



New anticipated loads in the United States

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Overview

Key trends in electric loading due to:

- Transportation Electrification
- Building Electrification
- Codes, Standards, Policies, and Laws

TRANSPORTATION ELECTRIFICATION

Transportation electrification

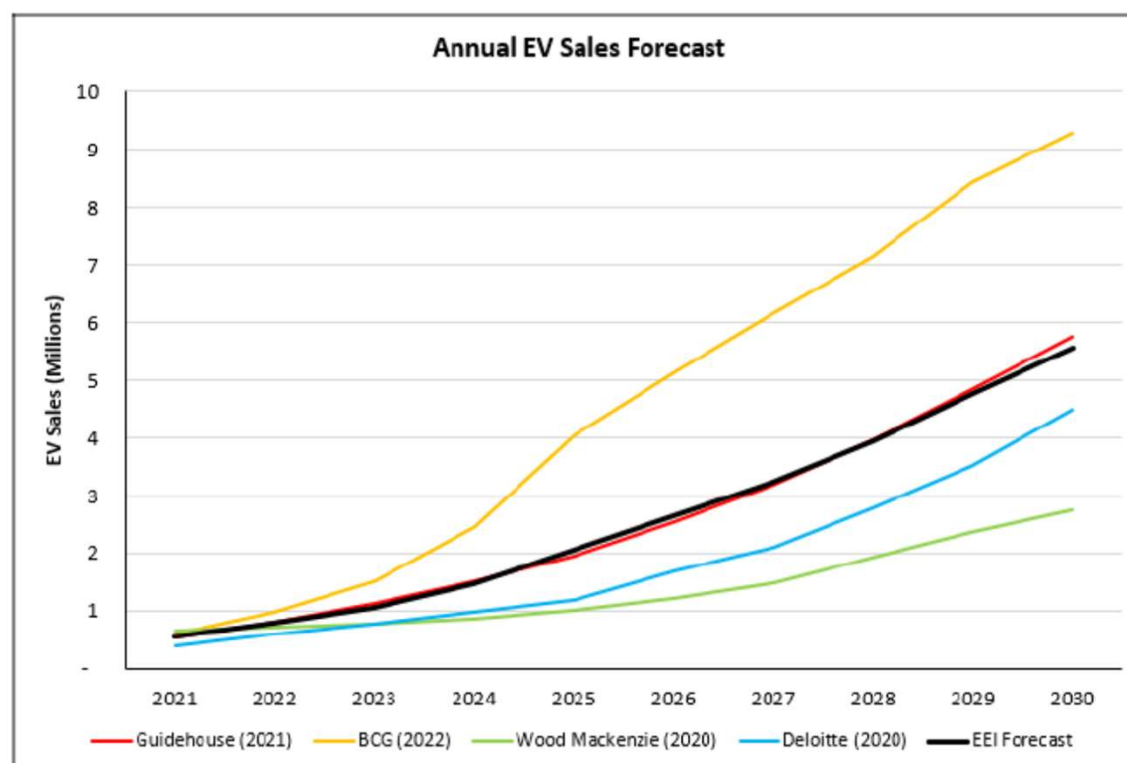
Light Duty Vehicles

As of August 2022, there are ~2.9 Million all-electric or plug-in hybrid electric vehicles operating in the US. More than 420,000 EVs were sold in the first half of 2022, 6.28 percent of all light vehicle sales.

- California, Washington, and New York state regulators announced that 100% of light duty vehicle sales in 2035 must be zero emission (80% BEV, 20% PHEV in CA). The requirement in CA is 35% in 2026 and ramps up every year. Other ZEV states are likely to follow California's lead.
- EEI / IEI Projections (June 2022 Update of October 2018 report):
 - The number of EVs on U.S. roads is projected to reach 26.4 million in 2030, up from the projected 18.7 million as projected in the 2018 report. 18.7 Million EVs on U.S. roads in 2030 (about 7% of LDV's).
 - Annual sales of EVs will be nearly 5.6 million in 2030, reaching more than 32 percent of annual light-duty vehicle sales in 2030.

Transportation electrification

Light Duty Vehicles



Transportation electrification

Light Duty Vehicles

Energy / Demand impacts:

If 12,000 Miles per year (average vehicle miles traveled):

- 4 miles / kWh = 3,000 kWh / year
- 3 miles / kWh = 4,000 kWh / year
- 2 miles / kWh = 6,000 kWh / year

Charging Levels

- Level 1: 1.4 kW typical (maximum = 1.9 kW, per SAE-J1772)
- Level 2: 3.3 kW was typical (1st generation < 2016). Now, 4.8 – 7.2 kW (maximum = 19.2 kW, per SAE-J1772 specifications).

Transportation electrification

Commercial (Medium / Heavy Duty) Duty Vehicles

Major corporations have announced plans to purchase partial or all electric fleet vehicles:

- Amazon
- DHL
- FedEx
- Hertz
- Ikea
- Pepsi
- WalMart

Transportation electrification

Commercial (Medium / Heavy Duty) Duty Vehicles

Energy / Demand impacts:

If 12,000 to 63,000 Miles per year (average vehicle miles traveled):

- 1 miles / kWh = 12,000 – 63,000 kWh per year
- 1.5 miles / kWh = 8,000 – 42,000 kWh per year
- 2 miles / kWh = 6,000 – 31,500 kWh per year

Charging Levels

- Level 2: 6.6 – 19.2 kW range
- DC Fast Charging: 50 – 500 kW +
- “Industry Develops 3.75 MW Charging System For EV Trucks” (Inside EVs, Sept. 27, 2021)

BUILDING ELECTRIFICATION

Buildings

Electrification due to:

- Higher efficiency + higher efficiency gains with technologies (e.g., geothermal heat pumps, LED lights, heat pump water heaters)
- Stable pricing compared to other fuels
- Apps, Artificial Intelligence, 5G communications allow more on-site and remote controls
- External Factors, such as decarbonization efforts

CODES, STANDARDS, POLICIES AND LAWS

Codes, Standards, Policies and Laws

Codes / Standards / Policies / Laws that are already in place in certain states:

- Economy-wide carbon reduction goals (e.g., 50% reduction from 2005 levels by 2030, 80% by 2035, etc.)
- “Carbon neutral” or “net zero” carbon by 2040-2050
- Higher Renewable Portfolio Standards for Electricity (e.g., 50-70% by 2030, “zero-carbon” or 100% RPS by 2040-2050)
- “EV Ready” or “EV Capable” infrastructure required for new buildings
- Policies / Goals on restricting fossil fuel infrastructure (pipelines)
- Restrictions on using gas / all fossil fuels in new (or existing) buildings in large cities (New York, Los Angeles, Boston, Seattle, Denver, Washington DC, etc.)

Codes, Standards, Policies and Laws

Fossil Fuel (gas or all types) Restrictions:

- Total prohibition in new residential and/or commercial buildings.
- Carbon reduction mandates in existing buildings (e.g., 50% by 2030).
- Only certain gas appliances allowed but must be installed with nearby electric infrastructure so customer can switch to electric.
- Only certain gas appliances allowed, but only after receiving approval from the local building official on a case-by-case basis.
- Gas equipment only allowed if the building is at least 10-20% more efficient than an all-electric building.
- Phaseout of gas / fossil fuel use in existing buildings by 20xx.

SUMMARY

Summary

Transportation Electrification

- Increasing number of electric light duty vehicles
- Increasing number of commercial electric vehicles
- More applications of autonomous electric vehicles

Building Electrification

- Higher efficiency of newer electric end-uses
- Corporate “green” goals and policies
- Impact of LEED, Energy Star, and other “green” codes

Summary

Codes / Standards / Policies / Laws

- More stringent energy codes and appliance standards
- Federal, State, and Local carbon reduction mandates
- EV infrastructure requirements for new buildings
- Fossil fuel restrictions = More electric consumption

Impacts on future electric loads

- Depends on market segment (residential, commercial, industrial or transportation).
- Short-term versus Long-term impacts of trends and policies

Summary

Forecast**

- Electric loads will increase, especially for transportation.
- The range of increase will vary widely, anywhere from 5 to 50%, depending on multiple factors.
- In the Annual Energy Outlook 2022, the Energy Information Administration predicts that “demand for electricity grows fastest in the transportation sector”.

**Photos like the next page will also have an impact.

Source: <https://www.latimes.com/business/story/2022-03-09/most-expensive-gas-stations-in-la>

