

January 27, 2022

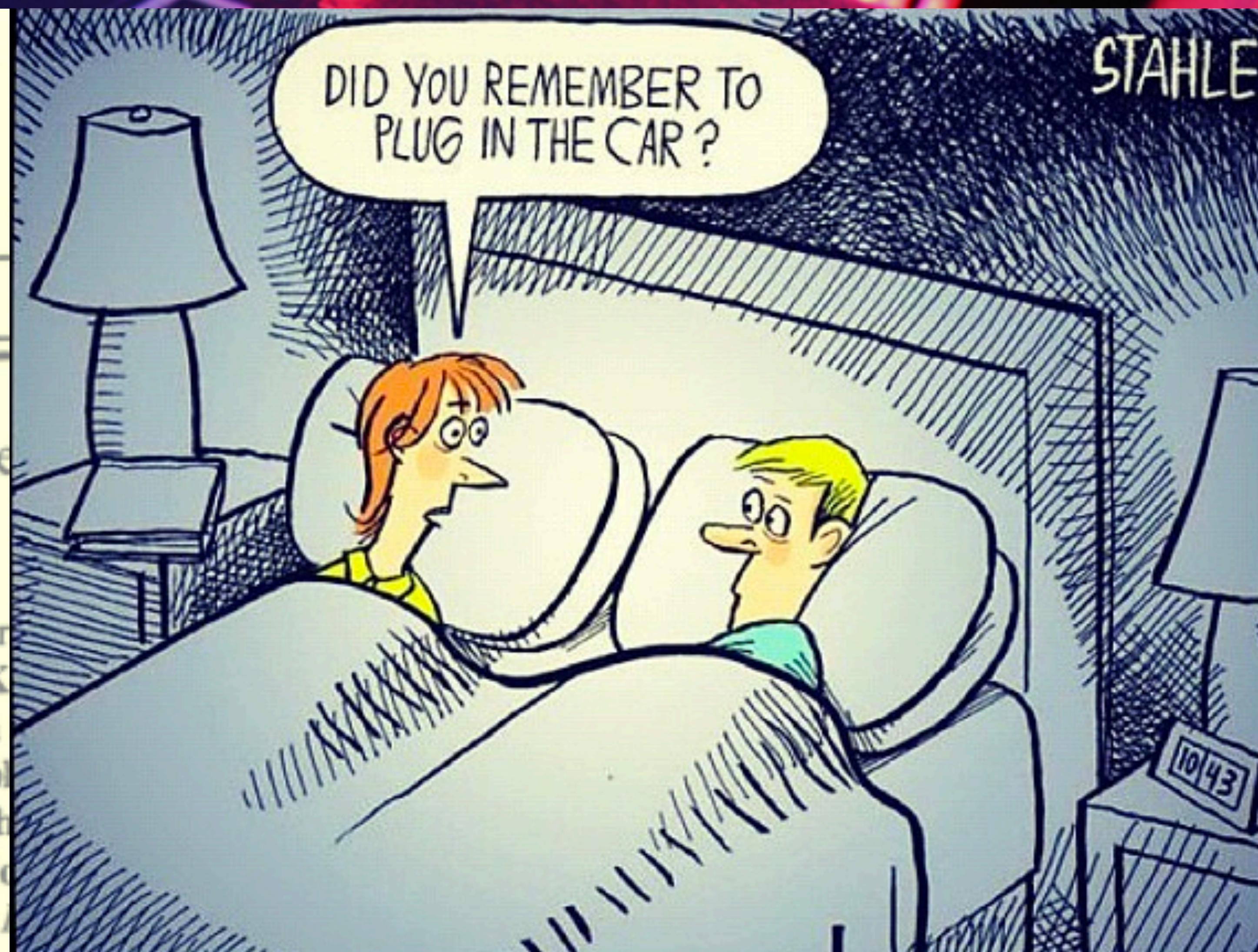
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# Hunterdon Computer Club

◆ DOS HUG

Volume 8

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# Hunterdon Computer Club

Agenda January 25, 2022

- Introduction & Announcements
- Q&A Segment
- Presenter Topics
  - ★ The 21st Century Revolution in Cars/  
Manufacturing
- Post Meeting Open Line Chit Chat Segment

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# Everything You Need to Know about Electric Vehicles

## Blog Post

### Everything You Need to Know about EVs

By Lon Hosford

01/25/2022



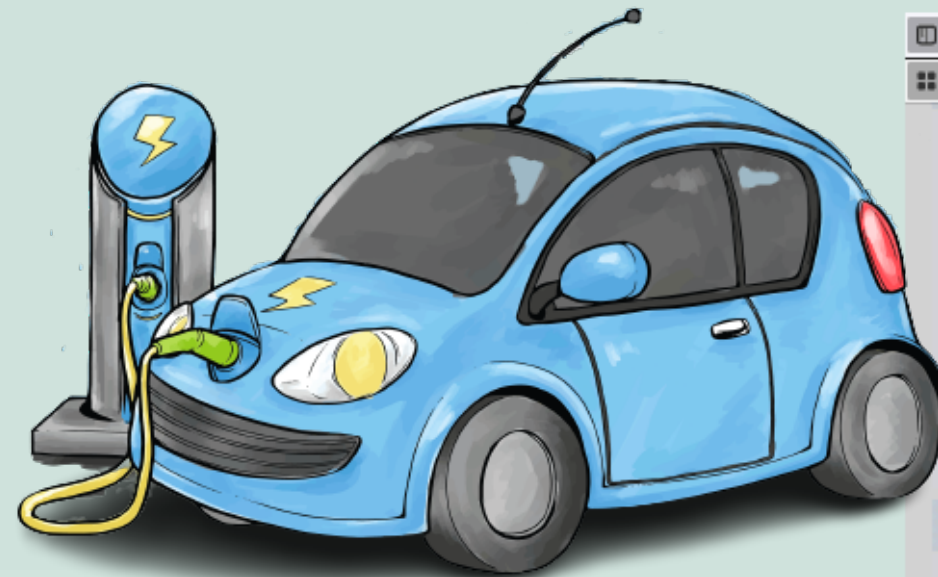
These are my notes from the meeting.

This was an engaging presentation. Jim Weichel's, our presenter, enthusiasm shined through and gave everyone a better perspective on the current state for electric vehicles.

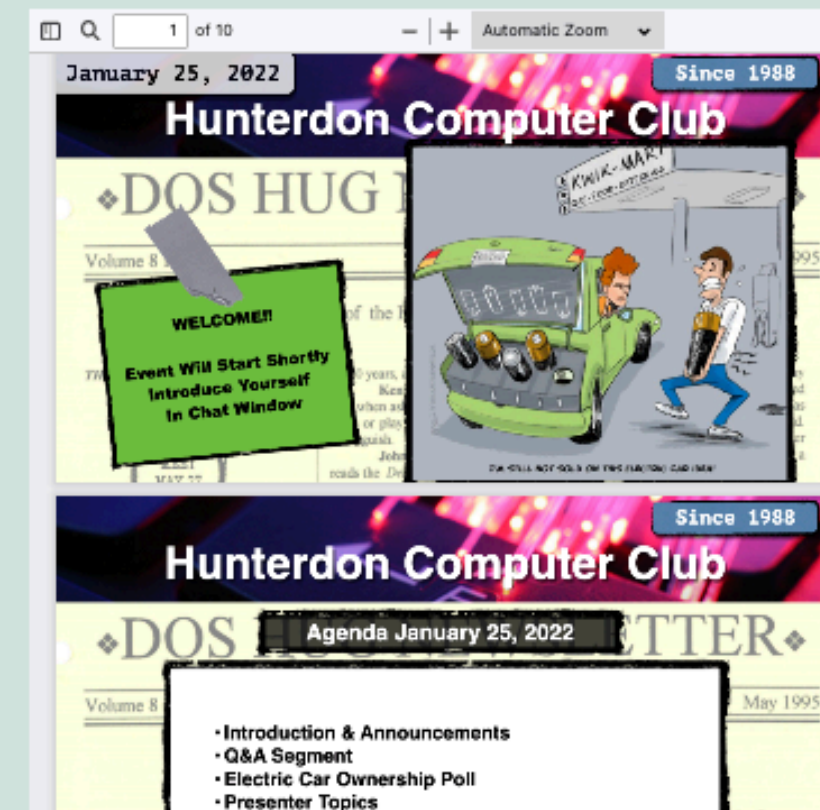
Many myths were dismissed. You can see these in Jim's presentation deck he has graciously provided for viewing and found below in this article.

One myth that caught my attention is that there is enough Lithium in one mine in Nevada to convert all US cars/trucks to EVs. Lithium is a key component to EV batteries. Then once Lithium is harvested for a battery, when the battery life cycle comes to an end and needs to be recycled, the Lithium in the battery can be extracted for new battery.

One other myth that struck a cord for me is that current EV production is limited by the production capacity for the EV batteries. This means




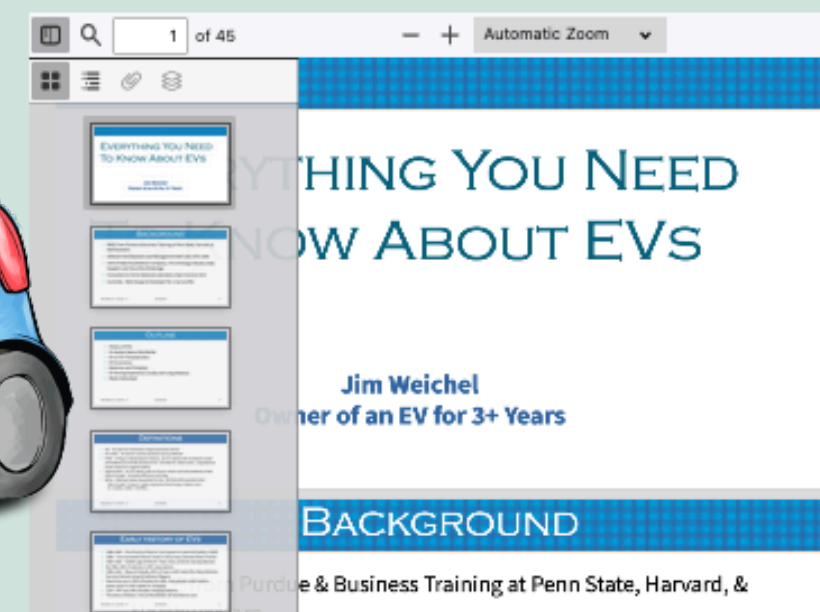
### Meeting Presentation Deck



hcc-2022-01-25

Download

### Jim Weichel's EV Presentation Deck



**James Weichel** · 1st  
Retired CTO and Management/Technical Consultant  
Naperville, Illinois, United States · [Contact info](#)

## Topics

- ✱ **Brief History of EVs (Electric Vehicles)**
- ✱ **EV vs ICE (Internal Combustion Engine) Characteristics**
- ✱ **EV Current Market Status Worldwide**
- ✱ **EV Economics vs ICE Cars**

# Everything You Need to Know about Electric Vehicles

HEALTHY LIVING HEALTHY PLANET

## natural awakenings



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January 2022 | Somerset-Middlesex-Hunterdon-Mercer-S. Warren  
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## The Electric Vehicle Revolution

Moving Toward an All-EV Future this Year

by Jim Motavalli



Almost certainly, electric cars are in everyone's future. Not only are automakers—from General Motors and Volvo to Rolls-Royce and Bentley—pledging to stop producing gas and diesel cars, but a long list of countries in Europe and Asia plus three U.S. states are planning to ban them by 2040 or earlier, often citing climate change imperatives.

This wouldn't be happening if electrification technology was standing still. Instead, it's made rapid progress to the point that electric vehicles (EV) are more often than not better cars than their internal combustion counterparts. A range of 300 miles or more (the top model of the luxurious Lucid Air claims 520) has become commonplace, and the inherent properties of electric motors—such as lots of low-end torque—means they're very fast off the line. The Rimac Nevera, an EV supercar, reaches 60 mph in an incredible 1.85 seconds.

But there's more. Fuel and service costs have been dramatically reduced with EVs. A 2018 University of Michigan Transportation Research Institute study pegged the average cost to operate an EV at \$485 a year, compared to \$1,117 for a gas-operated car, and battery packs and electric motors take up less space than engines, transmissions and radiators. This means larger passenger compartments with more legroom and no center "hump," and storage up front (the so-called "frunk"), as well as behind. Designers are even

able to ditch the grille—a feature shared by all but a few air-cooled cars on the market.

### EVs Get More Affordable

The high cost of EVs has been off-putting. The Tesla Model S Plaid Edition, made in California, starts at \$129,990, the Arizona-produced Lucid sells for up to \$170,000, and the Croatian-made Rimac costs \$2.4 million. That's one reason EV penetration is low—accounting for only 2 percent of U.S. sales in 2020. By last year, there were almost 1.8 million EVs on American roads—three times the number of 2016—but affordable cars would make the numbers grow much faster. The federal \$7,500 federal income tax credit for EVs

helps, but it has a 200,000-unit sales cap, and General Motors and Tesla have already met it. Some states, and especially EV-friendly California, have generous additional incentives, and a proposed increase in the tax credit from \$7,500 to \$12,500 is under consideration by Congress.

Battery pack costs—the key reason EVs are expensive—went down an average of 16 percent per year between 2007 and 2020, the University of Pennsylvania reports. And that has created cheaper electric vehicles such as the Chevrolet Bolt (\$31,995), Hyundai Kona (\$34,000), Mini Cooper SE (\$30,750), Nissan Leaf (\$32,620) and Tesla Model 3 (\$41,190).

The big news for truck fans is that the country's bestselling vehicle for many years, the Ford F-150 pickup, will have a battery electric variant called the Lightning on the market this spring with a price under \$40,000.

For some people, hybrid or plug-in hybrid vehicles are a better choice. They're certainly cheaper. Toyota's long-lived Prius (with 58 mpg city/53 highway) starts at \$24,525. And there's an appealing Ford hybrid truck, too—the Maverick—at \$19,995. It went on sale late last year.

These "green" trucks are undoubtedly better for the environment than their gas and diesel counterparts. Greenhouse gas production is directly tied to fuel economy, and some versions of the current F-150 pickup get only 15 mpg combined. The only emissions from its EV counterpart and battery trucks like it will be from the generation of the electricity to run them. The Maverick hybrid gets 40 mpg in city driving.

In 2020, researchers in England and Holland said that driving an EV is better for the environment in 95 percent of the world—the exception would be in areas with very dirty coal-based grids. For a complete lifecycle analysis, it's necessary to factor in the effects of manufacturing, the mining of rare earth minerals, the makeup of the local grid, end-of-life recycling and other factors. EVs do have slightly higher greenhouse gas production from recycling (1.8 tons versus 2.4 tons) because of battery processing, a Chinese study says. But that same study reports that complete lifecycle emissions for EVs are 18 percent lower.

The good news is that many of the factors that go into lifecycle analysis are getting better for EVs. Renewable energy is the fastest-growing energy source, and the amount in the U.S. grid increased 100 percent between 2000 and 2018. Lithium is essential for modern EV batteries, and both General Motors and BMW have invested in more sustainable methods of extraction.

### Integrating with the Home

Another EV cost is the installation of 240-volt electricity for home charging. But in 2020 the International Code Council (ICC) set new voluntary guidelines for new homes that would make all of them "EV-Ready". Installing the necessary wiring when the house is built would cost \$920, compared to \$3,550 for a retrofit, says the ICC. Some municipalities, such as Seattle, already require EV wiring for new homes with off-street parking.

Increasingly, EVs are being equipped for two-way power,

meaning they can power homes or construction sites. That's one part of the appeal of Ford's Lightning, which has 9.6 kilowatts of power available to keep the lights on during a power outage. It can provide full-home electricity for three days.

### What to Expect

Buying an EV will require some lifestyle changes, most but not all of them positive. Passing up gas stations is a plus. Studies show that 80 percent or more of EV charging will be done at home, mostly at night. Regular servicing for tuneups and oil changes will become a distant memory, and so will the financial bite. AAA says EVs will cost on average \$949 less per year to maintain.

Many of today's electric cars have range limitations, and this needs to be factored into trip planning. The 2021 Volkswagen I.D. 4 Pro can travel 260 miles on a charge, perhaps not enough to get to grandma's house. The 2021 Nissan Leaf only has a 150-mile range, although the Leaf Plus increases that to 226.

Buying used is tempting, because some EVs—such as early Nissan Leafs—are highly affordable, with good ones costing about \$7,000. But its range is poor, just 73 miles. While some older Teslas have credible range, they've also retained their value pretty well. In general, buying new—which includes claiming the federal income tax credit—is a better idea.

First-time EV buyers worry about high prices, range, finding public chargers (although the \$7.5 billion allocated to build them in the recent infrastructure bill may help), the considerable time needed to recharge at home, compromised interior space and replacing the expensive battery packs. These are all legitimate concerns, but the lower-priced, roomy, fast-charging EVs coming on the market now—and a network of more than 41,000 public chargers—go a long way toward addressing them.

Jim Motavalli, a Connecticut-based journalist, writes about the environment, cars and music. He can be contacted at [Jim.Motavalli.com](mailto:Jim.Motavalli.com).



In a pinch, the Ford F-150 electric pickup can power a house.

# Q&A Segment



*“How's opening a window going to help my computer?”*

# The 21st Century Revolution in Cars/Manufacturing



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Naperville, Illinois, United States · [Contact info](#)

## Topics

- ✱ EV Driving Experience Locally and Long Distance
- ✱ The Greatest Revolution in Autos Since the Model T
- ✱ Predictions (The 21st Century Auto)

**1/27/2022**

# The 21st Century Revolution in Cars/Manufacturing

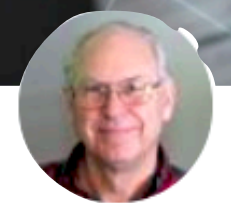


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- ◆ MSEE from Purdue & Business Training at Penn State, Harvard, & Northwestern
- ◆ Software Development and Management Bell Labs 1970-1999
- ◆ COO of Visualization Company, Energy Industry Data Supplier, & Securities Brokerage
- ◆ Consultant to Fermi National Laboratory Open Science Grid
- ◆ Currently Web Design & Development for 2 non-profits



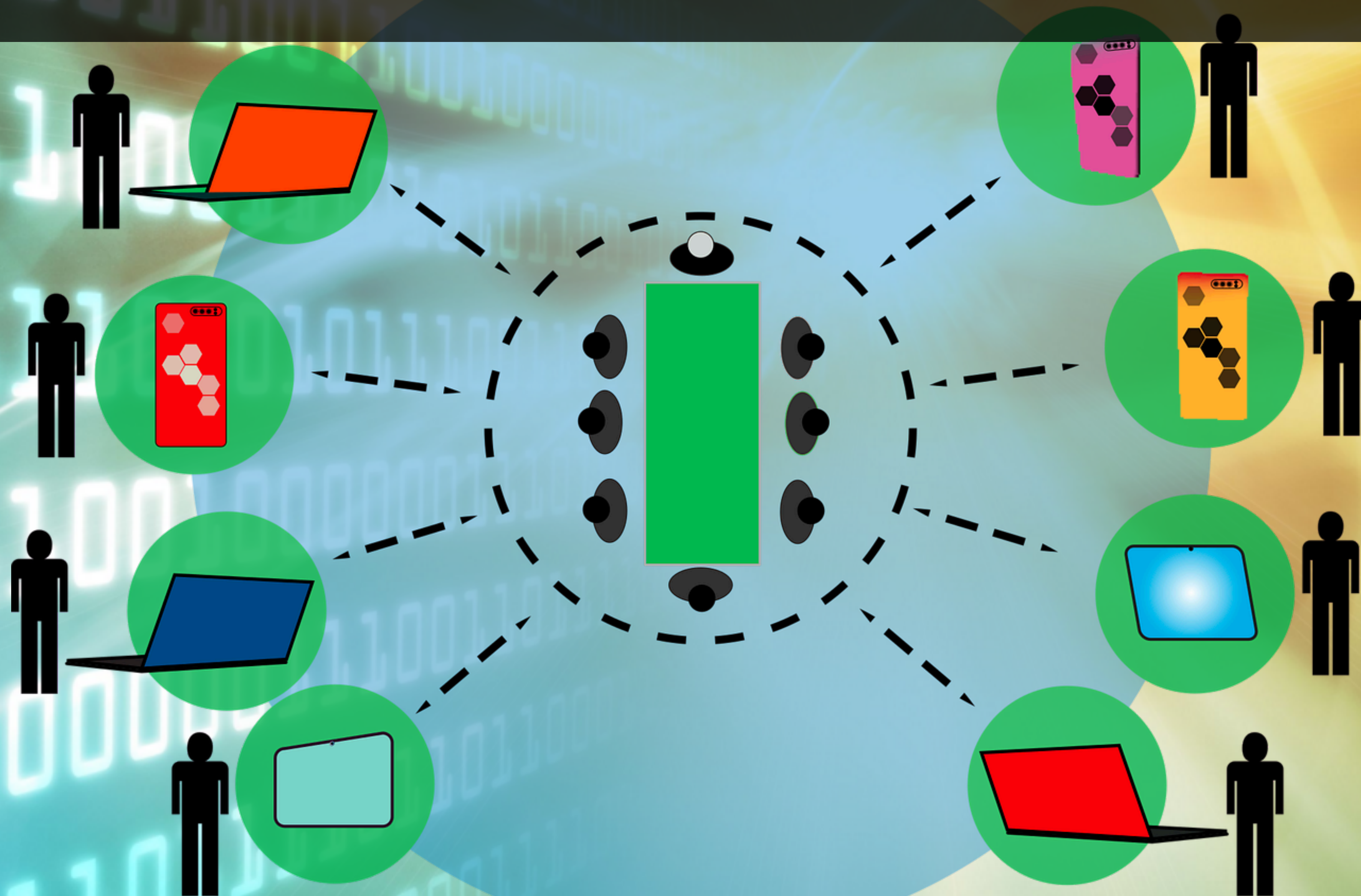
**Wayne Schneidman**  
Outstanding presentation by Jim Weichel. Very informative and I might say entertaining! We really appreciate what he put together and presented before our group!



**Eugene Bordelon**  
I also enjoyed the talk.



# Open Line Chit Chat



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