Rhombus May 2021 Newsletter

Rhombus Energy Solutions

Vice President Harris Pushes School Bus Electrification at Thomas Built

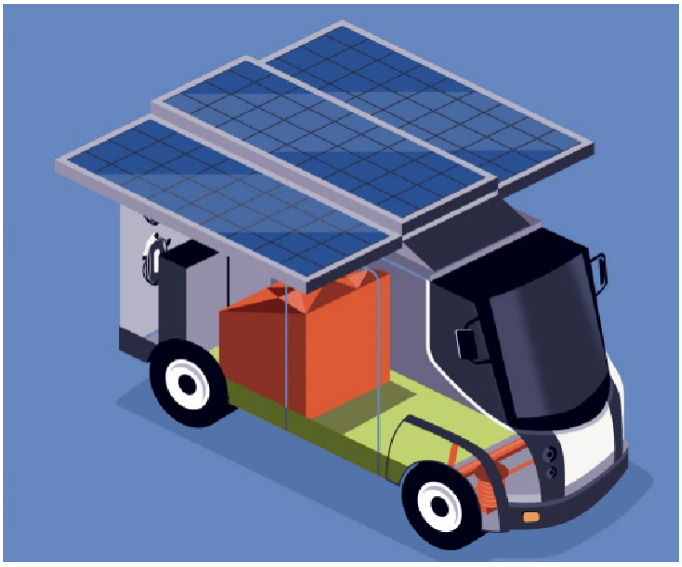
Late last month, US Vice President Kamala Harris traveled to North Carolina to promote the American Jobs Plan, part of the Biden Administration's infrastructure investment agenda. Along the way, VP Harris also visited Thomas Built Buses to discuss their vehicle electrification program, speaking to several workers at the plant about their jobs building electric school buses. VP Harris was accompanied at the Thomas Built plant in High Point, NC by North Carolina Governor Roy Cooper and Michael Stanley Regan (Administrator of the US Environmental Protection Agency). "Today I stopped by Thomas Built Buses in High Point, North Carolina. The union workers there make electric school buses. These are the kinds of jobs we will create through the American Jobs Plan," said Harris via her Twitter account.

Thomas Built utilizes Proterra electric powertrains for their electric school buses, as well as high-power DC fast chargers. The Thomas Build Saf-T-Liner C2 Jouley electric school bus features an 81-passenger capacity, highway-class speeds, a 220kWh battery that provides a 135-mile operating range, and no emissions. It has 295 peak horsepower with multiple driving modes to conserve power and extend operating range, as well as regenerative braking to conserve energy usage and reduce brake wear (a major contributor to particulate pollution). The C2 Jouley is also vehicle-to-grid (V2G) capable to further reduce operating costs. Pictured behind VP Harris in the above image is a Proterra 60kW DC fast charger power control system (PCS) and EV charger dispensers. The PCS pictured above was designed and built by Rhombus Energy Solutions for Proterra, and features full V2G capabilities. This allows the vehicle and charger to provide support to the electric utility grid during peak demand hours or during emergencies.

Rhombus Headquarters:
10915 Technology Place San Diego, CA 92127

Manufacturing and High-Power Lab:
15301 Century Drive, Suite 204 Dearborn, MI 48120

California Energy Commission Awards BESTFIT Innovative Charging Solution for Light-Duty Vehicles Grant to Rhombus Energy Solutions

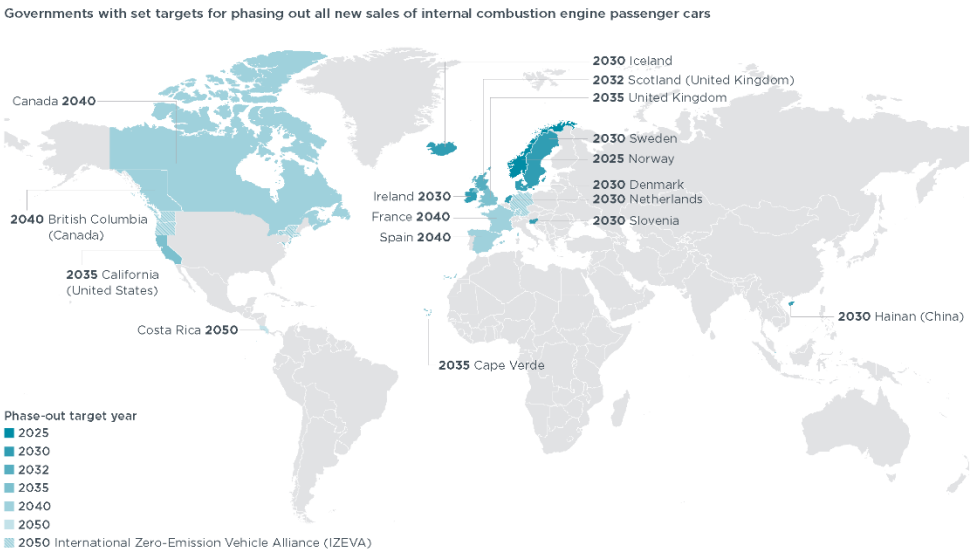


Rhombus Energy Solutions has been selected as one of the recipients for a California Energy Commission (CEC) BESTFIT Innovative Charging Solutions award under Clean Transportation Program GFO-20-605. The award is in the Light-Duty Vehicle Sector Focus Area 2 ("Minimizing Operation, Purchase, and/or Installation Costs"), for the 'El Bumeran' Mobile Light-Duty EV Charging System. Partnering with Rhombus on this opportunity are Smartville, Inc. and the City of Chula Vista CA.

El Bumeran is an innovative EV charging solution that provides competitive and cost advantages over current mobile EV charging solutions. The solution combines an electrified van, silicon carbide (SiC) based charging infrastructure, and 240 kWh of low-cost, second-life vehicle batteries to provide 120 kW of high-powered charging across four charger ports (up to 30kW per port). The batteries can be partially recharged from a solar canopy mounted on the vehicle rooftop, and can be fully recharged at night during super-off-peak hours. El Bumeran's mobile nature eliminates the need for permits or infrastructure during deployment and operation, and allows the solution to be quickly directed to where it is needed, providing the ability to service multiple locations in a single day. El Bumeran provides a way to bring EV charging to low-income and disadvantaged communities, one of the greatest hurdles preventing these communities from joining the vehicle electrification movement.

More States Jump on the ICE Phaseout Bandwagon

Last September, California Governor Gavin Newsom announced an executive order to phase out internal combustion engine (ICE) powered in California by 2035. It was a move that, while controversial with conservatives as an example of government overreach, actually mirrors similar moves both in the US and globally. In Europe, a number of countries including Germany, the United Kingdom, France, and Norway already



https://www.automotiveworld.com

have timetables for banks in place (Norway's ban actually starts in 2025). In the US, the state of Washington is now ready to pass the most aggressive US timetable yet with the Clean Cars 2030 Act. It follows the legislative action in Massachusetts, which in January 2021 passed a law banning the sale of ICE vehicles after 2035. Watch for more states to pass similar laws, as well as those incentivizing the use of electricity for heating, cooling, and cooking in both homes and businesses.

Renault Transitioning Truck Offerings to Electric

The medium/heavy-duty (M/HD) vehicle space, like the automotive industry in general, has not always been quick to jump on new developments and trends, but (happily) electrification seems to be bucking that trend across the industry. An example of this is Renault's announcement that they will have an electric vehicle (EV) in every market segment in 2023. This includes not only the types of vehicles shown in the photograph (including an all-electric refuse truck!), but also urban construction vehicles. Renault will also offer its customers the other key pieces for fleet solutions including charging infrastructure. The move to electrified trucks is part of Renault's initiative to reach a 100% fossil-free offering by 2040.

If You Ride Public Transit in the US, There is Likely an Electric Bus In Your Near Future

On May 4th, Senators Chuck Schumer and Sherrod Brown introduced a $73B proposal to speed the transition of the US public transit bus fleet to electric buses. The Clean Transportation for America program speeds the transition of the nation's 70,000 public transit buses and 85,000 cutaway vehicles and transit vans to electric models to eliminate diesel pollution (currently only 2% of the nation's buses are zero-emission vehicles). The $73B funds will be used to incentivize the purchase of new transportation EVs, accelerate the retirement of "clunker" diesel buses, and the purchasing and installation of charging infrastructure for these vehicles.

Honda Is Apparently Still on the "Slow Train" to Electrification

However, not every vehicle manufacturer in the transportation world is quickly transitioning to EVs. Perhaps one of the furthest behind is Honda, which did not even announce plans to build battery-electric vehicles (BEVs) until Toyota did so earlier this year. And Honda's timeline is not particularly aggressive – they are not planning on having any organically-developed EVs in the US until the back half of this decade, and is not projecting being 100% electric until 2040. To bridge the gap, Honda will be jointly developing two electrified SUVs with General Motors (GM will bring their batteries, and possibly drivetrains, to the party), with the goal to introduce these vehicles in the 2024 model year.

Like Toyota, the big driver for the slow transition is their persistent belief in hydrogen fuel cell technology for cars, a technology that while promising has been largely abandoned for use in near-term vehicles other than heavy long-haul trucks.

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

- Electrify America opens 600 public fast charging stations in less than 3 years
- Bye Aerospace unveils 8-seat all-electric eFlyer 800
- GM and LG to build second US battery plant in Tennessee
- The Latest Developments in Grid Resiliency
- Lion Electric to build battery manufacturing plant in Quebec
- Biden pledges to halve US carbon emissions by 2030, sending signal to business and world leaders

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.

Rhombus Energy Solutions