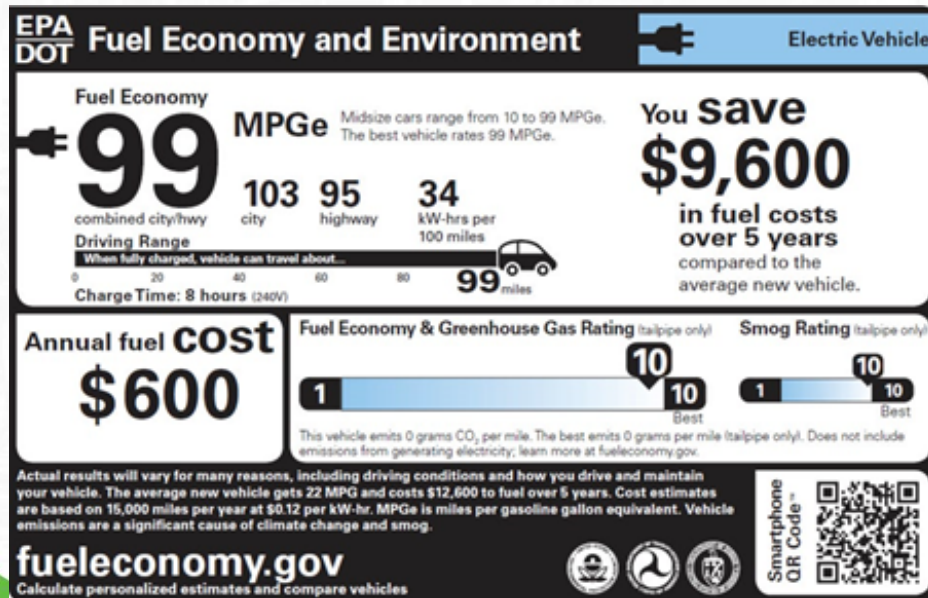


Electric Vehicle Charging Perspectives from Texas A&M's Transportation Services



Let's define some terms

What is a kWh?



What is MPGe?

- 33.7kWh of electricity= 1 gallon of gas
- MPGe is the distance a car would travel on 33.7kWh of energy
- Look also at kWh's per 100 miles



Charging Levels Explained

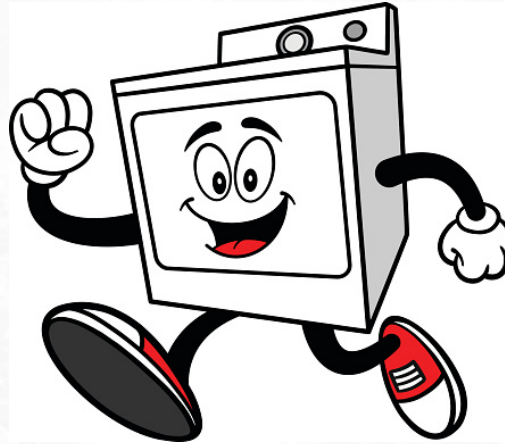
Level 1:

- 120V AC outlet
- Power range of 1kW to 1.8kW
- 1.8kW at max would roughly provide 7 miles per hour of charge



Level 2:

- 208-240V AC outlet
- Power range of 3kW to 19.2kW*
- 7.7kW at max would roughly provide 25 miles per hour of charge



Level 3:

- 480V AC/DC Conversion
- Power range of 30kW to 360kW
- 60kW at max would roughly provide 240 miles per hour of charge



* To go beyond 7.7kW in a level 2 configuration requires 3 phase wiring

But what about the Car?

Nissan Leaf

- 400V architecture
- 40kWh battery
- Max DC uptake of 46kW
- 140 miles of range per hour of charge*



Tesla model 3

- 400V architecture
- 60kWh battery
- Max DC uptake of 170kW
- 390 miles of range per hour of charge*



Porsche Taycan

- 800V architecture
- 80kWh battery
- Max DC uptake of 223kW
- 630 miles of range per hour of charge*



***Due to different systems, there is no consistent way to say exactly how many miles of range a given charger can deliver per hour of charging time**



A brief history of Charging on Campus

The 1st Level 2 was placed on lot 41 at the George Bush Presidential Library in 2012

By 2015 all 5 campus garages had at least one level 2 EV charger

- **Central, South, West, North, University**

2016 added Cain Garage and three chargers

**We've seen multiple providers
Each had their own set of issues**

- **Reliability**
- **Hardware problems**
- **Credit card reader malfunctions**
- **Unfulfilled service requests**

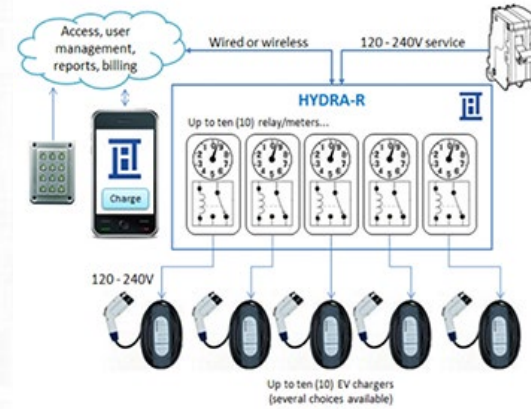


A New Service

August of 2021, installation of six new Level 2 chargers in Polo Rd Garage

We chose a new offering with several advantages:

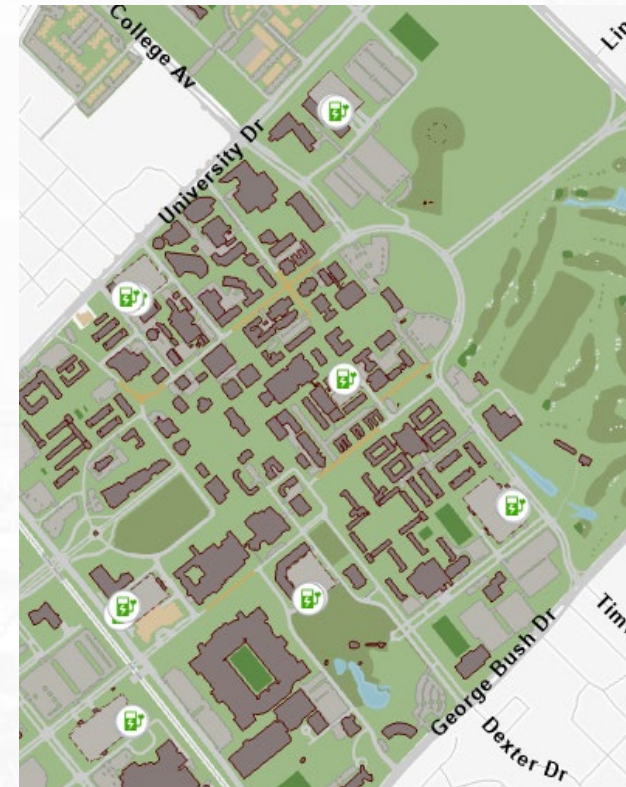
- **Dashboard Control**
- **No need to run comms line to chargers**
- **No individual credit card readers**
- **Switchgear, metering & network all in one unit**



Level 2 Charger Expansion complete

After 4 months of testing, refit of all garages

- Stallings by end of 2021
- North, West, University, South in 2022
- Central Campus Garage in February 2023



- All now offer at least four Level 2 chargers
- 30 chargers across 7 garages using Hydra controllers
 - 33 total with two at RELLIS and one at George Bush Library

Trends on Campus

EV adoption on campus has grown exponentially

- **Currently 211 permitted Tesla vehicles**
- **Soon to have a visual on all EV's registered**

Tracking the use of EV chargers

- **December, January, February- Northside Garage highest use**
 - **Longer duration charges with multiple sessions per user indicates likely a northside dorm resident**
- **During Football Season- Stallings and Polo Road Garage saw the highest use**



Community Trends



ChargePoint Superchargers at Brookshire Brothers

- 2 stations providing up to 50kW

Tesla Superchargers at Holleman HEB

- 8 stations providing up to 250kW



Industry Moves



Acceleration of available Level 3 Chargers

- **Alternative Fuel Corridor Designation Rounds 1-6**
- **NEVI- National Electric Vehicle Infrastructure**

Tesla still superior at Level 3

- **Saturating the US with more available chargers than any competitor**
- **Europe now requires Tesla to open network**
- **State level discussions in California**
- **National level discussions**

Not just a few players anymore

- **PlugShare is an open network, listing multiple vendors**
- **Chargepoint, Blink, Tesla, more to come...**



Future Funding Opportunities



<https://highways.dot.gov/newsroom/biden-harris-administration-opens-applications-first-round-25-billion-program-build-ev>



**U.S. DEPARTMENT OF
ENERGY**

https://afdc.energy.gov/laws/fed_summary?technologies=ELEC



<https://www.txdot.gov/projects/projects-studies/statewide/texas-electric-vehicle-planning-03-22-22.html>



Questions/ Comments

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