Electric Vehicle Project Management

May 2021

Agenda

1. Purpose of project
2. Tool Inspiration/Creation
3. Proactive Measures
4. What “if” scenarios

Purpose

1. Understand the **impact** of commercial fleet adoption on Oncor's electrical grid.
2. Collect actual load demand data for strategic transmission and distribution **planning**
3. Better understand customer needs to map Oncor **innovations** accordingly

Tool Inspiration

Situation: Distribution centers are very densely located and substations would be impacted if multiple customers electrify a small percentage of vehicles.

Tool Inspiration

Location: Approximately 13% of all freight traffic passes through Texas. Primary corridors pass through Oncor's Dallas and Fort Worth service area.

Tool Creation

Specifics: Preliminary data indicates there are approximately 21,987 fleets in the Oncor service area.

Question to answer:

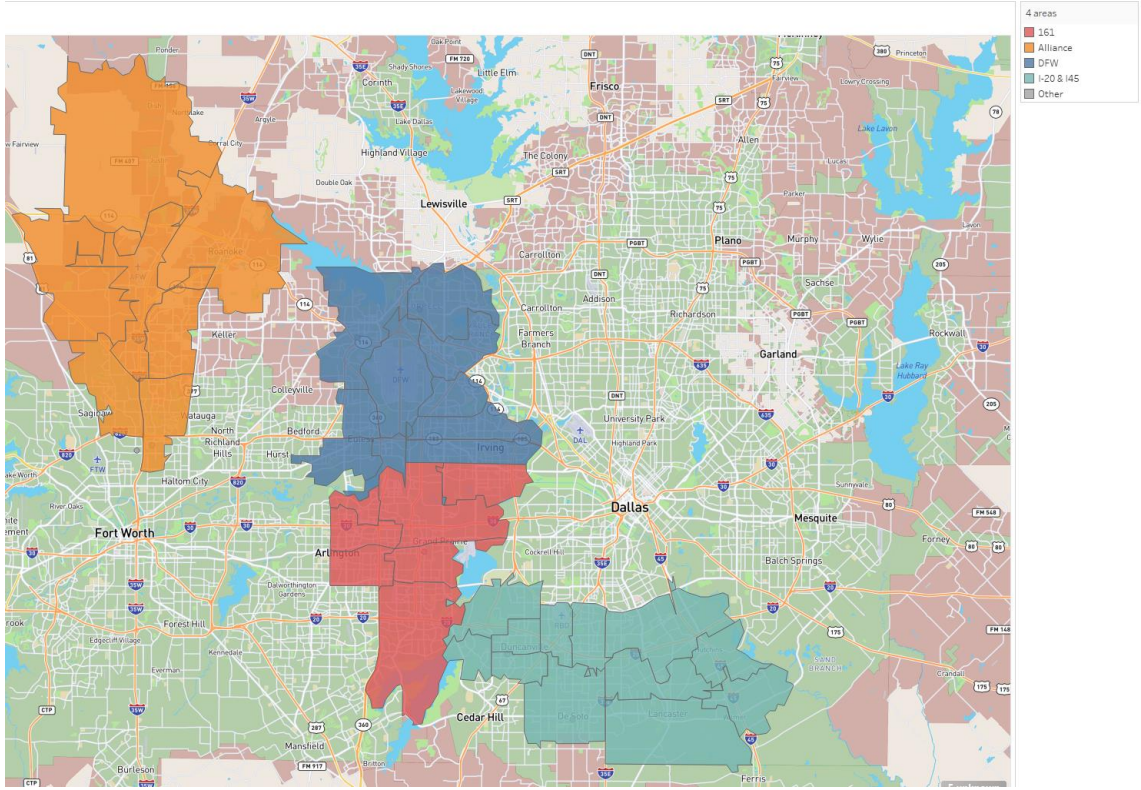
If 25% of Oncor service area fleet vehicles electrify with an average monthly 50,000kWh consumption each, then what??

Tool Creation

Data sets leveraged:

- Internal
  - Internal customer base
  - Oncor infrastructure

- External
  - Fleet Seek
  - Leonard's Guide
  - NCTCOG
  - Vehicle and Charger OEMs



Tool Creation

How data set(s) were used:

- Create Internal and External Data Relationships
- Create Calculations to simulate growth
- Aggregate Load
- Determine Impact of Load
- Track business behavior *
- Merge Residential and Commercial studies *

* Indicates future state

Proactive Measures

Internal process steps:

- Complete internal scenario planning initiative to forecast
- Identify the early adopters and work to have capacity in place when first fleet vehicles arrive
- Establish a cross company task force to identify reliability and resilience offerings
- Begin studies mapping how fleet sites will likely electrify

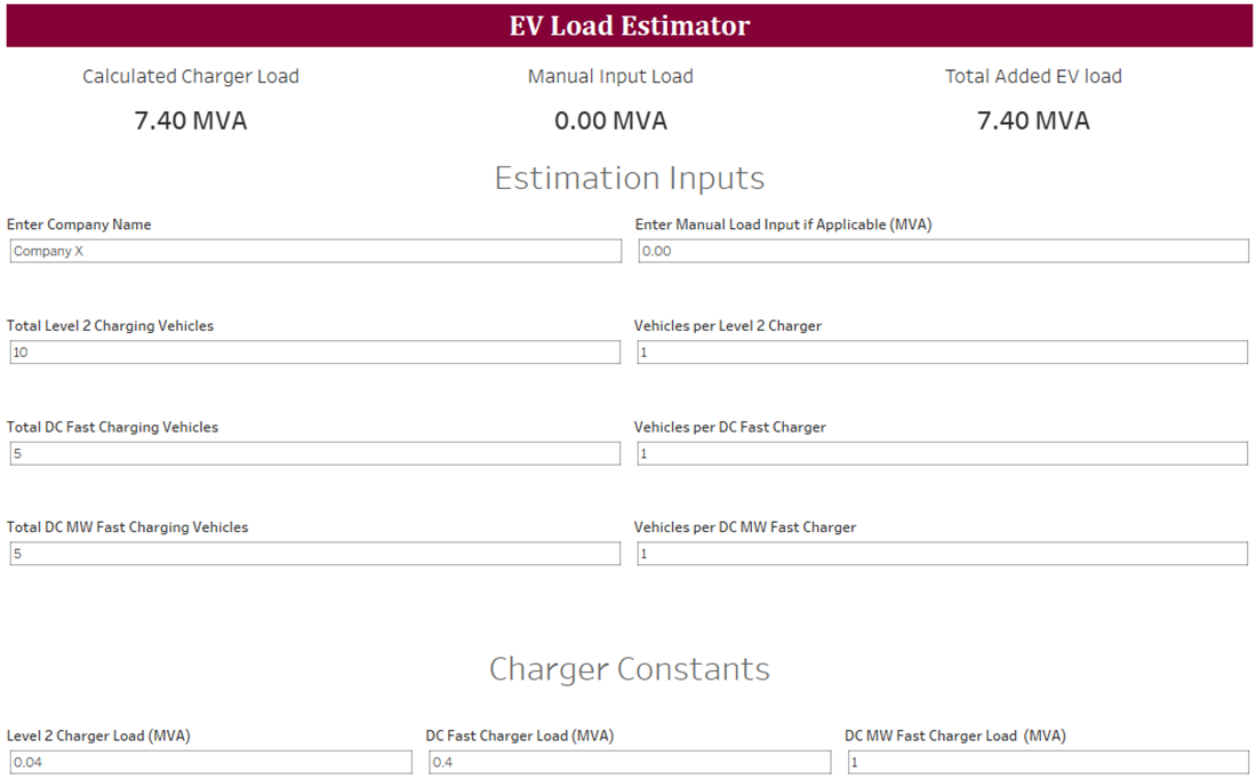
External process steps:

- Establish local partners aka “Hitting the Streets”
- Activate volunteers to speak with cities within impacted area
- Partnering with regionally groups like the COGs

What “if” Scenarios

Final tool input:

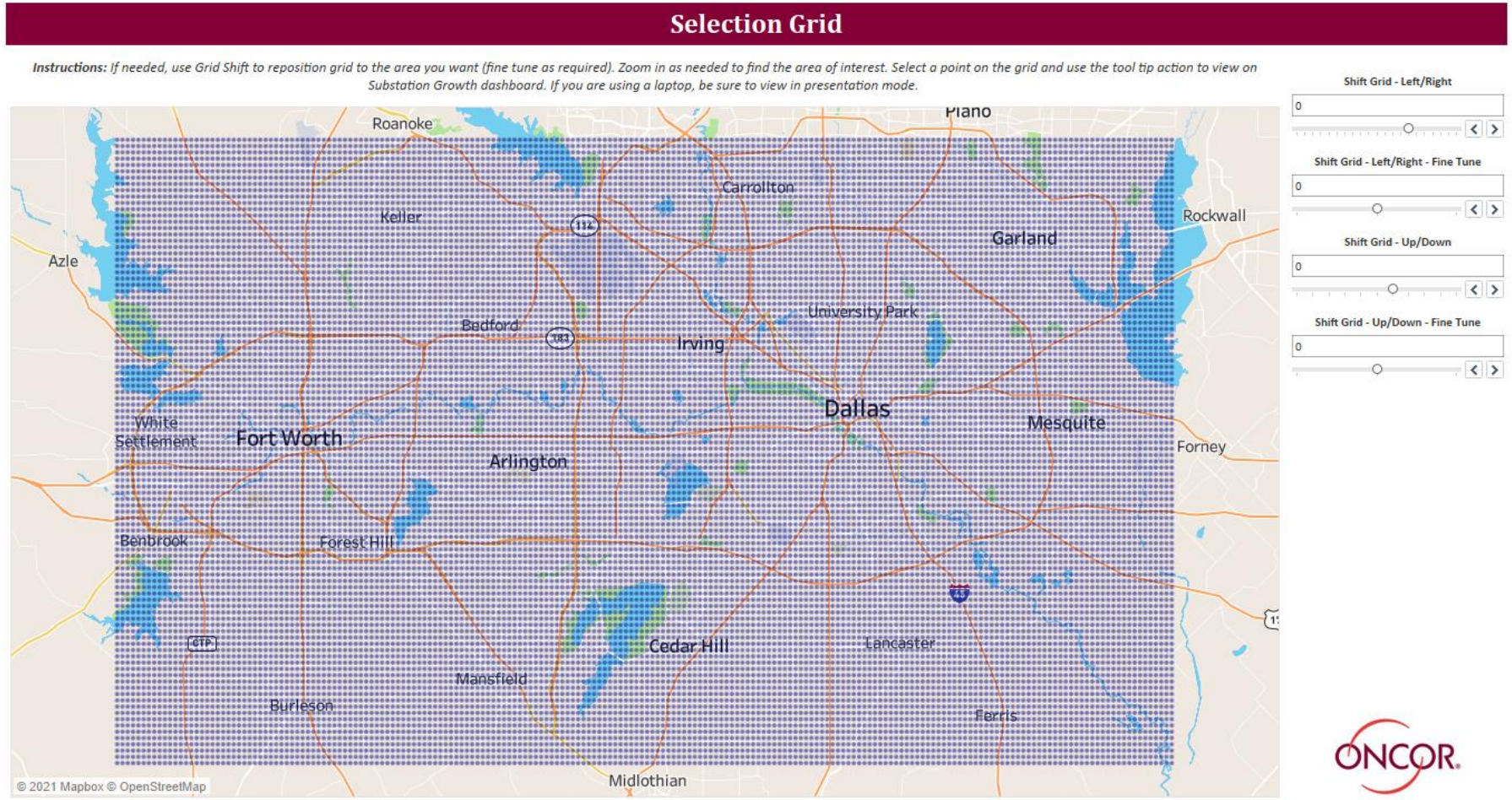
- Manuel input per location of “the what”
- Allows for site specific equipment needs to be entered
- Asks input charger constraints
- Result is an additional internal data set



What “if” Scenarios

Final tool output:

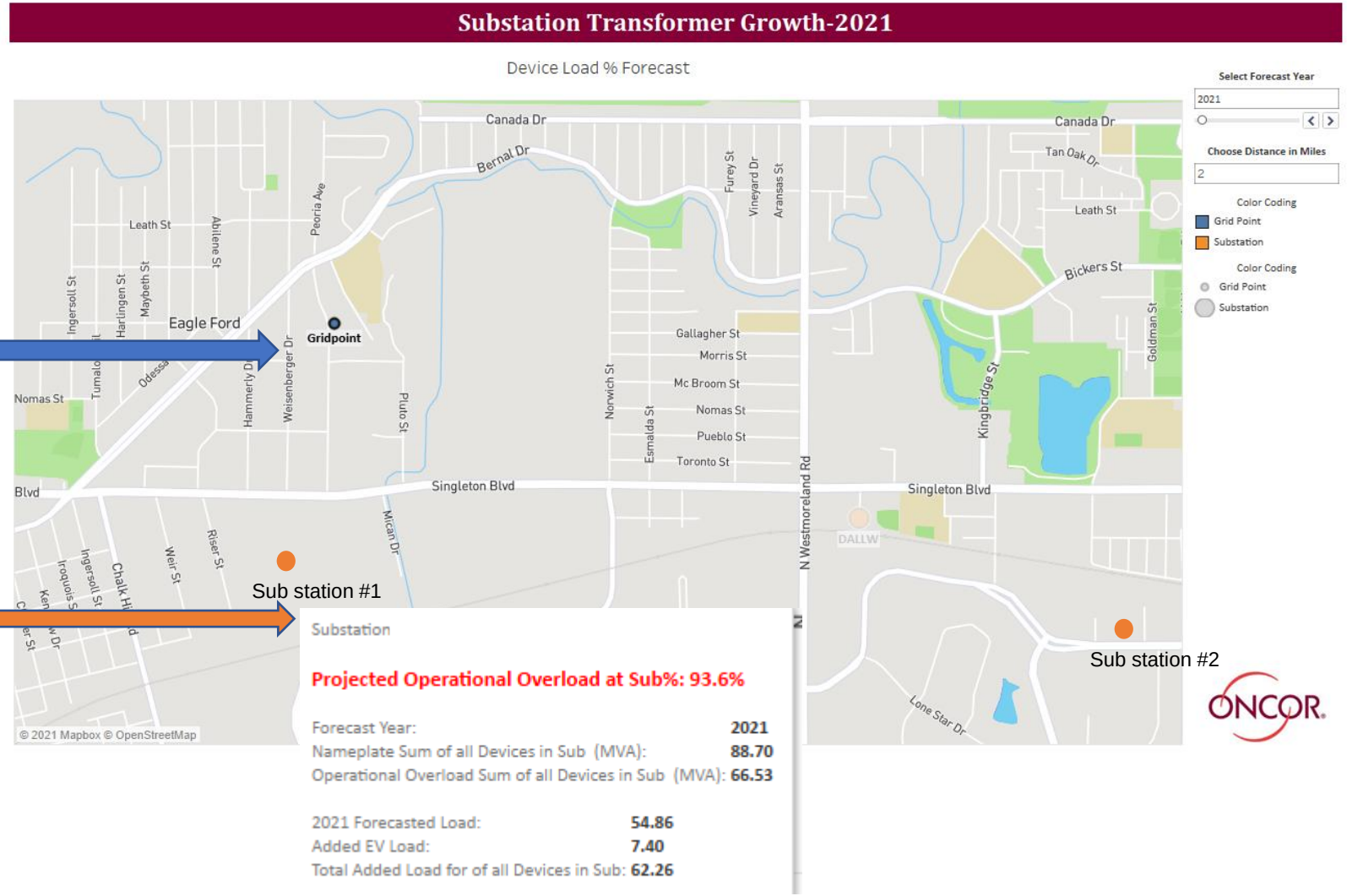
- “The what” entered is cross referenced to internal data assets map
- Result is a geographically referenced location with load
- Display output is a visual proximity to impacted facilities



What “if” Scenarios

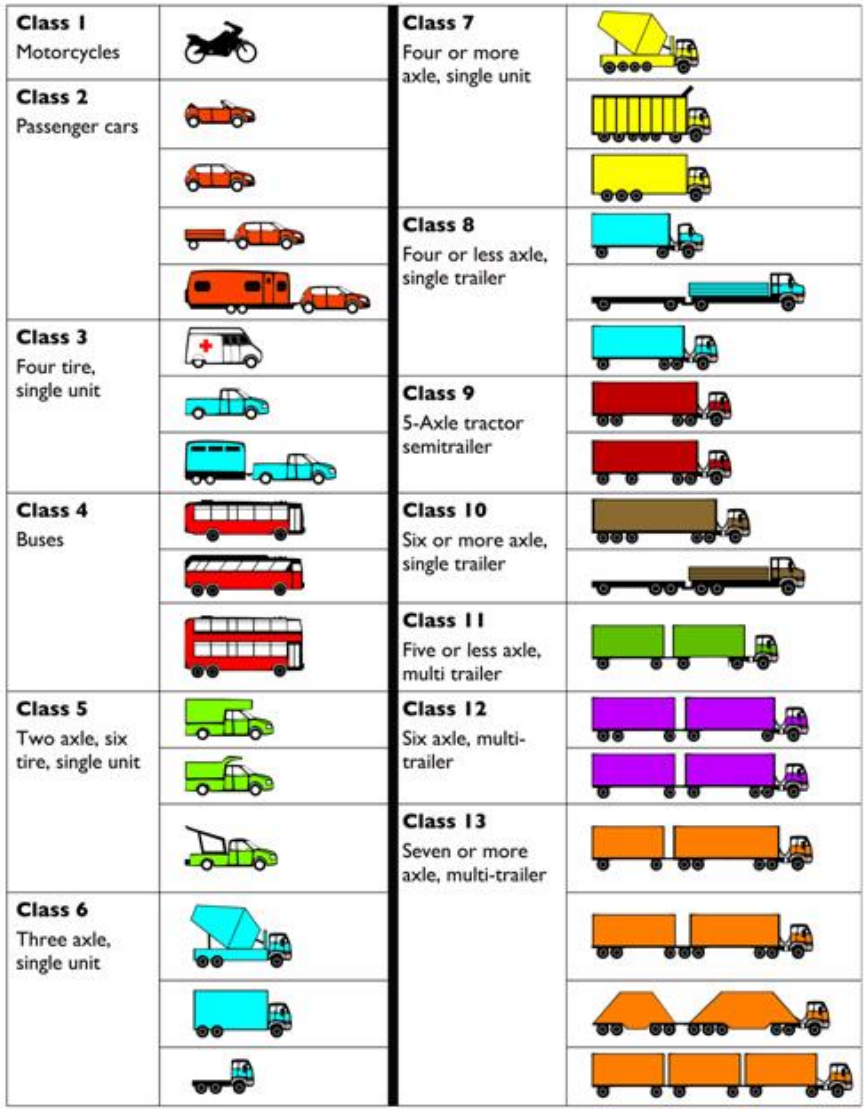
Final tool output:

- Entered location is displayed as grid point
- Substation assets depicted in relationship to locations
- Result is load specifics



Appendix Information

EV Offerings by Vehicle Class



Federal Highway Admin Vehicle Classifications:

- Class 1 Motorcycles: 88 manufacturers listed on EVTrader
- Class 2 Passenger cars 400 models by 2023 (McKinsey)
- Class 3 Four Tire Single Unit: 8 US manufacturers 2020-2022
- Class 4 Buses: Globally 50 manufacturers (Wikipedia)
- Class 5 Two axle six tires single unit: 5 US manufacturers 2020+
- Class 6 Three axle single unit: 5 US manufacturers 2020-2022
- Class 7 Four or more axle single unit: none disclosed
- Class 8 Four or less axle single trailer: 7 US manufacturers 2021+

Note: If not otherwise attributed source is multiple publications assembled by Oncor

The Economic Realities for Oncor: Residential Charging

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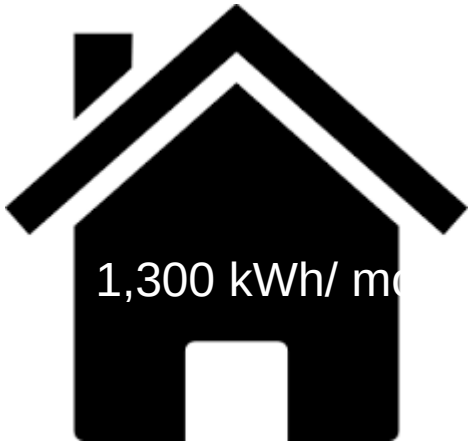
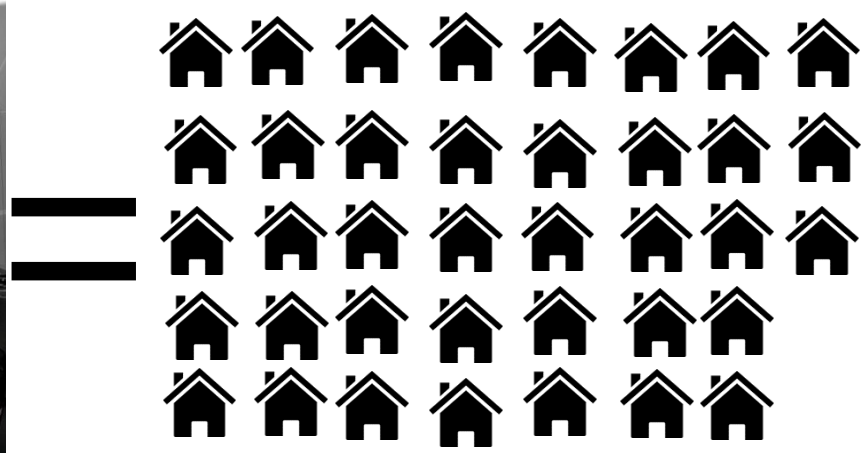


- The average Texan drives 16,347 miles annually
- Dallas area has second longest commute in the US behind only Atlanta
- An EV owner driving 16,347 miles annually consumes 5,231 kWh
- <u>Bottom line:</u> 2.98 average EV drivers is equivalent to adding a new home consuming 1300 kWh per month.

Notes: The average miles is from Hartford Insurance Company 2019
5,231 kWh is 16,347 miles / 3kWh/mile which is all EVs average
1,300 kWh/month is the Oncor residential customer average

But… The Economic Reality of Class 8 Truck Charging for Oncor



One typical Tesla Semi Truck (class 8) is the equivalent of:

38 typical Texas homes at 1,300 kWh/mo.

Or the equivalent of 114 Tesla Model 3 personal vehicles.

Or 50,000 kWh/mo.

Depending on operational usage

One recent inquiry was for a single logistics center with 435 Class 8 trucks charging overnight at the depot. To electrify the entire fleet the chosen overnight charging approach would require 39MW peak capacity

Notes: the National Petroleum Council reports that the average class 8 truck in Texas records 100,000 miles/yr. Tesla reports the average Tesla Semi truck consumes 2 kWh/mile in typical operations.

Key Terms

- Charging options: Level 2 (240Vac) DC Fast Charger (higher kW chargers – generally 25kW to 1MW+)
- EVs –Any vehicle that utilizes an electric motor as source for propulsion
- PEVs–Any vehicle that connects to the primary grid or generation source to recharge energy storage system
- BEVs –Battery Electric Vehicle– Vehicle that only uses an electric motor for propulsion with energy storage as a power source. Recharging can be done by plugging into the primary grid and/or generation source
- PHEVs – Plug Hybrid Electric Vehicles – Vehicle that uses both an electric motor with energy storage and an internal combustion engine for propulsion. Recharging can be done by plugging into the primary grid and/or generation source
- Hybrid Electric Vehicles – generally use an internal combustion engine to charge a battery to power an electric motor drive system (most Prius vehicles – they cannot take a grid charge)
- EVSE – Electric Vehicle Supply Equipment, official name for EV chargers
- Fleet Vehicles – Delivery vans and freight box trucks and tractors (classes 4-8)
- Green Fleet Tools: Oncor proprietary tools to estimate distribution system impacts of fleet electrification
- Light Duty Vehicles – passenger cars, SUVs, pickups and vans
- NCTCOG – North Central Texas Council of Governments (DFW Clean Cities, EV North Texas)
- Public Charging Infrastructure – electric vehicle chargers that are publicly available for any EV owner
- Underserved Areas – locations where few if any public chargers are available and current economics limit investment attractiveness.