Is There An Electric Vehicle In Your Future? The US Government is Definitely Betting That There Is!

President Joe Biden and the US Department of Transportation (not to mention most economists and environmental experts) believe that electrification of the US transportation sector is critical to US economic recovery. To further this goal, the Biden Administration is drafting a $174 billion program to increase US electric vehicle (EV) adoption. The EV acceleration proposal is part of the larger $2.3 trillion infrastructure and jobs proposal currently being discussed between the White House and Congressional Democrats.

The key components of the EV acceleration program include:

- $100 billion in incentives to help consumers purchase EVs, with the amount of each rebate expected to be between $7,500 and $10,000 per vehicle. There are two particular items that economists like about the proposed incentive program: no capping of the incentives based on the number of vehicles sold by a given manufacturer (previous incentives were capped at 200,000 EVs per manufacturer), and since they are rebates, the benefit is the same regardless of the buyer’s tax bracket.

- $25 billion to be provided to city and state governments to purchase zero-emission transit vehicles such as public transit buses.

- $20 billion to subsidize the purchase of electric school buses.

- $15 billion for the construction of roughly 500,000 new EV charging stations nationwide.

Just to put things in perspective, $100 billion in incentives could fund the purchase of 10 million EVs (at $10,000 per vehicle), which is about 10X the total number of EVs that were on the road in the US at the end of 2018, and 34X the number of EVs that were sold in the US in 2020.
Apple is Building a Massive Grid-Scale Energy Storage System to Augment Its California Solar Farm

Becoming carbon neutral by 2030 is one of Apple’s big environmental goals – one of which Apple’s manufacturing partners are also dedicated to, according to Lisa Jackson, Apple’s VP for Environment, Policy, and Social Initiatives. A big part of this effort is a new energy storage project that Apple is building in California, which will have the capacity to store 240 MWh of energy. The new storage facility will compliment Apple’s “California Flats” photovoltaic (PV) solar energy farm (pictured here), which has the capability of generating 130 MW of power. To put the size of the storage project in perspective, 240 MWh is roughly enough energy to power over 7,000 homes for a day. These projects are all part of a recently-announced $4.7 billion “Green Bond” to fund both clean energy projects.

Heavy Truck Electrification Makes Significant Progress

In many respects, electrification of heavy trucks has been the “final frontier” in transportation electrification, exceeded in difficulty only by the electrification of aviation. The reasons for this have included:

- **Annual Miles Driven**: The average Class 8 truck drives over 60,000 miles per year – nearly 6X the miles driven by the typical passenger car in a year. This is over 250 miles per day (assuming 5 days of driving per week across 50 weeks in a year), and note that long-haul semis can often have average daily driving distances of nearly 700 miles.

![Average Annual Vehicle Miles Traveled by Major Vehicle Category](chart.png)
• **Vehicle weight**: Class 8 trucks have a **gross vehicle weight (GVW) of over 33,000 lbs.** – over 8X the weight of a standard passenger car.

• **Limited Fueling Times**: This is a significant issue for Class 8 trucks, especially for long-haul semis which may only have the 30-minute mandated driver rest time to refuel their vehicle.

With these challenges, one would suppose that fleet operators will need a better reason than environmental concerns to switch from diesel-powered vehicles to gasoline-powered vehicles.

A recent study by Berkeley Labs may have just provided that reason. The study looked at total cost of ownership (TCO) concerns such as current battery costs, vehicle maintenance costs, fuel costs, daily average mileage, and fuel costs. The study found that a Class 8 electric truck with a 375-mile range could achieve a 13% lower TCO than a diesel-fuel vehicle, resulting in a roughly $200,000 lifetime savings. One of the key requirements of the study’s model was the need for a 500kW or greater charger to be able to recharge the trucks during the driver’s 30 minute mandated safety break. As with most issues concerning electric vehicles, the ability to adequately charge the vehicles is one of the greatest challenges (or enablers) to EV adoption.

In a related story, LION Electric sold one hundred (100) LION6 and LION8 battery-electric trucks to Pride Group Enterprises, a supplier of fleet trucks to a number of companies. The LION6 and LION8 trucks are built for urban use, with a range of 180 miles (LION6) and 165 miles (LION8), with a battery capacity of up to 336 kWh.

**Pushing Towards the “Universal EV Charger” (If Everyone Plays Well Together...)**

In the EV charging world, there are a couple of standards for the interface between the vehicle and the charger. The two industry standards today are based around the ChaDeMo standard (originally developed in Japan, and until recently supported aggressively by Nissan and their LEAF electric car), and the Combined Charging System (CCS) standard, which appears to be replacing ChaDeMo fairly quickly. Of course, there have also been outliers to these standards (Tesla being the most notable one with their proprietary vehicle-charger interface). Then there was the issue of “who can use shoes chargers”, as even having the same charger plug didn’t ensure that your EV could charge up at my charging network. To put an exclamation point on this, Rivian recently announced that its new 3,500 fast charger network will only be accessible by Rivian owners. And since most chargers use RFID cards, it’s not like you can just pull out your...
credit cards to pay for electricity for your car. While we are all used to being able to fuel nearly any vehicle at the corner gas station, it took nearly 50 years for gasoline grades to get standardized in the US. ... Let’s hope that those 500,000 charging stations that the US Government wants to put onto our highways don’t have this issue.

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

- California considers electric-car V2G charging tech for grid stability
- Our Garages Aren’t Ready For the EV Revolution
- The US is Real Close to Screwing Up Electric Vehicle Charging Forever
- Electric car rebates, charging stations: What’s in $2 trillion Biden infrastructure plan?
- How to Ensure Electric Vehicle Charging Infrastructure is Accessible to Everyone
- VW to enable bidirectional charging on all EVs on its MEB platform starting next year
- Blue Bird delivers electric school bus equipped with Nuvve (and Rhombus Energy Solutions) V2G tech

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.