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Impact of Rising EV Market Share on Utilities

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EV Role in rising demand for Electrical Power

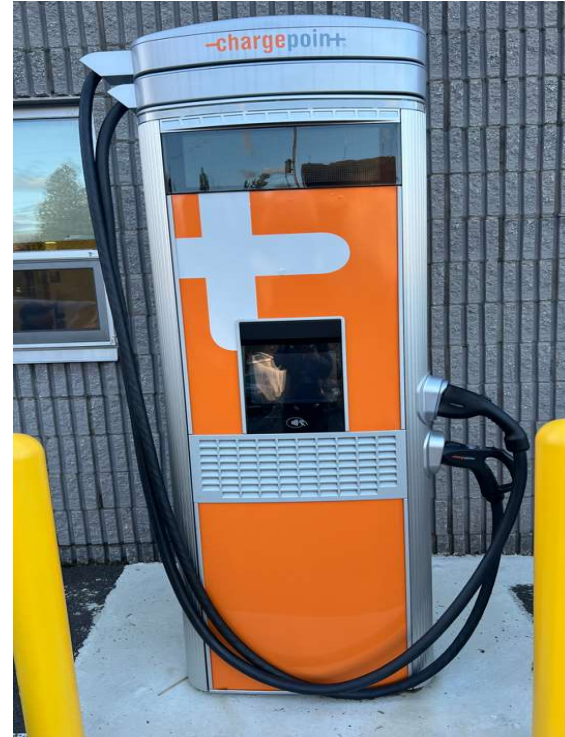
- ✓ It is widely perceived that growing EV market share is the leading factor for electrical power demand constrains in near future
- ✓ To evaluate this statement, we will separate EV charging units into two categories
 - Residential (up to 19.2kW)
 - Commercial/DC Fast charging (50kW – 350kW)
- ✓ Commercial or DC fast charging units' installation treated very differently by Utilities;
 - an organization/business that plans installation of EV Fast charger must file request to utility before proceeding with installation
- ✓ Focus of our study is the network of Residential EV chargers
 - Most EV owners going to charge their vehicles at home
 - Most Residential EV chargers are 11.5kW (Level-2)

Typical Residential vs Commercial EV charging unit

Residential EV charger – 11.5kW



Commercial EV charger – 62.5kW

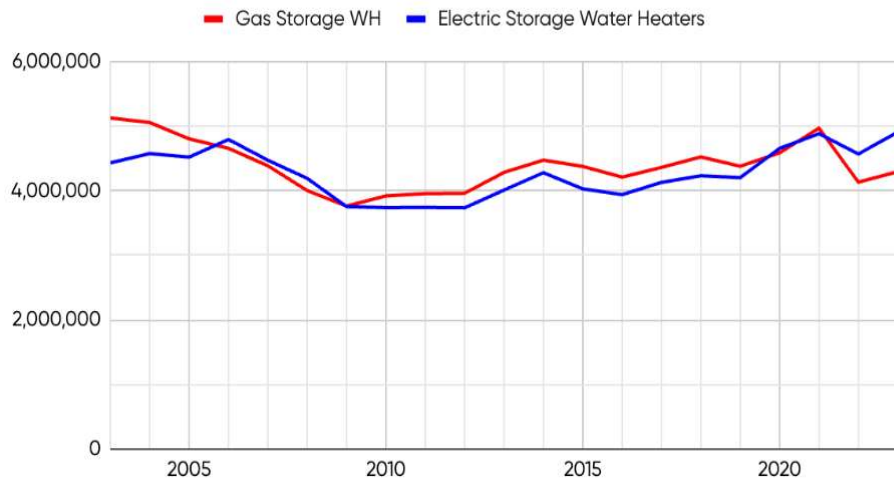


Standard and Emerging Residential Electric load

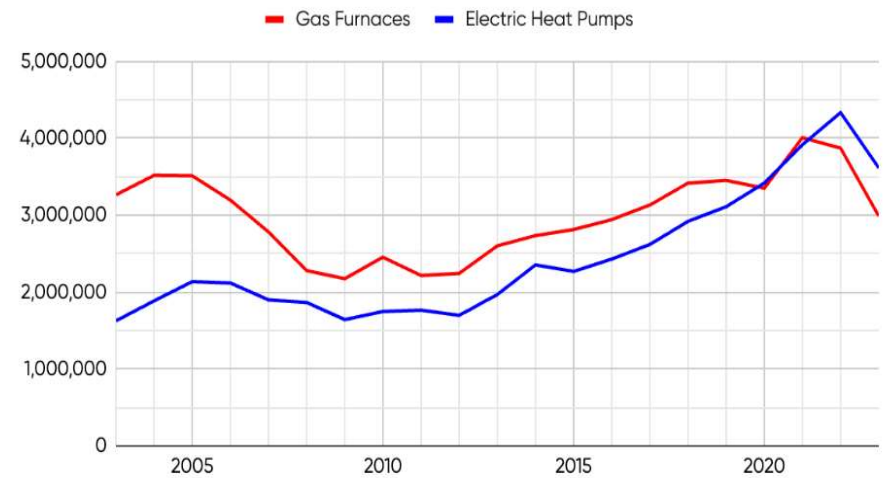
- ✓ Residential Electric loads, excluding lights
 - Refrigerator
 - Dishwasher
 - Washing machine
 - Dryer
 - EV charger (emerging el. load)
 - Electric Water heater (emerging el. load)
 - Electric Heat pump (emerging el. load)
 - Electric Cook top (emerging el. load)

Residential Electric Water Heaters and Heat Pump sale trends

Gas Storage WH and Electric Storage Water Heaters

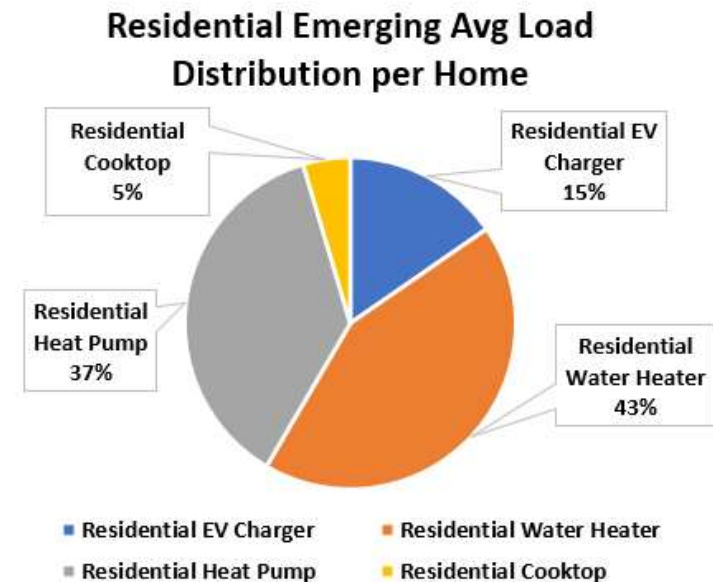


Gas Furnaces and Electric Heat Pumps



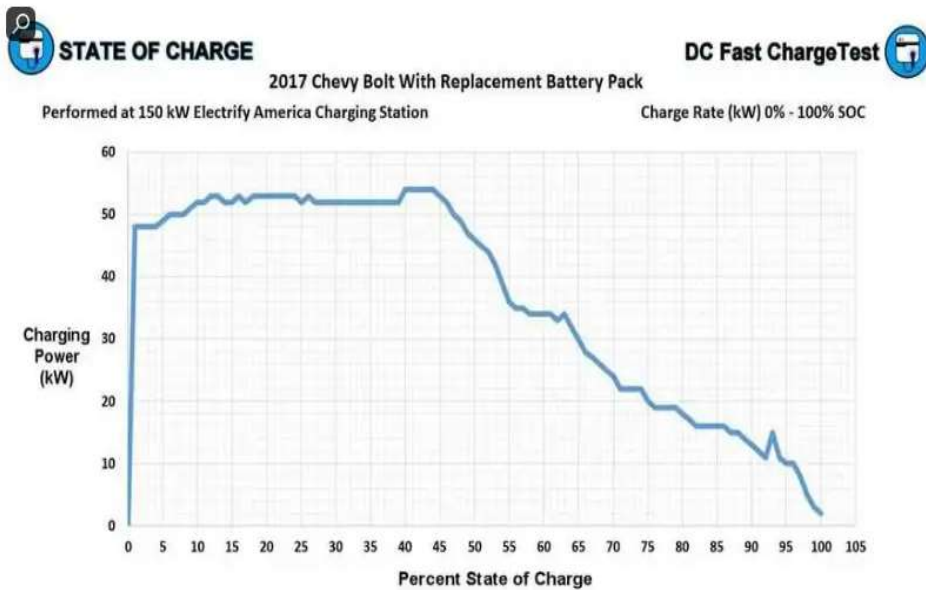
Use of Residential EV related vs other emerging Electric loads

- ✓ Residential EV standard charger (11.5kW)
 - Average weekly trip – 200 miles
 - Average EV energy consumption – 4miles/kWh
 - Average Energy weekly demand – **50 kWh**
- ✓ Residential Electric Water Heater (10kW- 20kW)
 - Average run time per day – 3-5h (we take 2h)
 - Average Energy weekly demand – **140 kWh**
- ✓ Residential Heat Pumps (9kW- 25kW)
 - Average run time per day – 2h
 - Average Energy weekly demand – **126 kWh**
- ✓ Residential Cook top (2kW- 4kW)
 - Average run time per week – 5h
 - Average Energy weekly demand – **15 kWh**

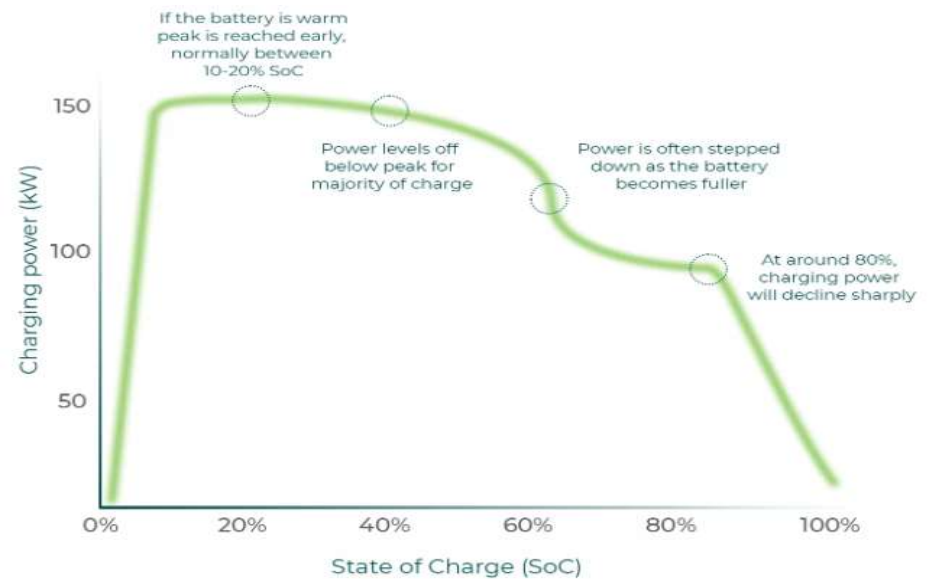


EV charging curve

- ✓ EV charging power consumption profile is not linear
- ✓ Charging curves differ from one EV manufacturers to another
- ✓ Understanding the curve is important for both, Residential and Commercial EV charger user

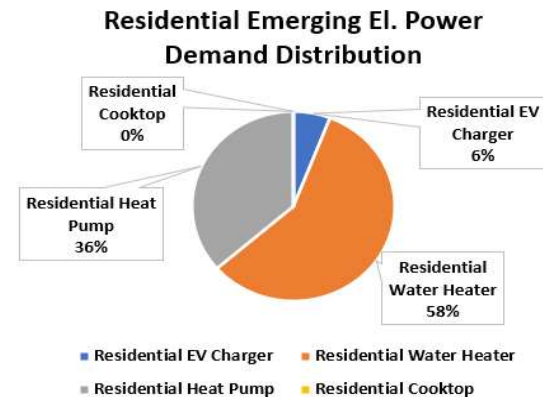


The Chevrolet Bolt EV DC fast charging curve



2023 Sales statistics Total Demand distribution

- ✓ Estimate EVs sales in the USA in 2023 – 1.4 million
 - Average energy demand added weekly – **70 GWh**
- ✓ Estimate Residential Electric Water Heater sales in the USA in 2023 – 4.9 million
 - Average energy demand added weekly – **686 GWh**
- ✓ Estimate Residential Electric Home Heat Pump sales in the USA in 2023 – 3.6 million
 - Average energy demand added weekly – **432 GWh**
- ✓ Estimate Residential Cooktop sales in the USA in 2023 – official unknown (hypothetical 1.5 million)
 - Average energy demand added weekly – **0.23 GWh**



Reference Sources

- ✓ Industry Analysis – www.grandviewresearch.com
- ✓ The US Records – www.cleantechnica.com
- ✓ Universal Heat Pump System manufacturer – www.mrcool.com
- ✓ Portal for Market Data – www.statistica.com
- ✓ All about Water Heaters – www.waterheaterhub.com
- ✓ All about Home heating and Cooling – www.aircomfortlab.com
- ✓ EV owners portal – www.insideevs.com