Texas Electric Transportation Resources Alliance

Texas' Electric Transportation Future

Tom "Smitty" Smith, Executive Director

TxETRA

January 2021

What is TxETRA?

Texas Electric Transportation Resources Alliance

We are a non-profit group for utilities, manufacturers, charging companies and environmentalists.

We are developing the policies and infrastructure needed to electrify the Texas transportation system.

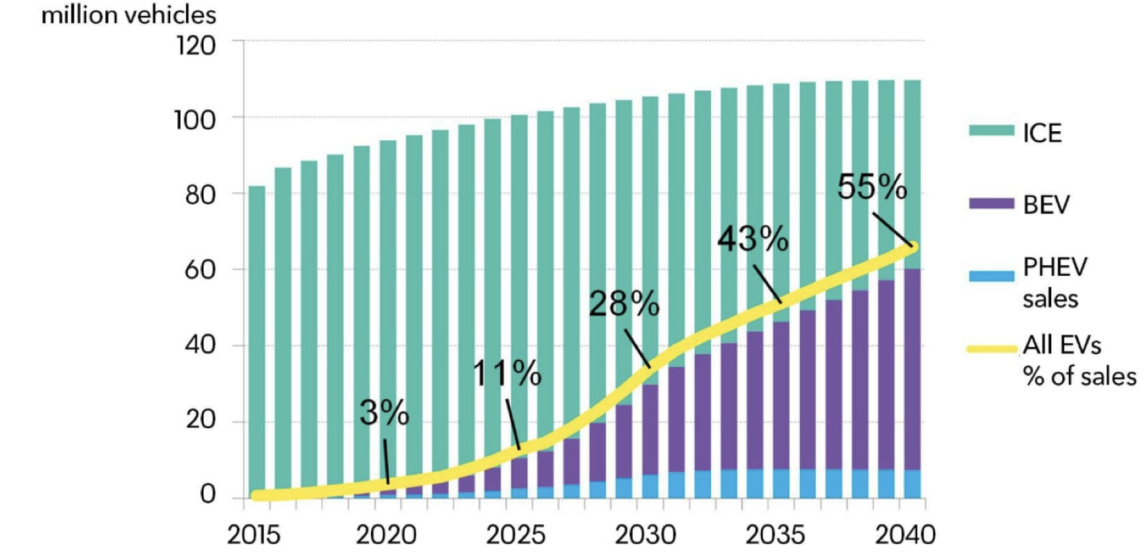
Why are Electric Vehicles Transforming the Transportation Market so Rapidly?

- Reduces air pollution levels and carbon emissions
- Lower and more stable fuel and maintenance costs
- EVs provide grid stability
- Promising new industries for emerging ccountries
- Can be powered with renewables & storage

A Massive Shift in Investments in EVs is Occurring

$435B	$63.6B	61
Total Global Investment	Investments Targeted for USA	Companies

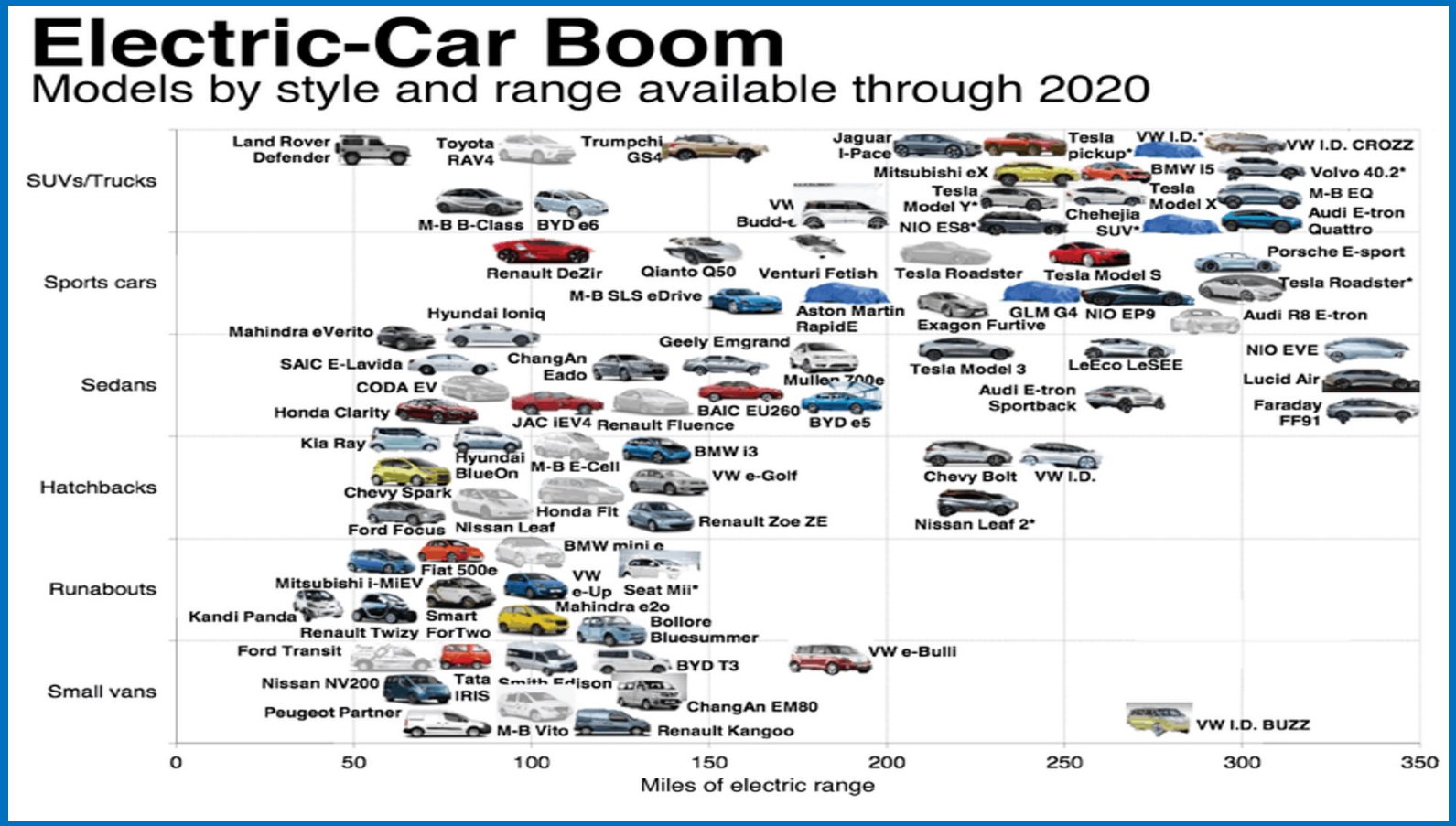
In Texas, this transition will be market driven with minor incentives.



https://www.atlasevhub.com/materials/private-investment/ 9/30/20
https://www.bloomberg.com/news/articles/2020-03-17/an-economic-crash-will-slow-down-the-electric-vehicle-revolution-but-not-for-long

Over 200 EV Models Will Be On The Road by 2022

Including 10 Pick-Up Trucks



https://www.ahssinsights.org/news/battery-electric-vehicles-boom-or-bust-for-ahss/

Big Automaker Shifts to EVs

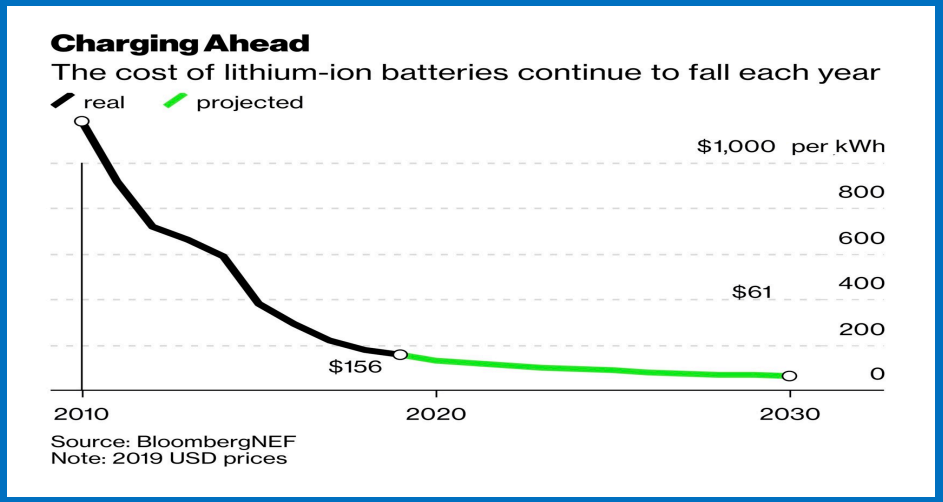
All Electric in Europe by 2030

Only EV Models by2035

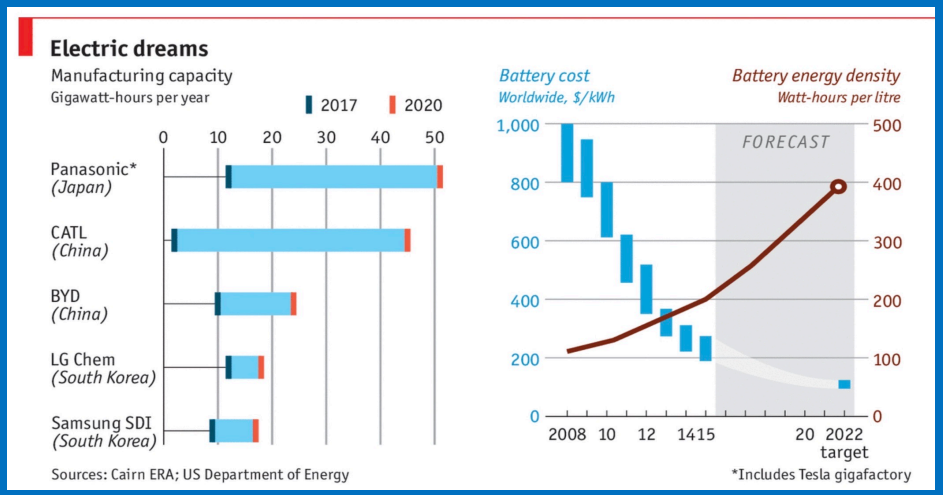
All Electric Brand by 2025

Declining Battery Costs are Causing A Shift

Innovative Technology is Driving the Battery Cost Decline

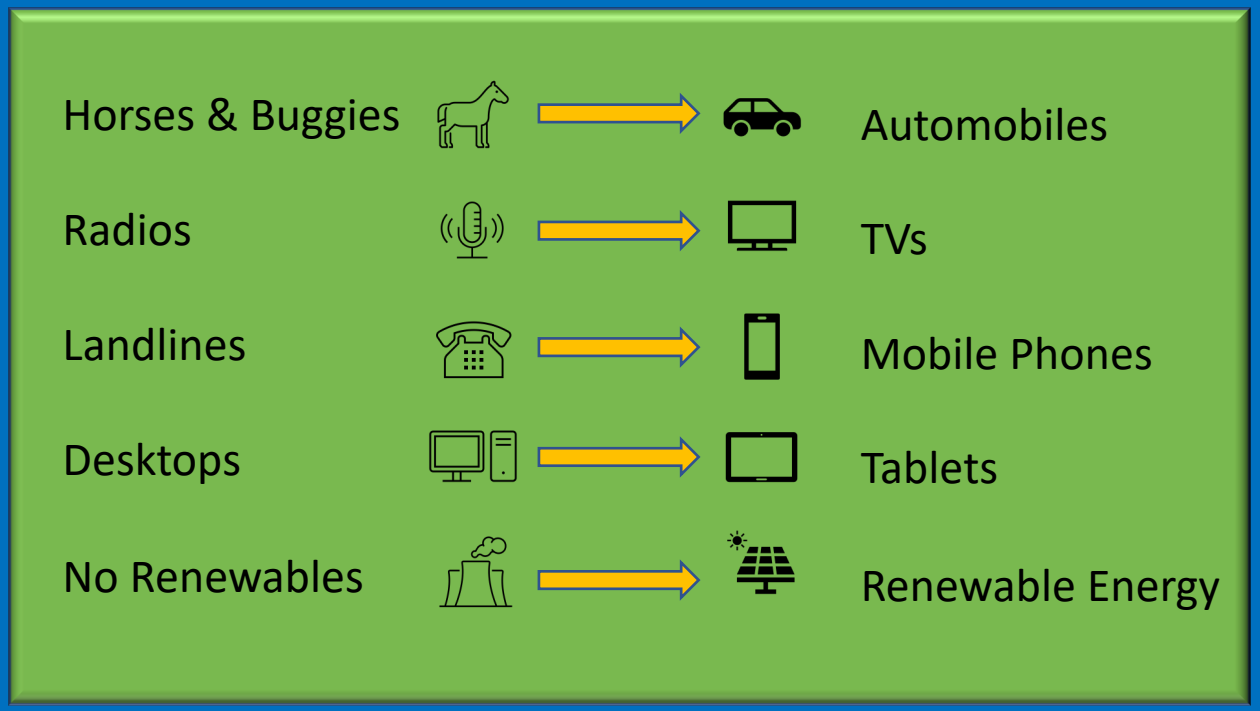


Battery Density Has Increased 6-7% Per Year

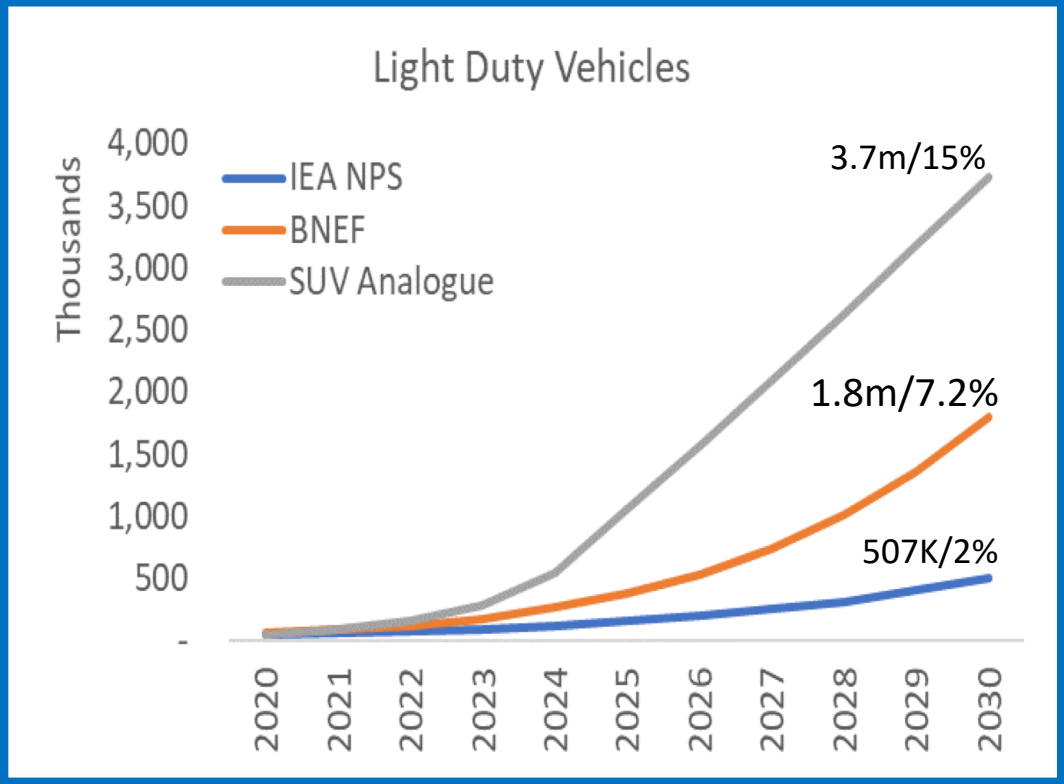


https://www.bloomberg.com/news/articles/2020-03-17/an-economic-crash-will-slow-down-the-electric-vehicle-revolution-but-not-for-long
www.economist.com

Transition to EVs Could Occur in 15 Years or Fewer As has Occurred in These Technologies



EV Projections for 2030



If EVs transform the market as fast as SUVs, we predict by 2030 EVs will be 41% percent of light duty sales and 15% of the light duty fleet.

TxETRA Responses to PUCT 49125, February 3, 2020, page 9.
https://interchange.puc.texas.gov/Documents/49125_17_1050900.PDF

Why Truckers Will Be The Biggest Users of EVs

200 Mile Fuel Costs

Diesel 8 MPG	$4/Gallon	$100
Electric	1.6 kWh/Mile - $0.12 kWh	$23

Charging Patterns

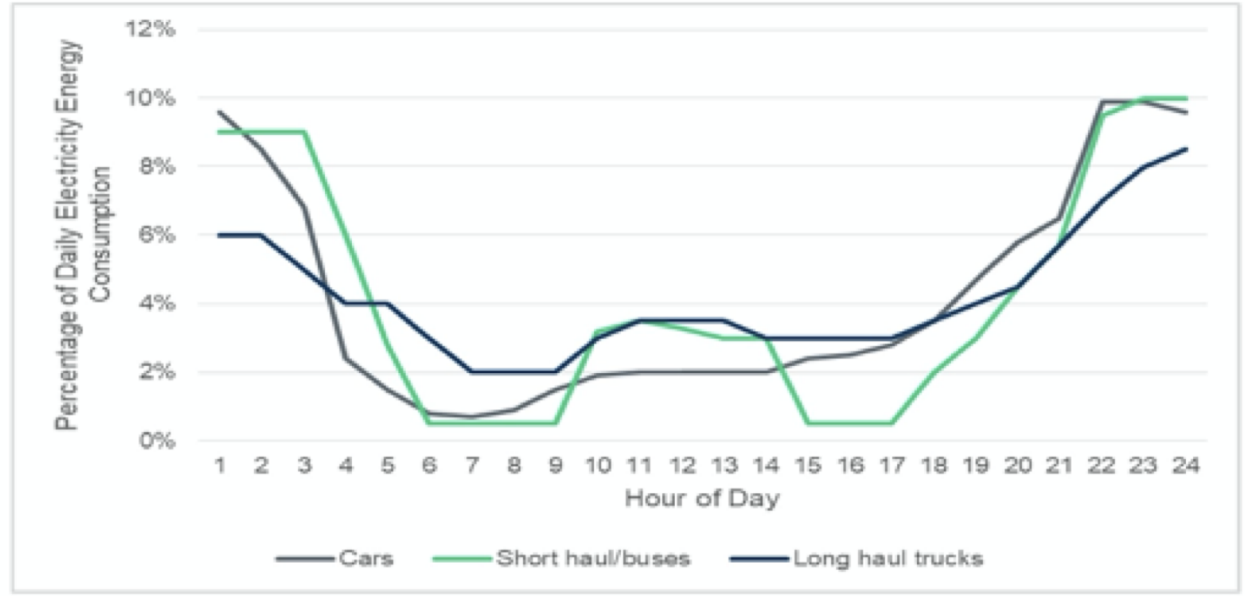
Single Family Residential	>80% of EV owners	Level 1 & 2	120 V AC
Multifamily Residential	<20% of EV owners Lower income on average	Level 2	200-240 V AC
Workplace	>85% workers drive to work	Level 2	200-240 V AC
Urban Public DCFC	Commuters, consumers Co-location opportunities Overlap with inter-city	DC fast charging	400 V – 1000 V DC
Inter-city DCFC	Travelers – fun/work Inter-city freight Co-location opportunities	DC fast charging	400 V – 1000 V DC

TxETRA

Charging Pattern for EVs by Type and Hour

Most cars were assumed to charge overnight so that they would be fully charged before 5am.

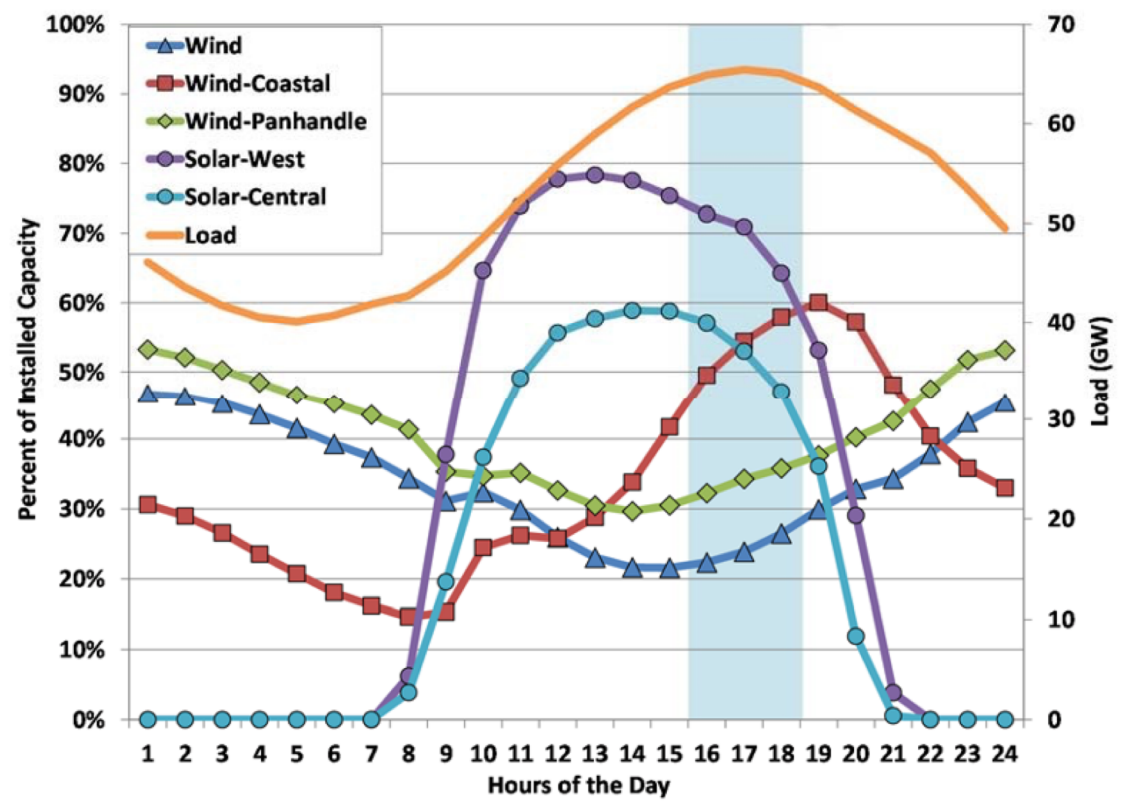
Trucks and buses were assumed to charge around noon and again overnight.



http://www.ercot.com/content/wcm/lists/144927/2018_LTSA_Report.pdf

Renewables Power EV Charging Cycles Almost Perfectly

Solar and Wind Production 2018



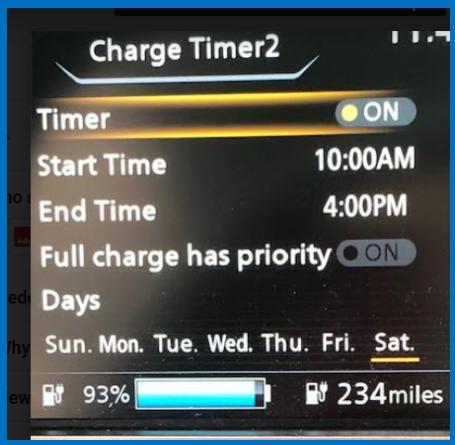
https://www.potomaceconomics.com/wp-content/uploads/2019/06/2018-State-of-the-Market-Report.pdf

How Do We Assure Charging Occurs At The Best Time To Reduce Pollution?

Smart chargers can delay or reduce charging on peak.

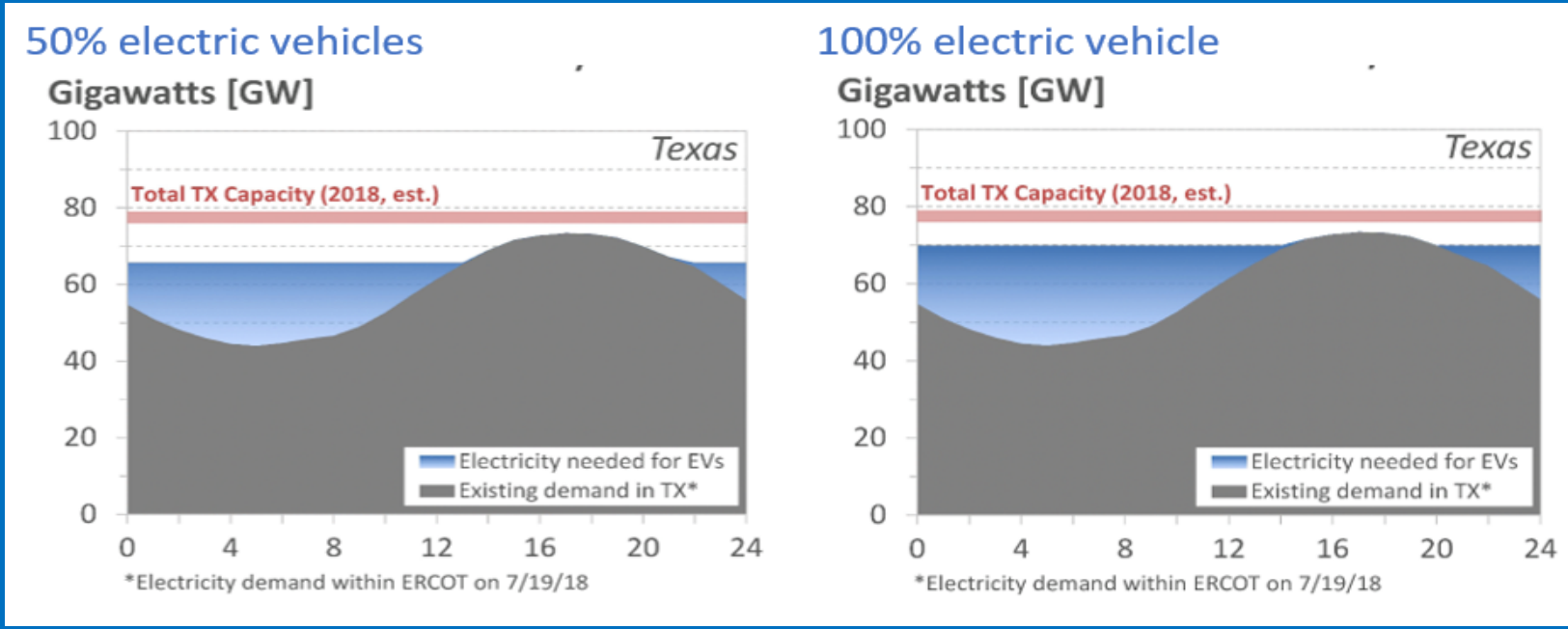
Most EVs have charging controls.

2020 Nissan Leaf
Controls set to use wind and solar



You Can Eliminate Peak Overloading By Encouraging EVs To Charge Off Peak Through Time Of Use Rates and Demand Controls

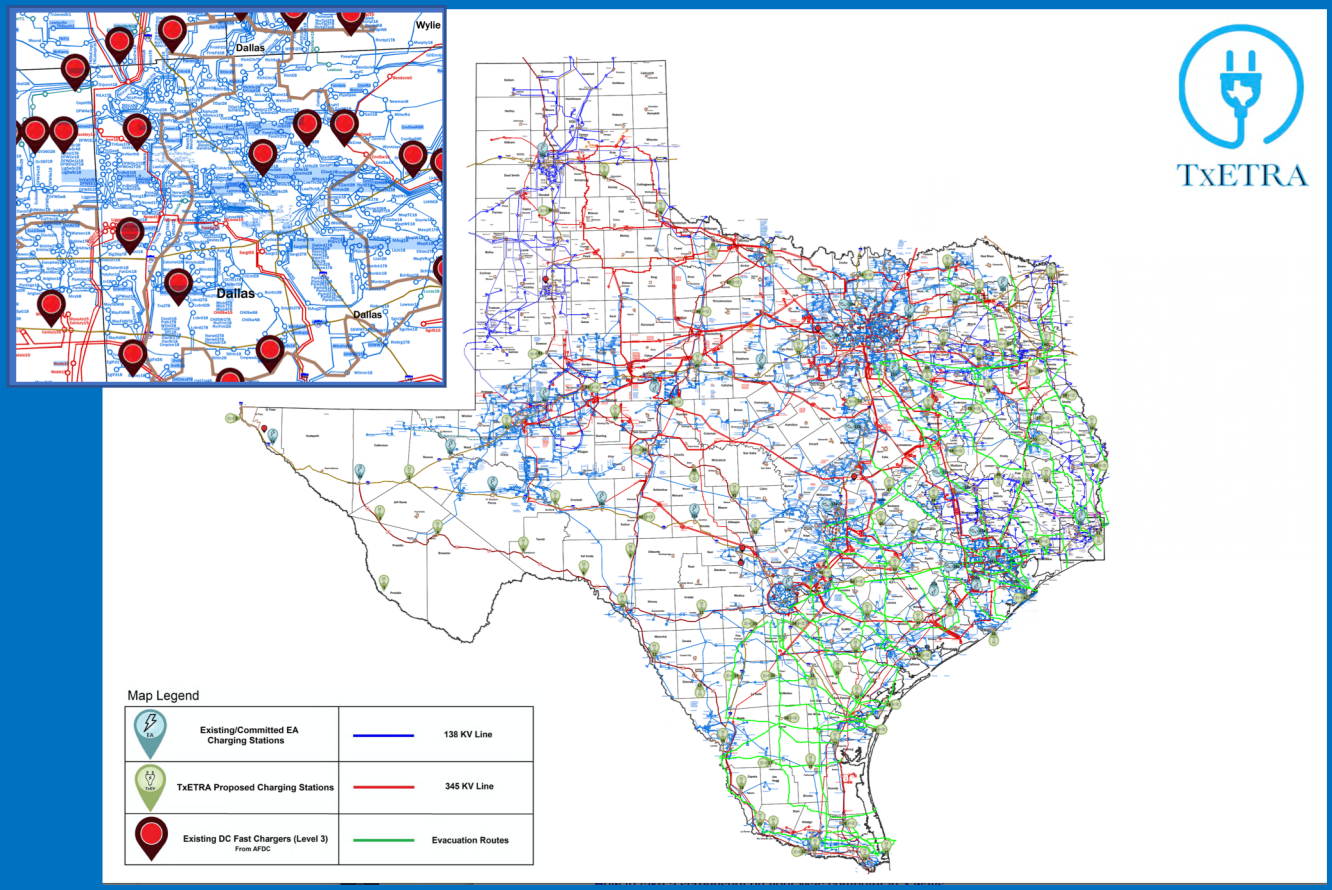
A recent UT study showed that if charging is managed in Texas, we could charge 100% of electric fleet vehicles without overloading the grid.



https://theconversation.com/switching-to-electric-vehicles-could-save-the-us-billions-but-timing-is-everything-106227
TAEBA Docket 49125

Ultra-Fast Charging Can Impact Our Transmission Grid, So Texas Needs to Plan to Put Them Where the Power Lines are Adequate

Texas needs to develop a border-to-border charging network.

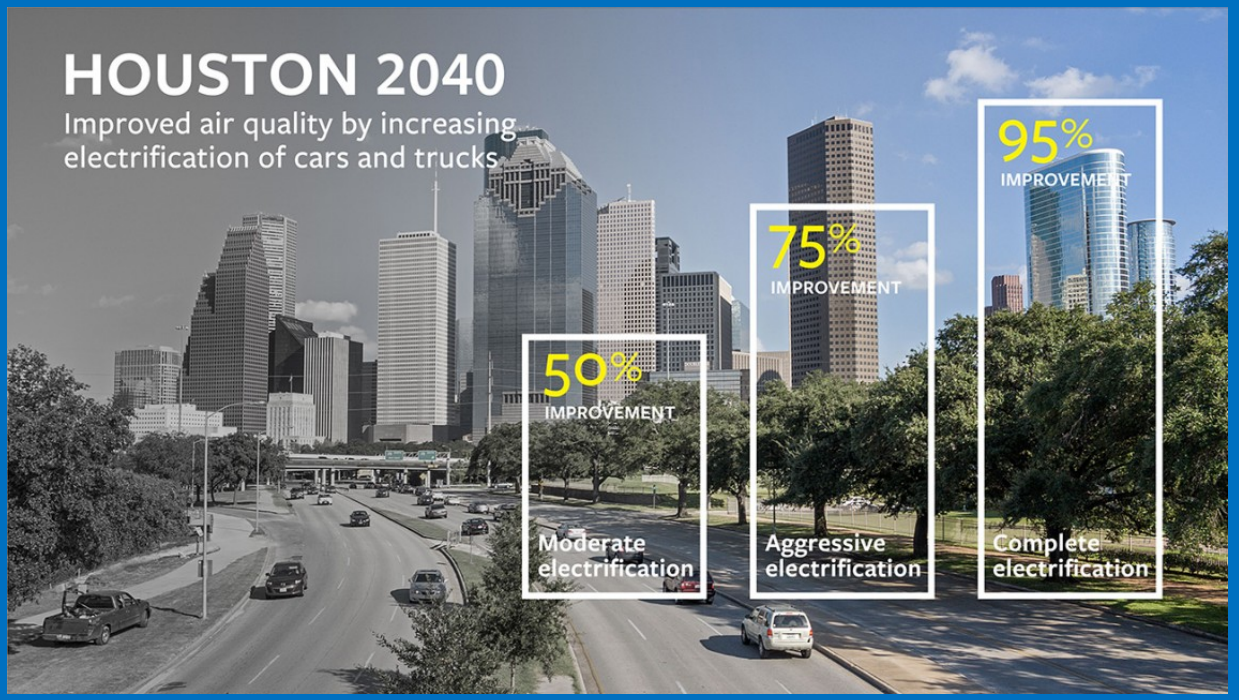


This map shows locations about 50 miles apart where T&D is adequate for HD charging stations.

Electric Vehicles Would be a Breath of Fresh Air for Houston and Other Metro Areas

U of H researchers say replacing at least 35 percent of Houston's diesel trucks with electric vehicles by 2040 will reduce pollution and improve air quality by 50 percent. (June 11, 2019)

A recent TCEQ report said if 2.2% of light duty vehicles were electric it would reduce emissions by .8 to 2.2%.



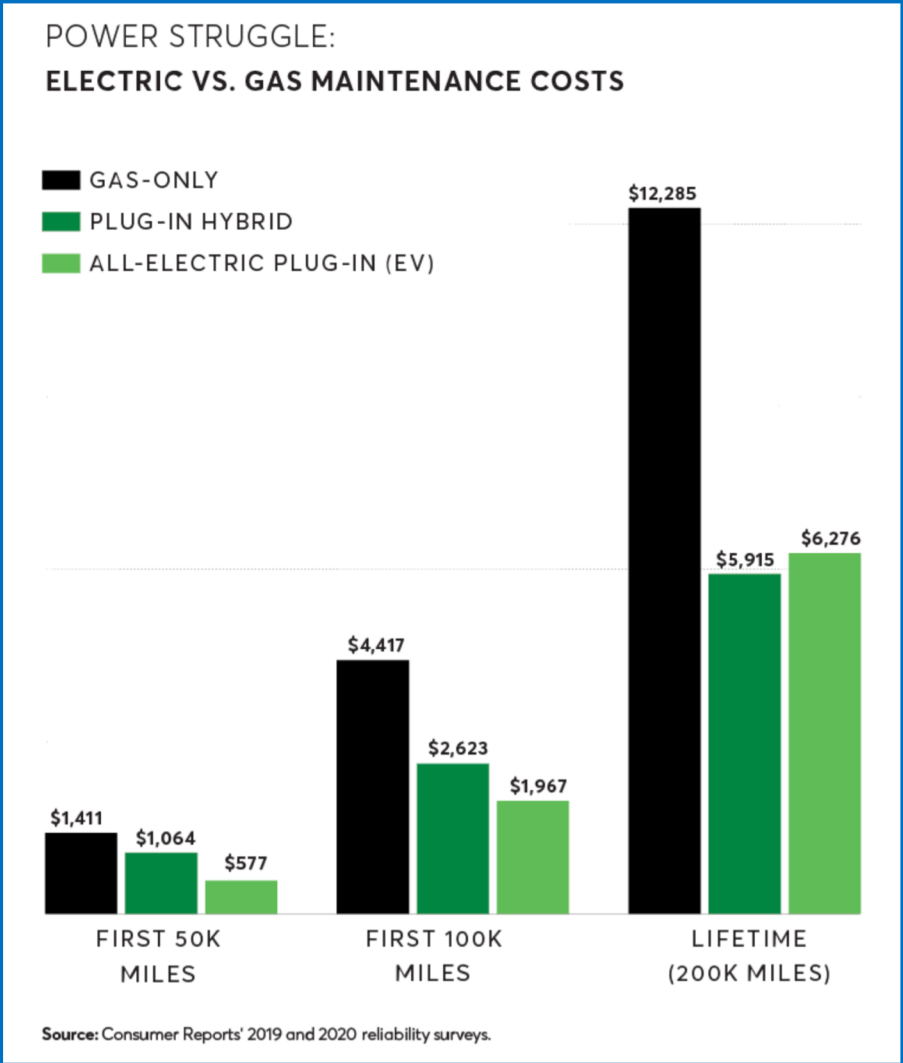
www.sciencedaily.com › releases › 2019/06
"Potential Impacts of Electric Vehicles on Air Quality and Health Endpoints in the Greater Houston Area in 2040," published in Atmospheric Environment.
Dept of Motor Vehicles Study on Imposing Fees on Alternatively Fueled Vehicles December 1, 2020, pg 15

How a Tesla Model 3 Kept a Family With A Newborn Safe and Warm During the big freeze

“We are experiencing an historic winter storm here in Texas. The power grid is not able to handle this type of demand, and a lot of neighborhoods are experiencing power outages for hours at a time when the temperature outside is in the single digits...

“So my wife my dog and my newborn daughter slept in the garage in our Model3 all nice and cozy. If I didn't have this car, it would have been a very rough night.”

EVs Offer Big Savings Over Traditional Gas-Powered Cars



https://www.consumerreports.org/hybrids-evs/evs-offer-big-savings-over-traditional-gas-powered-cars/

Texas Should Ensure That Lack of Access to Charging Facilities Does Not Create a New "Digital Divide"

Without regulatory action, charging facilities in some areas will unlikely be able to develop.

- Rural towns
- Multi-family apartment complexes
- Low-income communities
- Interstates and secondary roads

ET Manufacturing in Texas

19th Century - Texas emerged as global energy leader in oil and gas production
2000s - Texas added renewable energy to the portfolio
Currently - Leads the nation in wind energy production (and ranks 5th in the world)

It's time for Texas to transform once again as a leader in this new EV world.

- **Tesla** building a new billion-dollar manufacturing plant near Austin
- **Peterbilt** already builds electric trucks in Denton
- **Navistar** will begin manufacturing trucks and school buses in San Antonio
- **Hyliion** produces electrified powertrains in Cedar Park
- **Lone Star Specialty Vehicles** makes electric terminal tractors in Texarkana
- **Toshiba** makes motors and transmissions for Ford EVs in Houston
- **Ayro** manufactures small delivery trucks in Round Rock
- **Volcon** makes electric motorcycles and off-road vehicles in Round Rock

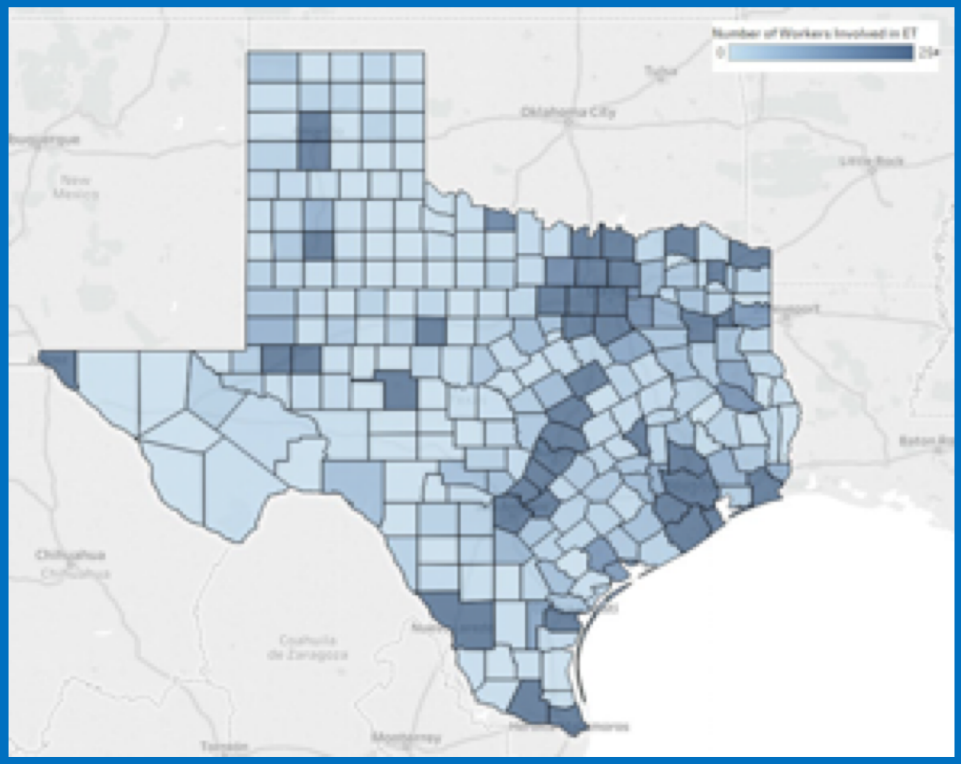
By 2024, a projected 13,500 workers in Texas will be involved in ET, including the Tesla factory currently under construction outside of Austin, which will add an estimated 5,000 ET jobs to the state.

While population centers have the greatest number of ET workers, **ET workers make up a greater share of the labor force in some suburban and rural counties, including Titus, Cook, Lamar, Calhoun, and Dallam Counties.**

ET Jobs Can Be Found In 203 of the 254 Texas Counties

Most counties have some ET employment, with the highest numbers found in population centers, including:

- **Harris** County (1,400 jobs)
- **Dallas** County (900 jobs)
- **Tarrant** County (700 jobs)
- **Bexar** County (600 jobs)
- **Travis County** (5,000 projected)



Biden's EV Platform

500,000 chargers funded nationwide by 2030 should equate to 65,000 in Texas

100% sales of light duty EVs by 203_?

Continues and expands EV tax credits

Cash for clunkers and replacement with EVs

Last Session the Legislature asked Agencies to Study EVs In SB 604

PUC study on EVs found that EV charging demands can be handled, but definitions need to be changed to clarify the charging companies are not utilities

TCEQ EV emissions impact study found that if 2.2% of light duty vehicles were electric by 2028, it would reduce emissions by .8 to 2.2%, however it did not look at medium and heavy duty trucks

DMV study found that a $100 fee would be equivalent to the fees paid by gas cars

TXDOT Study on Imposing Fees on Alternatively Fueled Vehicles (December 1, 2020)

Omnibus Electric Transportation Act HB 2221 By Chm Canales

Clarifies the definition of a retail sale of electricity to exclude electric vehicle charging

TDLR would set standards and disclosures for electric vehicle charging

DMV would establish an annual road use fee for EVs of $100

TCEQ would expand its Light Duty Incentive to include pick-ups, require the dealer to credit incentive to buyer at time of sale and allow them to serve as a funnel for federal funds

TXDOT would create a multi-agency Texas Transportation Electrification Council to develop a comprehensive charging infrastructure plan

TxETRA

Now is the Time to Prepare for the EV Boom

We have an opportunity to set policy ahead of the demand

Other countries and states have gone before us, so we can use the best practices they have developed

If we plan now, we can accelerate through the boom