12:16:11 PM

ONCE EVS BECOME THE NORM, ELECTRICITY FROM INTERMITTENT GENERATING ENERGY SOURCES SUCH AS WIND AND SOLAR WILL NEED TO BE STORED, PROBABLY THROUGH BATTERY TECHNOLOGY, MUSK SAID. HE ALSO SAID HE WAS OPEN TO DISCUSSING A MERGER OF TESLA WITH A RIVAL.



December, 2020 Automotive News

Regulators receive a roadmap toward smart self-driving vehicle policies

NOVEMBER 24, 2020 01:04:25 PM

THE WORLD ECONOMIC FORUM LAYS OUT WAYS IN WHICH REGULATORS WHO LACK TECHNICAL EXPERTISE CAN MOVE FROM A PRESENT-DAY MURKINESS TOWARD PRACTICAL FRAMEWORKS FOR SELF-DRIVING VEHICLES.

MY2019 Offerings



2019 Audi E-Tron



2019 BMW i3



2019 Chevrolet Bolt



2019 Fiat 500e



2019 Honda Clarity

MY2019 Offerings



2019 Hyundai Ionic
E



2019 Hyundai
KonaE



2019 Jaguar i-Pace



2019 Kia Niro E



2019 Kia Soul E

MY2019 Offerings



2019 Nissan Leaf



2019 SMART E-ForTwo



2019 Tesla Model 3



2019 Tesla Model S



2019 Tesla Model X



2019 VW e-Golf

Coming Soon...

Pandemic interrupts the flow,
but electrified offerings are building

Plug-in progress

The list of electric vehicles planned for the next five years is slightly shorter than it was in 2019, in part because some plans have been pushed back to conserve cash during the pandemic. A few vehicles have been canceled outright as automakers evaluate the market and narrow their focus.

But the number of plug-ins on sale is rising steadily, and automakers expect consumers to warm up to electrification as the vehicles become less a curious novelty and more a practical, mainstream option.

Here are the battery EVs and plug-in hybrid EVs that *Automotive News* has reported as being in development and expected to debut through 2024.

2020

BMW 5 Series: The 5 Series plug-in hybrid receives a more powerful six-cylinder drivetrain and a beefier battery in the fall. A full redesign of the 5 Series is expected in late 2023.

Chrysler Pacifica Hybrid: A refreshed version of the plug-in hybrid minivan is due to arrive in the fourth quarter. A redesign isn't expected until 2026.

Ford Mustang Mach-E: The Mach-E is the first real result of Ford Motor Co.'s \$11.5 billion investment into electrification announced in 2018. Executives hope a legendary name will be enough to convert traditional gearheads into battery-electric buyers. The crossover, built in Mexico, will have a range of 300 miles. It will be offered in rear-wheel-drive and all-wheel-drive configurations and go on sale this year.

Jeep Wrangler: A plug-in hybrid option will arrive in U.S. showrooms by the end of this year with the brand's new 4xe tag for electrified models.

Lincoln Corsair GT: A plug-in hybrid model of Lincoln's bestselling nameplate, called the Grand Touring, will go on sale this year. From a performance perspective, the plug-in nestles between the standard 2.0-liter engine and available 2.3-liter. The GT has an all-electric range of more than 25 miles and a Lincoln-first electric awd system. The Corsair is expect-

ed to be freshened in 2022, with a redesign in 2024.

Polestar 2: The battery-electric fastback, inspired by the Volvo 40.2 concept, is powered by a 78-kilowatt-hour battery. The car is based on Polestar's compact modular platform, the same platform that underpins the Volvo XC40 crossover. The 2021 Polestar 2 debuts Google's Android Automotive for its infotainment system. It is expected to go on sale in October.

Volkswagen ID4: The first Volkswagen ID4 battery-electric compact crossover will arrive in the U.S. at the end of 2020 and should be in most VW dealerships in the first half of 2021. The ID4, built on the modular MEB electric platform and assembled initially in Germany, will have a range of up to 311 miles on a single charge, based on the larger 82-kWh batteries in the first versions. U.S. production of the ID4 is slated to begin in 2022 in Tennessee and is likely to bring a price cut and a smaller battery.

Volvo XC40: An all-electric variant of the XC40, called the XC40 Recharge P8, will arrive in the U.S. this fall. It will debut an Android-powered infotainment system.

pected to go into production in 2021 and have a plug-in hybrid option.

Audi E-tron GT: The E-tron GT, a battery-electric sportback sedan developed alongside the Porsche Taycan, will join the Audi lineup in the U.S. during the second half of 2021. It is expected to have electric motors on each axle producing a combined 590 hp across its awd system, and it should be capable of a 0-to-60-mph time of 3.5 seconds or less.

Audi Q4 E-tron: The full-electric compact crossover is a new vehicle joining the lineup in late 2021 as Audi's third EV, following the E-tron and E-tron GT. The sportback crossover, built on Volkswagen Group's modular MEB platform, is expected to offer greater range than its E-tron predecessor. The concept on which the Q4

E-tron is based featured a large rear spoiler to improve airflow that is expected to carry over to the production model.

Bentley Bentayga: The refreshed Bentayga V-8 is arriving at dealerships now. Bentley says the refreshed plug-in hybrid variant will be shown by year's end and arrive in the second half of 2021.

Bollinger B1/B2: Bollinger Motors says its electric B1 SUV and B2 pickup will start at \$125,000. The boxy vehicles have a 200-mile range and removable doors and roof panels. The company plans to build about 1,000 total units during the first year of production.

BMW iNext: The new X5-sized battery-electric crossover will arrive in late

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2021

Alfa Romeo compact crossover: A new small crossover is ex-



Polestar 2: Debuts
Android Automotive



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Automotive News

FUTURE PRODUCT PIPELINE

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EVs

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2021. It will feature BMW's fifth-generation battery design and be built on the Cluster Architecture platform. The base version iNext will be powered by a 63-kWh battery pack and deliver 335 hp and 285 miles of range. The iNext will launch with Level 3 autonomy.

BMW X3 xDrive30e: BMW has electrified its bestselling model in the U.S. The X3 xDrive30e plug-in hybrid crossover combines a 2.0-liter, inline four-cylinder engine with an electric motor and a 12-kWh battery pack to deliver an electric-only range of about 20 miles. The X3 is due for a freshening in late 2021, followed by a redesign in 2024.

Byton M-Byte: Chinese EV startup Byton says its M-Byte crossover will have a 224-mile range, start at about \$45,000 and feature a 48-inch display screen in the dashboard. The automaker last year received licenses to sell the vehicle in California, paving the way for a North American arrival in 2021. But the cash-strapped company suspended production in July for a reorganization after being hit by the coronavirus pandemic.

Chevrolet Bolt: The Bolt will be updated in 2021 but stay on the BEV2 platform for now. The freshening includes a new front fascia and rear lights, along with more cameras and other technology. The updates were postponed to the 2022 model year because of the pandemic.

Chevrolet Bolt crossover: Chevy will launch a utility version of the Bolt in 2021. The electric crossover will be built on the Bolt's BEV2 architecture but offer more interior space.

Ferrari SF90 Stradale: The coronavirus pandemic delayed the start of production of Ferrari's first plug-in hybrid, the 986-hp SF90 Stradale. It was due to be delivered to cus-



The Lordstown Endurance is designed for commercial fleets.



The 1,080-hp Lucid Air will have standard lidar for detecting objects.

tomers in the first half of 2020, but now European deliveries are expected to begin in October, with U.S. deliveries to follow in 2021.

Genesis EV: Since Hyundai has confirmed that its first EV on a new dedicated platform will be a midsize crossover, chances are that Genesis will build something similar. Spy shots suggest the Genesis version could be a tall hatchback, echoing the body of EV crossovers such as the Tesla Model Y that are relatively low to the ground to reduce wind resistance and increase efficiency. The five-door Genesis could take some cues from the well-received Mint concept from last year's New York auto show. The Genesis EV should launch before the end of 2021.

Hyundai Ioniq 5: Hyundai has said the Ioniq name will be used for a global EV brand with three new battery-electric models. The Ioniq 5 midsize crossover will launch globally next year but not arrive in the U.S. until the fall.

Hyundai Kona: A freshening of the subcompact, which is available in gasoline and electric versions, is scheduled for next year.

Karma GS: Karma Automotive plans to expand its lineup with a new, lower-priced family of sedans called the GS series, which in-

cludes at least one battery-electric sedan. Sales will start "towards the end of 2021," a spokesman said last month. The GS will ride on a skateboard-style chassis and be based on the current Revero GT's architecture.

Kia electric crossover: Kia's plan for 11 EVs by 2025 includes a new product next year riding on the company's first dedicated global battery-electric platform. The vehicle is expected to be a compact-to-midsize crossover similar to Hyundai's planned Ioniq 5, announced in August. Spy photos show what appears to be the Kia version of the EV still covered to hide its styling elements. Motor1.com reported that spy photos of the new Kia indicate a model that is similar to the Genesis version.

Lordstown Endurance: Deliveries of Lordstown Motors Corp.'s electric pickup, designed for the commercial fleet market, are scheduled for summer 2021. The pickup is slated to be built at the former General Motors plant in northeastern Ohio. The pickup will feature four hub motors producing a combined 600 hp, have more than 250 miles of range on a full charge and will start at \$52,500 before tax credits. The company says it has received more than 40,000 preorders since unveiling

the Endurance in June.

Lucid Air: The 1,080-hp electric sedan with a 517-mile range, from startup Lucid Motors, is expected to be one of the first production vehicles equipped with standard lidar for detecting vehicles, pedestrians and other obstacles. Lucid plans to have 20 retail and service locations in North America by the end of 2021 for the Air.

McLaren plug-in hybrid: McLaren's upcoming plug-in hybrid will have a higher power output than the entry-level Sports Series vehicles, but it will slot below the 720S from the brand's midrange Super Series. It will have an electric range of roughly 19 miles, with a charge time of three to four hours. The launch has been delayed more than six months by the pandemic, with North American deliveries now set to begin around May. The electric motor will sit between the engine and the gearbox, and McLaren has not identified which internal combustion engine will be included in the layout.

Mercedes-Benz EQA: The electric version of the GLA should arrive in the U.S. next year. The crossover is inspired by the Concept EQA

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shown at the 2017 Frankfurt auto show, which proposed a 60-kWh battery and about 250 miles of driving range, based on European emissions tests.

Mercedes-Benz EQB: The electric version of the GLB crossover will arrive in the second half of 2021. The EV is expected to have a range of more than 200 miles, based on Worldwide Harmonized Light Vehicle Test Procedure estimates.

Mercedes-Benz EQC: Mercedes' first electric compact crossover is scheduled to arrive early next year. It is part of a family of electric vehicles with standalone designs launched under the EQ subbrand. The EQC is powered by an 80-kWh battery and has about a 280-mile range on a full charge, based

assembled at a resurrected Mitsubishi plant in Normal, Ill. The company, backed by investments from Amazon, Ford and Cox Automotive, planned to begin deliveries in late 2020 but now says customer shipments will begin in 2021.

Rivian delivery van: Amazon has ordered 100,000 electric delivery vans from Rivian. Drivers will be able to use voice commands in the cargo area to sort packages without having to manually enter instructions or use handheld devices. The vans are expected to come in three sizes and support multiple battery sizes to accommodate different types of routes, Rivian said. They will be manufactured at Rivian's Illinois plant and are expected to begin package delivery beginning in 2021, with at least 10,000 in use by 2022 and the entire fleet by 2030.

Tesla Cybertruck: It looks like nothing else on the market, and that's just what Tesla CEO Elon Musk wants. The Cybertruck, scheduled to go on sale in late 2021, is expected to have a towing capacity of up to 7,500 pounds and a range of more than 250 miles. It will be assembled at the plant Tesla is building outside Austin, Texas, and it's likely to be classified as a medium-duty truck. The automaker has received about 500,000 preorders, Musk says, although he's left open the possibility of scrapping the vehicle's bold design for a "normal truck" if sales flop.

Volvo XC40: The new sporty electric crossover is expected to launch in the second half of 2021. It will have a sloping roofline and feature an EV-inspired grille design. The new design swaps the slotted grille for a



Cybertruck: Its own thing

partially closed-off, more aerodynamic one since there is no internal combustion engine to cool. A combustion engine variant is also expected.

Volvo XC60: The midsize crossover was redesigned for the 2018 model, and the T8 plug-in hybrid variant was introduced. A freshening is due in the second half of 2021, possibly with Volvo's new Android-powered

infotainment system.

2022

Alfa Romeo subcompact crossover: A new subcompact crossover starts production in 2022 and will have a battery-electric variant, but the brand hasn't given many details yet.

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BMW 7 Series: The large luxury sedan received a freshening and powertrain improvements last year and will be redesigned in the second half of 2022. The car will be available as a gasoline-powered model with 48-volt technology, as a plug-in hybrid and, for the first time, as a battery-electric model.

BMW i4: The EV will launch in the first quarter of 2022, promising more than 300 miles of battery range. The sporty four-door coupe will be built on BMW's lightweight modular Cluster Architecture platform, capable of going from 0 to 60 mph in four seconds.

BMW X5: A redesigned plug-in hybrid version of the midsize crossover arrived in July. That model is

powered by a turbo inline-six coupled with an electric motor, delivering a combined 389 hp. The plug-in version can go from 0 to 62 mph in 5.6 seconds. The X5 is due for a freshening in late 2022.

Cadillac Lyriq: The Lyriq, with at least a 300-mile range at launch, is one of two EVs confirmed by Cadillac so far. The sporty midsize crossover likely will be built in Orion Township, Mich., and will be one of the first vehicles to adopt Cadillac's new EV naming strategy — ending names with "iq." It also will be one of the first EVs to be powered by GM's proprietary Ultium batteries. The Lyriq, which Cadillac says will start at less than \$60,000, will go on sale in the fourth quarter of 2022.

Chevrolet Corvette: Expect Chevy to add variants of the midengine



Cadillac Lyriq: One of two EVs confirmed by the brand

Corvette over the next couple of years, including a hybrid or plug-in hybrid version in 2022. Democratic presidential candidate Joe Biden has made several mentions of being told that an electric Corvette that can go 200 mph is on the way.

Fisker Ocean: Henrik Fisker

showed off the Ocean, a 300-mile electric SUV with a solar roof, in January. It's planned to arrive in early 2022 as the first of three EVs to revive the Fisker name.

Ford Escape: Ford added a plug-in hybrid this year and plans to freshen the Escape in 2022. A redesign is expected no sooner than late 2024.

ment, which could be shown to the press late next year and would go on sale in 2022, is expected to move far upmarket and offer full-electric and hybrid models.

Land Rover Road Rover: An awd, carlike electric vehicle that uses Jaguar Land Rover's MLA architecture could be introduced sometime next year, with sales starting in 2022. The vehicle, possibly a tall wagon or a beefy, five-door hatchback in the vein of the classic Rover SD1, would not be aimed at off-road enthusiasts.

Maserati GranTurismo: The coupe and its convertible counterpart will be the first all-electric models from the luxury brand when they debut in 2022.

Maserati Grecale: An electric version of the midsize crossover that's debuting in 2021 could hit dealerships in 2022.

Maserati MC20: The sports car,



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Coming Soon...

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tery-powered compact crossover will start in Leipzig, Germany, in the second quarter of 2022, with U.S. arrival later that year. The electric Macan will be based on the PPE architecture, developed in collaboration with Audi. Like the Taycan, the Macan EV will use 800-volt charging technology.

Tesla Roadster: Tesla announced in 2017 plans for a new Roadster that would start at \$200,000. After initially promising it late this year, Musk recently said it has taken a back seat to other projects, including construction of the Berlin Gigafactory and planned production of the Cybertruck. He still hasn't set a firm time frame for a vehicle that he says will lay a "hardcore smackdown to gasoline cars," but it's not likely before 2022.

2023

Audi E-tron: Audi's first BEV went on sale in the U.S. in early 2019, and its limited range disappointed. Audi took steps this year to improve range through software and packaging changes. A sportback version went on sale this year, as well. The crossover will be due for a freshening in 2023, when its range is likely to be expanded further, among other changes.



Honda EVs: Honda is co-developing two electric vehicles with GM based on a GM platform and using GM's new Ultium batteries. Honda will design the EVs, which are likely to be crossovers. Sales are expected for the 2024 model year, so the models are likely to appear in 2023, if the original timeline holds.

Jaguar EV-Type: Jaguar reportedly is considering two possible successors to the F-Type: a midengine gasoline model or a battery-electric sports car. Reports out of England say Jaguar has trademarked the name EV-Type in case the electric version is chosen. It could arrive in 2023.

Land Rover Discovery Sport: During a reengineering of the awd midsize crossover in 2023, the mild-hybrid powertrain could be upgraded to a plug-in version.

Maserati Levante: Maserati's first crossover could get a mild hybrid

crossover: Not much is known about the EV fruits of a partnership between Subaru and Toyota, but the two brands will share one platform. It'll be a new nameplate rather than a battery-powered variant of an existing model and will be about the size of a Forester. It might be offered in a front-wheel-drive variant with one motor and an awd layout with two motors. The timing of its arrival has been unclear from the automakers except that it'll be in the first half of the 2020s. For this list, we'll estimate it's about three years away.

Volkswagen ID Buzz: The retro-styled homage to the venerated Microbus of yore is finally due to arrive in the U.S. in 2023, some five years after the concept was shown. The Buzz concept remains popular, and Volkswagen has announced plans to overhaul its plant in Hamburg, Germany, to begin producing it.

pected no sooner than late 2024.

Ford F-150 EV: Ford will add a battery-electric variant of its most important vehicle by mid-2022. The automaker hopes to sell business owners on the benefits of the F-150 EV, which it says will produce more horsepower and torque than any previous F-150 and cost more than 40 percent less to operate than the current gasoline model. Ford also says it will have a "distinct" look relative to the gas-powered F-150.

Ford Transit EV: Ford has no plans to redesign the gas-powered Transit for the foreseeable future, but a battery-electric model is coming in mid-2022. The Transit EV will be offered with three roof heights and three body lengths, in cargo van, cut-away and chassis cab varieties.

GM electric van: Expect at least one commercial electric van in 2022. GM could sell two variants under the GMC and Chevy brands, or the automaker could even create a new brand.

GMC Hummer electric pickup: The Hummer name will be revived on a high-powered pickup that will be unveiled this month, go into production in late 2021 and arrive at dealerships in early 2022. The pickup, powered by GM's proprietary Ultium batteries, will generate 1,000 hp and go from 0 to 60 mph in three seconds. GMC officials have said a little more than half of the brand's dealerships have opted in to sell the truck.

Hyundai Ioniq 6: The battery-electric sedan arriving in 2022 will be the second entry in the Ioniq EV lineup.

Jaguar XJ: Jaguar ended produc-

Maserati MC20: The sports car, which maxes out at 630 hp, is being tasked with generating excitement as Maserati diversifies its lineup with electrified options and new technologies. It could go on sale in the first quarter of 2021 and will cost around \$230,000. Convertible and battery-electric versions are scheduled to arrive in 2022.

Mercedes-Benz EQE: The compact battery-electric sedan could arrive in 2022. Although the EQE will have the proportions of a C-Class, its interior should offer the roominess of an E-Class. This will be due to packaging advantages of the EQE's dedicated EV platform, referred to internally as MEA2.

Mitsubishi Outlander PHEV: The plug-in hybrid version of the Outlander will remain on the old platform for now but receive a more powerful gasoline engine and a bigger battery in the fourth quarter of this year as a 2021 model. Overall power and all-electric range will increase modestly. Mitsubishi's product plans have the redesigned plug-in showing up in 2022. A freshen to the plug-in should come with the gasoline model in 2024.

Nikola Badger: Production of Nikola Corp.'s first vehicle, the Badger pickup, is scheduled to begin in late 2022. GM, under a partnership that gives it an 11 percent stake in Nikola, will engineer and assemble the truck. It will be powered by GM's proprietary Ultium batteries and Hydrotect fuel cell systems, while Nikola facilitates sales and marketing.



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Chasing a Trend...



Chasing a Trend...

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|| EVs IN FOCUS ||

Automotive News

New EVs target demand for crossovers

Brands focus on customer appeal as competition grows

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Even before it reaches dealerships this fall, the Ford Mustang Mach-E is getting a price cut of up to \$3,000.

It's a testament to the looming competitiveness of a segment — battery-electric crossovers — that barely even exists at the moment. Ford, Volkswagen, Hyundai and Nissan are joining Tesla's Model X and Model Y by shifting their electrification focus from cramped compliance cars to more-appealing crossovers and SUVs that hit at the heart of today's internal-combustion market.

"It's the next frontier," Karl Brauer, executive analyst at ISeeCars, told *Automotive News*. "EVs were always kind of little econoboxes that happened to be powered by electric motors."

"But I think a lot of people started to realize, these vehicles are never going to have a chance at going mainstream unless they move beyond the traditional small car and into larger crossovers that have a lot of compelling features."

Unlike earlier electric vehicles, it's not a matter of weaker-than-expected demand. Reservations for the top-end Mach-E First

Edition sold out in days and quickly filled again after Ford doubled the production allocation. Ford says the sticker reductions will help the vehicle "remain fully competitive in a segment that is seeing dynamic price changes."

Volkswagen soon will launch its compact ID4 with a starting price roughly \$2,000 less than that of the Mach-E and a base model that can go 20 more miles on a charge than what Ford will offer. Tesla this year slashed Model Y prices by \$3,000, bringing the crossover's least expensive version to less than \$50,000. Next year, the Hyundai Ioniq 5 and Nissan



Ford's Mustang Mach-E, top, will join Tesla's Model Y and others in the BEV crossover fray.

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Winds of Change are a-blowin'...

Dealers win pivotal change to Colo. EV bill

Startups can own stores, but franchised networks protected

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In what Colorado auto dealers are calling a victory, state senators last week approved legislation that would allow Rivian and other electric vehicle manufacturers to sell directly to consumers — but only after scaling the bill back to exclude traditional automakers with franchised retail networks.

That change softened the Colorado

Automobile Dealers Association's opposition and gave proponents the votes needed to pass the bill Friday, Feb. 28, after lawmakers delayed a vote for several days. The dealers association, which had fiercely opposed the original bill, said it supported the amendment and now was neutral on the proposal, which goes to the state House for consideration.

Dealers were able to block the most controversial provision, which

would have allowed an automaker to own, operate or control a dealership selling EVs it manufactures. They argued that would allow brands with franchised dealership networks to compete directly with dealer-owned stores, despite traditional automakers' public statements that they weren't interested in doing so.

Rivian and other EV makers also gained a path forward to sell directly to Colorado consumers, a move



Jackson: Offers some security

backed by Democratic Gov. Jared Polis' administration and environmental groups. But the revised language prevents traditional automakers, such as Ford Motor Co., from doing

the same with, for instance, its upcoming Mustang Mach-E crossover.

The way the bill initially was written, "there would have been a lot of pullback of [dealer] investments," association President Tim Jackson said. "This provides some security on that investment."

The Alliance for Automotive Innovation, the newly formed trade group that represents automakers, said it opposed the revised bill because all companies would not be treated equally.

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