

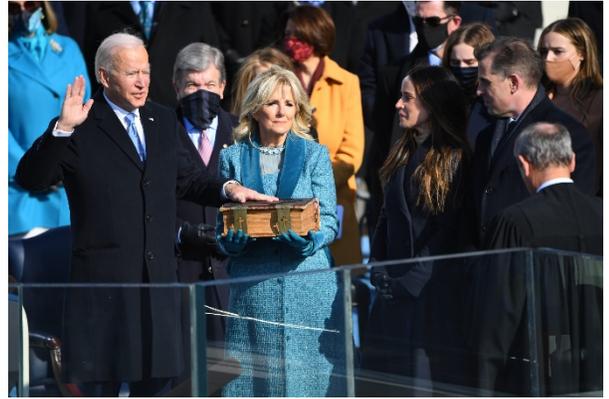


The EV Market is “Electric” in 2021

If there was any doubt about the viability of the vehicle electrification market, 2021 should put these doubts to rest completely. In the past four weeks (and we are not even out of January yet!), there have been any number of events and announcements which by themselves would be huge:

- Joe Biden was inaugurated as the United States' 46th President. The installation of a new administration will likely lead to two changes that will be good for the EV industry: a renewed emphasis on the environment, and economic stimulus spending which will likely include (if not be centered on) transportation electrification.
- Daimler's announcement of an \$85 billion investment in vehicle electrification. On January 14th, [Daimler](#) (which owns [Mercedes Benz](#)) [announced](#) a five-year program that will invest €70 billion (\$85 billion US) in research/development and plant/equipment, the bulk of which will be used “to accelerate the transformation towards electrification and digitalization.” Audi also [announced](#) that they would spend €12 billion to develop 30 new electric vehicles to market, of which 20 would be all-electric.
- GM and Ford get behind electric vehicles. In an interview at the 2021 virtual Consumer Electronics Show (CES), [Ford](#) CTO Ken Washington [told Yahoo Finance](#) (and the world) that electric vehicles will start to take off in the US in 2021, and that fully autonomous vehicles will start appearing in the US in 2022. The Ford CTO also touted the new electric Mustang Mach E crossover as an example of this trend. In roughly the same week, [GM announced](#) that it was investing \$27 billion in electric and autonomous vehicles by 2025, and that the company would start building an all-electric cargo van called the EV600. GM already has an order for 500 of these vehicles from [FedEx](#). These vehicles will come from a new GM division called “BrightDrop”.

All in all, looks like 2021 will be a good year for EVs and the EV ecosystem.



Rhombus Energy Solutions Launches New EV Dispenser

Today, we launched our newest product, the RES-D2-CS20 electric vehicle (EV) charging dispenser. The dispenser, which is certified to [Underwriters Laboratory](#) (UL) standards UL 2202 and 2231, as well as CSA C22.2, is designed to support medium- and heavy-duty (M/HD) EV fleets. It is a perfect complement for the Rhombus 60kW and 125kW charging systems for unidirectional and bi-directional/vehicle to grid (V2G) use cases. The RES-D2-CS20 and the Rhombus 60kW and 125kW chargers were also placed on the San Diego Gas and Electric (SDG&E) Approved Equipment List. You can read the press release for this launch [here](#), and see our blog on the release on the [Rhombus website blog page](#).



Volta Charging Series D Round Raises \$125 Million

[Volta Charging](#), which operates charging stations in twenty-three states and 200 cities, just completed a Series D funding round valued at \$125 million, which increased their total funding to date to \$200 million. The company, whose charging stations utilize a 55-inch video screen to stream ads and other content, provides free (or nearly-free) charging to drivers, while attracting customers for nearby businesses. The Volta business model is a unique one in an industry that is experimenting with a variety of possible



ways to monetize electric vehicle charging. Volta will utilize the new funds to expand internationally, as well as to fund infrastructure, charging stations, and engineering efforts.

Taking Electrification to the Water

Generally speaking, the combination of water and electricity is one that is best avoided, especially seawater which is both corrosive and a reasonably good conductor. Nevertheless, electrification of marine transport vehicles is an area which has generated significant interest, especially for tugboats and ferries. The European Union (EU) just took a bold step in this direction with their [Current Direct](#) project.



One of the big drivers for this project is the concern over seaborne transportation emissions, which represent 13% of the EU’s transport sector greenhouse gas emissions, and are expected to increase between 50% and 250% if business continues “as-is”. The project’s goal is to develop and demonstrate containerized energy storage for marine applications that is swappable, reducing vehicle down-time. These containerized battery energy storage systems could form the backbone of an “energy as a service” for marine applications.

The Alphabet Soup of “Vehicle-to-X”

One of the hot topics in vehicle electrification today is bi-directional charging – the ability to put energy into a vehicle and take energy out of a vehicle (this differs from the conventional unidirectional charging approach where energy can only be put into a vehicle). Bidirectional charging enables a wide number of possible use cases, including:

- Vehicle to Grid (V2G) – Energy coming off of the vehicle is put onto the utility grid, generally during peak load hours. This allows the vehicle owner to receive a premium for the power that they put onto the grid, which they can then replenish during off-hours.
- Vehicle to Home (V2H) – Similar to V2G, but the energy is put back into the home, either directly to power the home (especially during power outages) or into a home-based battery energy storage system. In nearly all cases this is a “behind the meter” approach that allows the homeowner to perform “peak shaving” during peak hours.
- Vehicle to Building (V2B) – Like V2H, V2G looks to reduce energy costs by taking energy left over in a vehicle’s battery, and put it into the building, again generally in “behind the meter” mode.
- Vehicle to “X” (V2X) - This is a catch-all that encapsulates all of the different “vehicle to” use cases.

In all of these use cases, the goal is to either: i) reduce energy costs by using energy left in the battery to put back into the grid/home/building during peak hours; or ii) provide energy during power interruptions due to natural disasters, rolling blackouts, etc. The greatest difference between the different “V2X” approaches tends to be at the management level. While homes and buildings generally just utilize a cutover switch to switch from grid power to non-grid power (vehicle, solar, generator set, etc.), the V2G use case requires significant interaction with the utility to balance power demands, phase balancing, etc. Today, every V2G use case today is a bit of a “one-off” with each utility setting its own interoperability requirements for V2G, but the industry is working on a common standard (ISO-15118) to simplify interoperability.

Cycle Capital and Emerald Technology Ventures Nominated to “Climate 50” List

Emerald Technology Ventures and Cycle Capital, investors in Rhombus Energy Solutions, were both nominated for inclusion in the 2021 Climate 50 list, an annual ranking of the most impactful climate-focused



venture capital (VC) funds. If you would like to see who is on the Climate 50 list and/or vote for your favorite VC, you can do it [here](#).

Quick Notes from the Electric Vehicle (EV) / Energy Storage Ecosystem

- [Biden administration promises and EV era, new world for the auto industry](#)
- [Electric vehicle models expected to triple in 4 years as declining battery costs boost adoption](#)
- [EVgo Seeks \\$2.6B Public Market Valuation in SPAC Reverse Merger](#)
- [Volkswagen brand triples deliveries of pure EVs in 2020](#)
- [BNSF Railway and Wabtec begin battery-electric locomotive pilot in California](#)
- [Amping Up: Charging Infrastructure for Electric Trucks](#)
- [Proterra Set To Take Heavy-Duty Electric Vehicle Business Public via SPAC](#)
- [Electric vehicles close to 'tipping point' of mass adoption](#)
- [Every Electric Vehicle That's Expected in the Next Five Years](#)

About Rhombus Energy Solutions

Rhombus develops and manufactures next-generation bi-directional electric vehicle charging infrastructure, high-efficiency power conversion systems and energy management system (EMS) software for vehicle-to-grid (V2G) capable electric vehicle fleet charging, energy storage and microgrid applications. The high reliability of our solutions is the result of decades of experience developing high-power systems for a variety of applications and deployment scenarios, including UL-1741-SA system-to-grid solutions. For more information, please visit www.rhombusenergy.com.

