



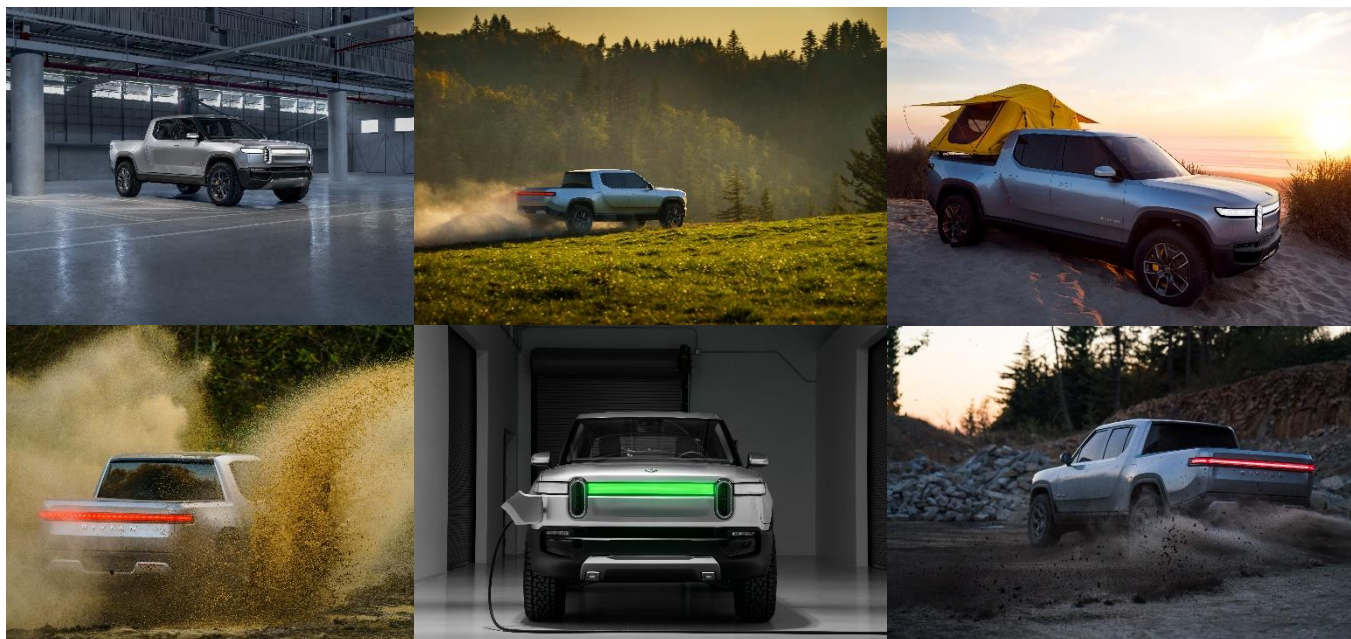
ELECTRIC TRANSPORTATION UPDATE

November 2018

IN THE NEWS

Electric Pickup Debuts at 2018 LA Auto Show

Part 1 of 2



Photos courtesy of www.rivian.com/

Overview

Full-size pickups have been the best-selling cars in the US, with Ford leading the charts for the past 36 years. A market gap in the EV market has been the lack of a plug-in pickup. Rivian, start-up company out of Plymouth, Michigan, just released pictures and specs on its plug-in pickup to be launched this week at the LA Auto Show 2018. Rivian has about 600 employees and is stated to have \$0.5B in funding. EPRI is meeting with Rivian at the event and will report back with part two of this update next week. Media coverage of the Rivian announcement can be found at: InsideEvs.com, Jalopnik.com, GreenCarReports.com, pickuptrucks.com, and trucks.com.

What is it?

A ground-up, fully-electric crew cab 4x4 high-end pickup truck, the Rivian R1T, available with three battery sizes (see table below) and up to Level 3 autonomous driving.

How big is it?

At 215 inches long and 79 inches wide, it's about a foot shorter than a Ford F-150 or Chevrolet Silverado 4x4 crew cab, all with similar width. At 71 inches tall, it's about four inches lower than the Ford or Chevy.

What are the key performance specs?

Each R1T will have four electric motors, each producing 147 kW and rated to tow 11,000 lbs. Level 2 AC charging is stated to be 11 kW. DC fast charging (Combo/CCS) at 160 kW is standard. Off-road specs include 14.1 inches of ground clearance, 39 inches of fording depth, and front and rear departure angles of 34 and 30 degrees.

What are key options?

Battery size (kWh)	Driving Range (miles)	Cost	Availability	0-60 mph (seconds)
180	400+	TBD	Late 2020	3.2
135	300+	TBD	Late 2020	3.0
105	250+	\$69,000	Mid 2021	4.9

Where will it be built?

Rivian has purchased the former Mitsubishi factory in Bloomington-Normal, Illinois. The factory formerly produced 250,000 vehicles annually.

What else?

Rivian has also announced (but not shown) a similar fully-electric SUV, the R1S, to be available early 2021. The R1S is to be launched on 11/27/2018.

EPRI's take:

The \$70k price may raise eyebrows, but this largely competes against other "lifestyle trucks" like the GMC Sierra Denali (\$59k), Ford F-150 Platinum (\$55k), Chevrolet Silverado High Country (\$58k), and the Ram 1500 Limited (\$57k). Those trucks start at \$55,000 (as a base price), and buyers load them up with options, which could result in the vehicle costing as much as \$70,000. The technical and performance specs are noteworthy.

Other OEM efforts for electrified pickups

- RAM currently offers a [mild-hybrid eTorque](#) in its 2019 trucks. This does not plug-in and has a 0.33 kWh battery.
- Prior to 2019 model year for its Silverado pickup, Chevrolet offered a mild-hybrid called eAssist with a 0.45 kWh battery. This also does not plug-in. On its 2019 models, Chevrolet has appeared to switch to a [turbo four cylinder](#) that drops to two cylinders instead of offering eAssist.
- Ford has announced the [2020 F-150 will have a hybrid option](#). No specs are available yet.
- The mid-sized 2019 Jeep Gladiator pickup (to be shown this week in LA) will share a platform with the 2021 RAM Dakota. While rumors abound, it is currently unknown whether either of these trucks will have the mild hybrid system (2018) or plug-in hybrid system (2020) of the Jeep Wrangler with which they share many components.

Volt dead. Long live the Volt.

[General Motors announced today](#) the closure of five factories in North America, [layoffs of 15%](#) of its workers, and the elimination of eight car models by March 2019, including the plug-in hybrid Chevrolet Volt. GM has also announced that it will have [20 electrified vehicles by 2023](#). EPRI is digging into the details in a 2018 deliverable, but it looks like GM will offer between six and nine electrified EVs in the US under the Chevrolet, Buick, and Cadillac brands.

EPRI's take:

This is not a surprise. GM has been saying for a while that the [Volt PHEV technology might go into a crossover](#) (the body style that much of the global car market currently wants) and the Volt sedan would go away (sales show that the global market apparently doesn't want sedans – gas or electric -unless it's a Tesla Model 3). Also, PHEVs have their place, but due to the parallel systems, are more complicated and in the long run may be more expensive than a BEV. However, PHEVs require less battery capacity and do not require DC fast charging infrastructure, also significant expenses, so we shall see how this plays out.

ELECTRIC POWER RESEARCH INSTITUTE

3420 Hillview Avenue, Palo Alto, California 94304-1338 • PO Box 10412, Palo Alto, California 94303-0813 USA

800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com

© 2018 Electric Power Research Institute (EPRI), Inc. All rights reserved. Electric Power Research Institute, EPRI, and Together...Shaping the Future of Electricity are registered service marks of the Electric Power Research Institute, Inc.



ELECTRIC TRANSPORTATION UPDATE

December 2018

IN THE NEWS

Electric Pickup (and SUV) Debut at 2018 LA Auto Show

Part 2 of 2

Meeting Summary

As mentioned in Part 1 / the November 2018 “hot topic” overview, startup company Rivian introduced two fully electric vehicles at last week’s Auto Show. If the amount of interest on industry day before the show opened to the public is any indication, Rivian’s truck and SUV looked to be quite popular. During our meeting with Rivian at the show, their executive detailed their plan: launch the truck (R1T) in late 2020 and the SUV (R1S) about six months later, in three different battery sizes with driving ranges up to 400 miles. Rivian will not have traditional dealers, but instead have service centers.

Rivian is also in discussions to sell components, battery, and/or chassis to other interested parties. They also are considering various ownership structures, such as selling or leasing the battery separately. Although their prototypes are fully-loaded, they also are already spec’ing out a simple utility-spec truck that might be of interest to fleet managers. Lastly, and to no surprise, they are also interested in energy storage, providing services to the grid, etc. We had a good discussion with Rivian and will invite them to EPRI Infrastructure Working Council (IWC). It is important to remember that Rivian doesn’t plan to launch for another two years and much work remains to be done until then.

Rivian R1T electric truck:



Rivian R1S electric SUV:



What else was at the LA car show that plugs in?

Plug-in crossovers and SUVs from Audi, Range Rover, Hyundai, KIA, Jaguar, BMW, Mini, and Mercedes filled the hall. The cargo van version of the VW I.D. Buzz was also noteworthy. In the category of future/might-not-happen tech, BMW also featured the [iNext](#) concept, and Icona showed an autonomous pod called the [Nucleus](#).



EPRI's take:

The upper range of crossovers and SUVs looks to be the next to electrify. Lincoln's top-of-the-line Aviator SUV will be a plug-in with 450 horsepower. At more mass-market levels, Hyundai/KIA also showed five plug-in crossovers; the BEV versions will have more than 230 miles of range. In parallel, most competitors to a Tesla Model S or Model 3 also have announced a plug-in version. Audi revealed the e-tron GT, its answer to the Model S that will share a platform with next year's Porsche Taycan sedan. Both will charge at 350 kW. It was interesting to see Range Rover featuring their two plug-in SUVs at the very front and center of their booth, while Mercedes relegated the plug-ins to the back. Jaguar and Audi had plug-in SUVs that you could sit in. Look for overview and specifications in EPRI's annual "Consumer's Guide to EVs" to be released in February 2019. In the meantime, the 2018 Guide is [here](#).

Photos taken by Rob Schurhoff and Dan Bowermaster, EPRI

ELECTRIC POWER RESEARCH INSTITUTE

3420 Hillview Avenue, Palo Alto, California 94304-1338 • PO Box 10412, Palo Alto, California 94303-0813 USA
800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com

© 2018 Electric Power Research Institute (EPRI), Inc. All rights reserved. Electric Power Research Institute, EPRI, and Together...Shaping the Future of Electricity are registered service marks of the Electric Power Research Institute, Inc.