The State of the U.S. Power Markets

EPISODE 1

U.S. Power Generation

JUNE 2025

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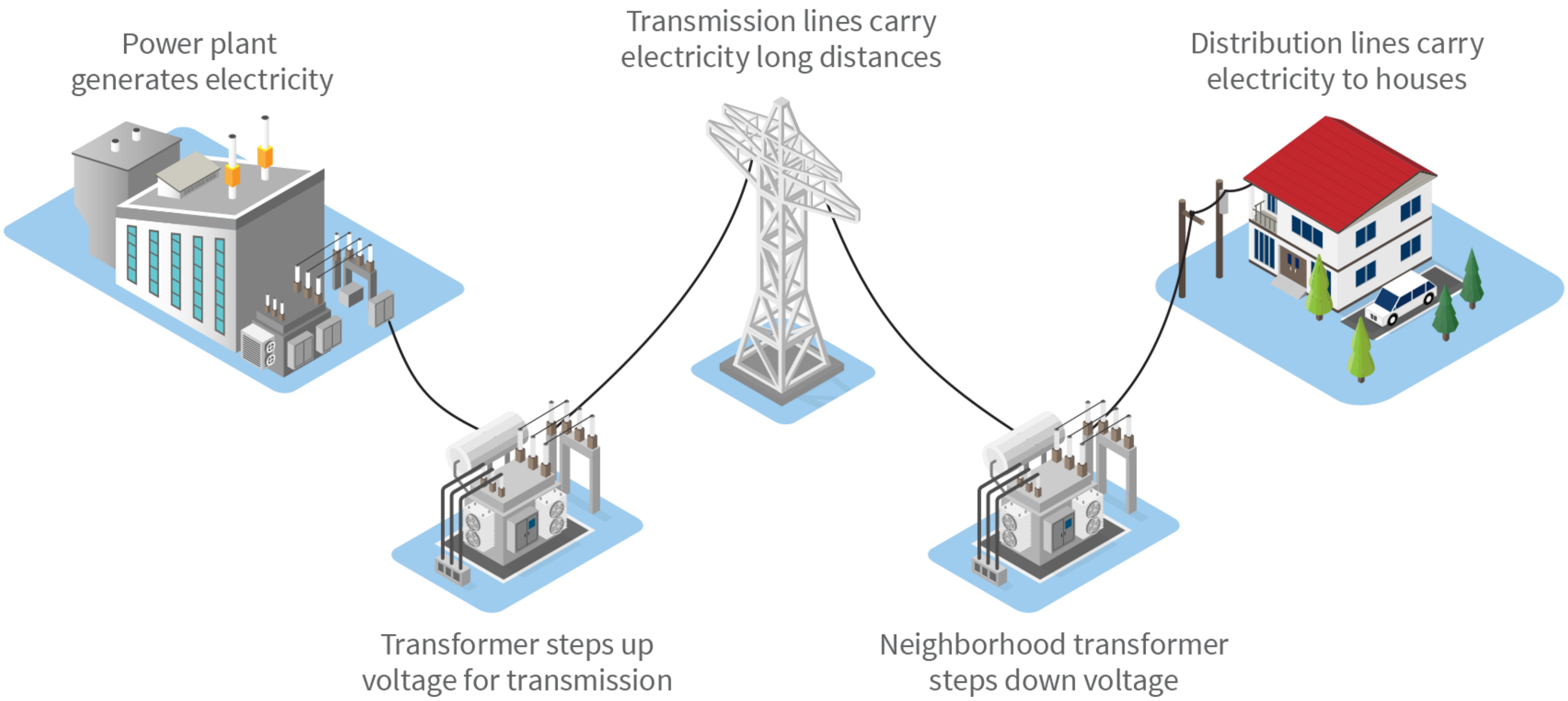
The electricity market consists of three main processes before reaching the end consumer: Generation, Transmission, and Distribution.

Source: EIA adapted from the National Energy Education Development Project

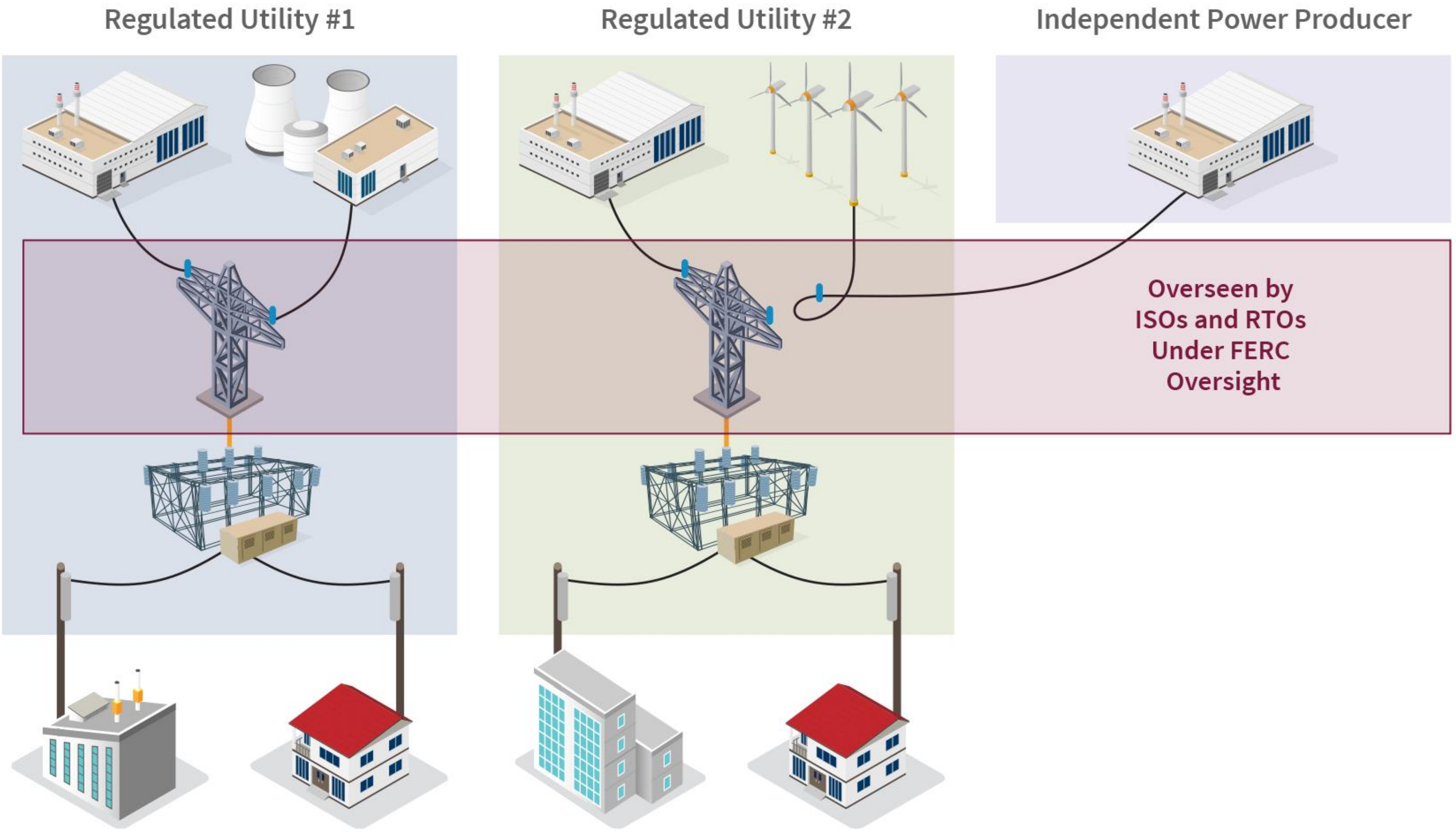
Electricity generation, transmission and distribution



Types of Power Providers

Regulated Utilities provide customers with a vertically-integrated supply chain that includes the generation, transmission, and distribution.

Independent Power Providers (IPPs) operate outside the traditional utility grid and sell power into wholesale markets.



Source: National Academies of Sciences, Engineering, and Medicine. 2009. America's Energy Future: Technology and Transformation. Washington, DC: The National Academies Press. https://doi.org/10.17226/12091.

U.S. Power Generation

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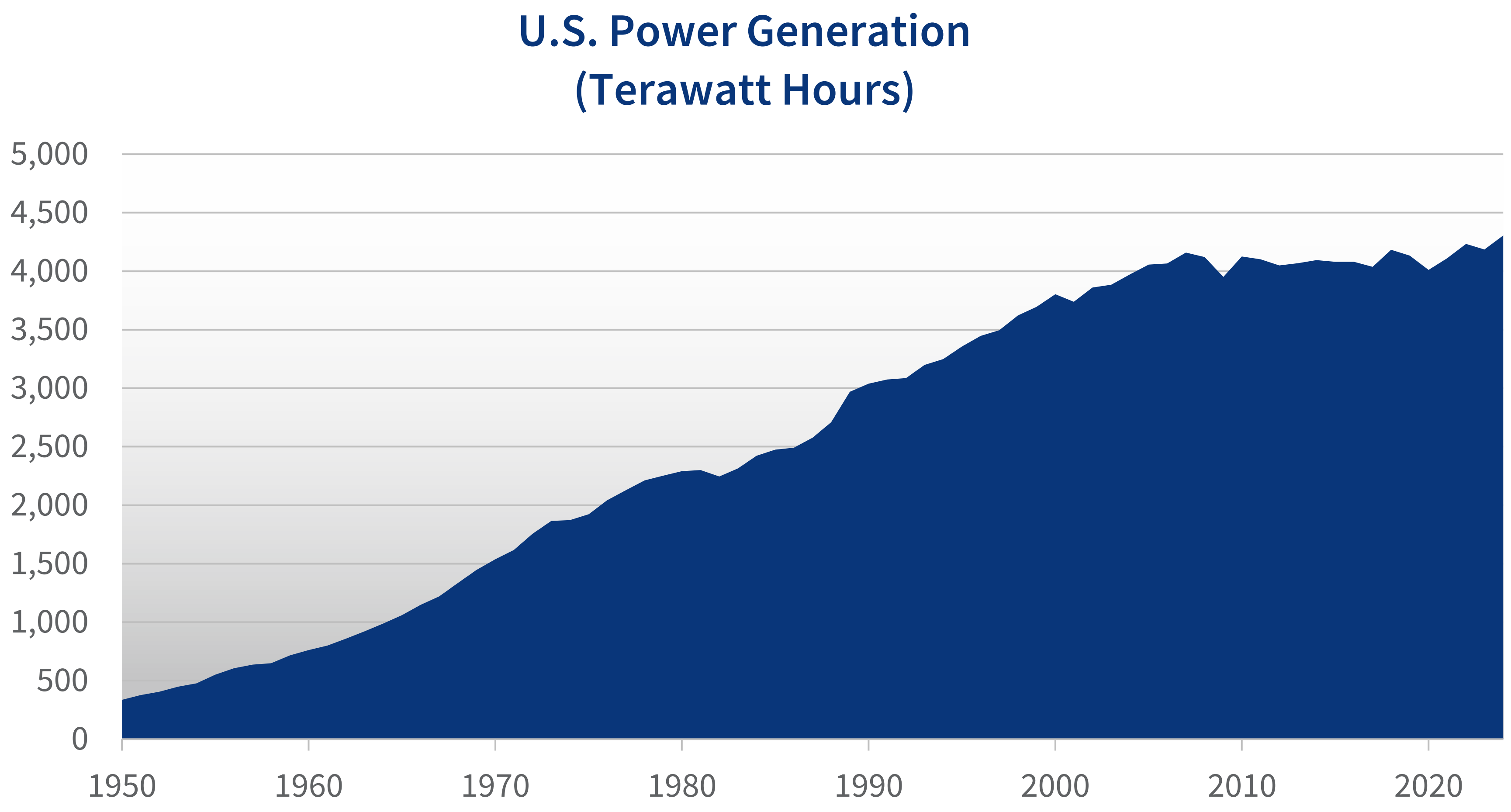
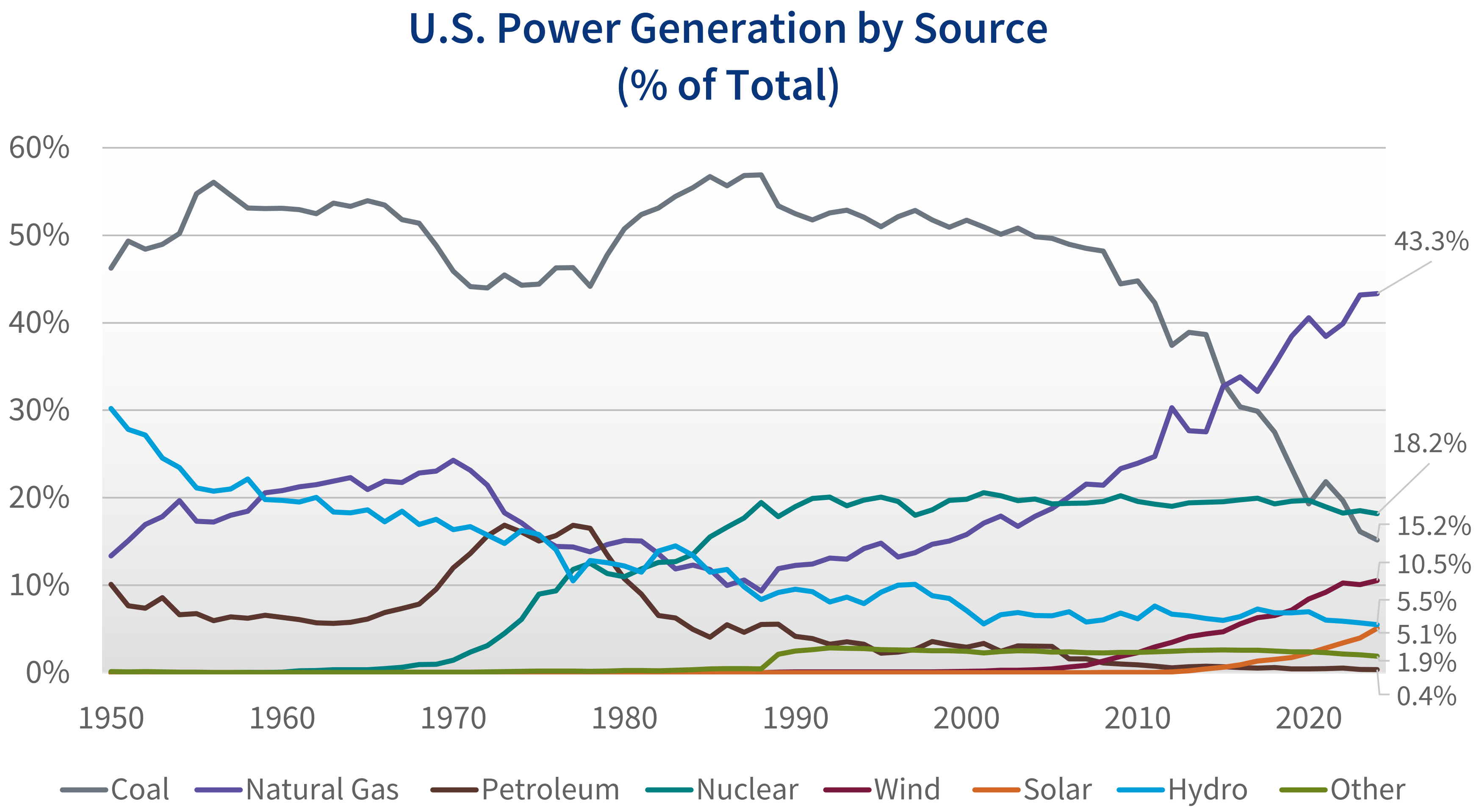
U.S. Power Generation output has been fairly stable over the last twenty years, but we have seen an uptick over the last few years that could be the start of a trend for increasing power demand through the end of the decade.

Source: EIA: April 2025 Monthly Energy Review



The composition of U.S. power generation has evolved over the last 70 years with natural gas now the leading supplier of electricity, representing 43% of supply in 2024.



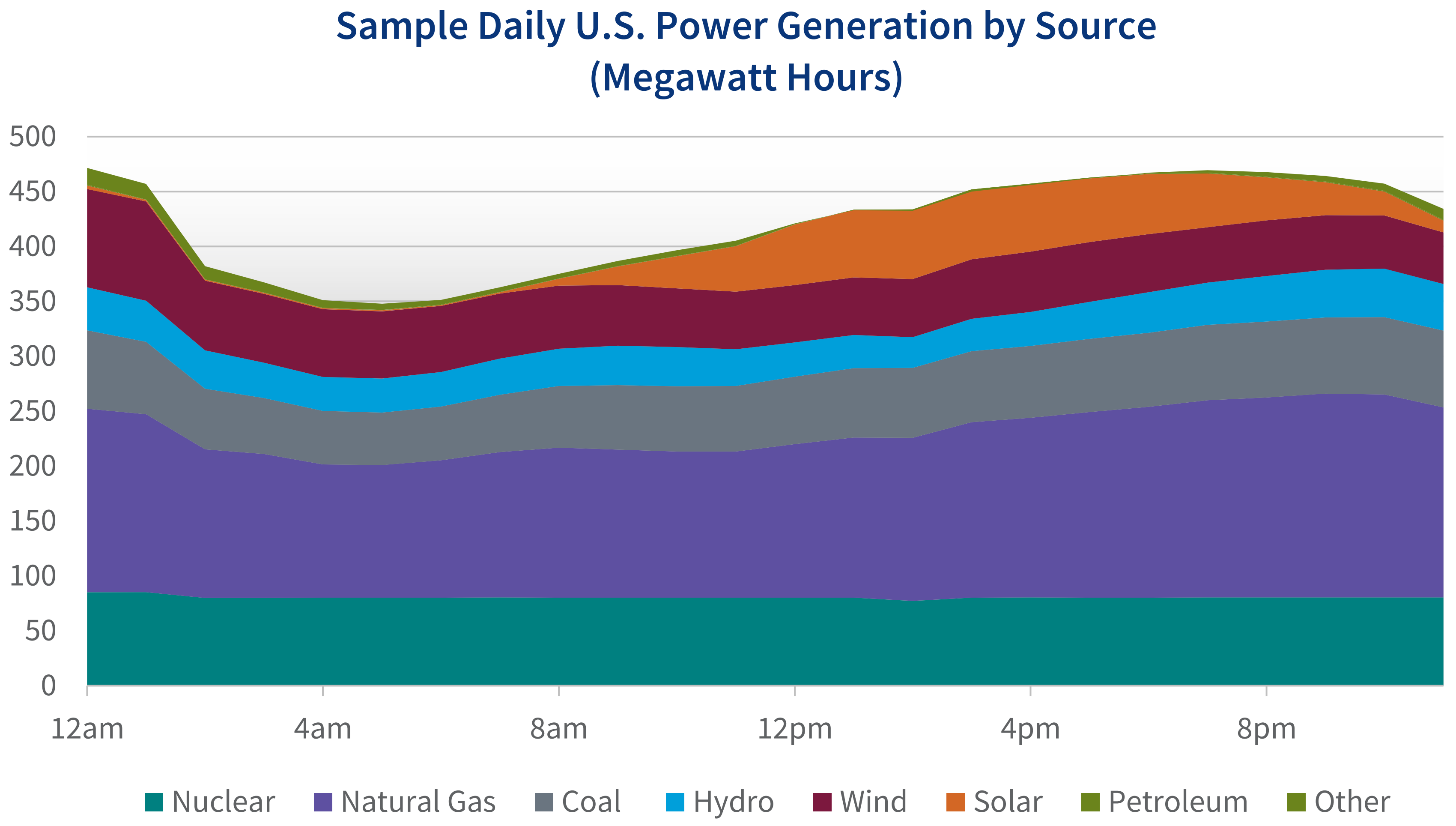
Source: EIA: April 2025 Monthly Energy Review

Dispatchable vs Intermittent Power

Dispatchable power is readily available to be turned on or off as needed.

Intermittent (Non-Dispatchable) power is not always readily available, and in most cases, is subject to dynamics such as the time of day, weather conditions, or other seasonal factors.

Source: EIA Hourly Grid Monitor, May 20, 2025

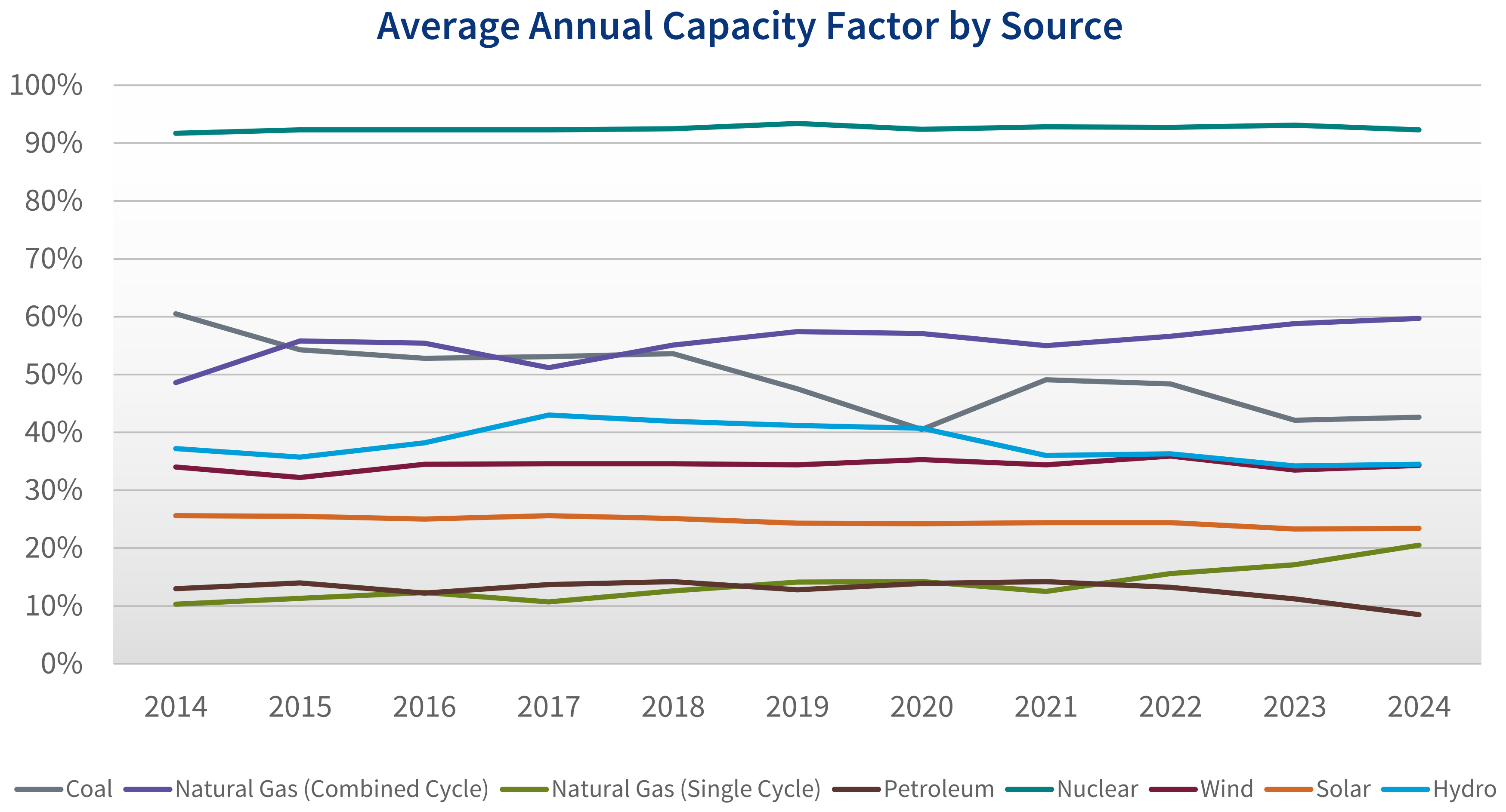


U.S. Capacity Factor by Source

The capacity factor for a power plant is measured by calculating the amount of power generated relative to its potential generating capacity.

It can also be referred to as the utilization percentage of the plant's capacity.

Source: EIA: Electric Power Monthly

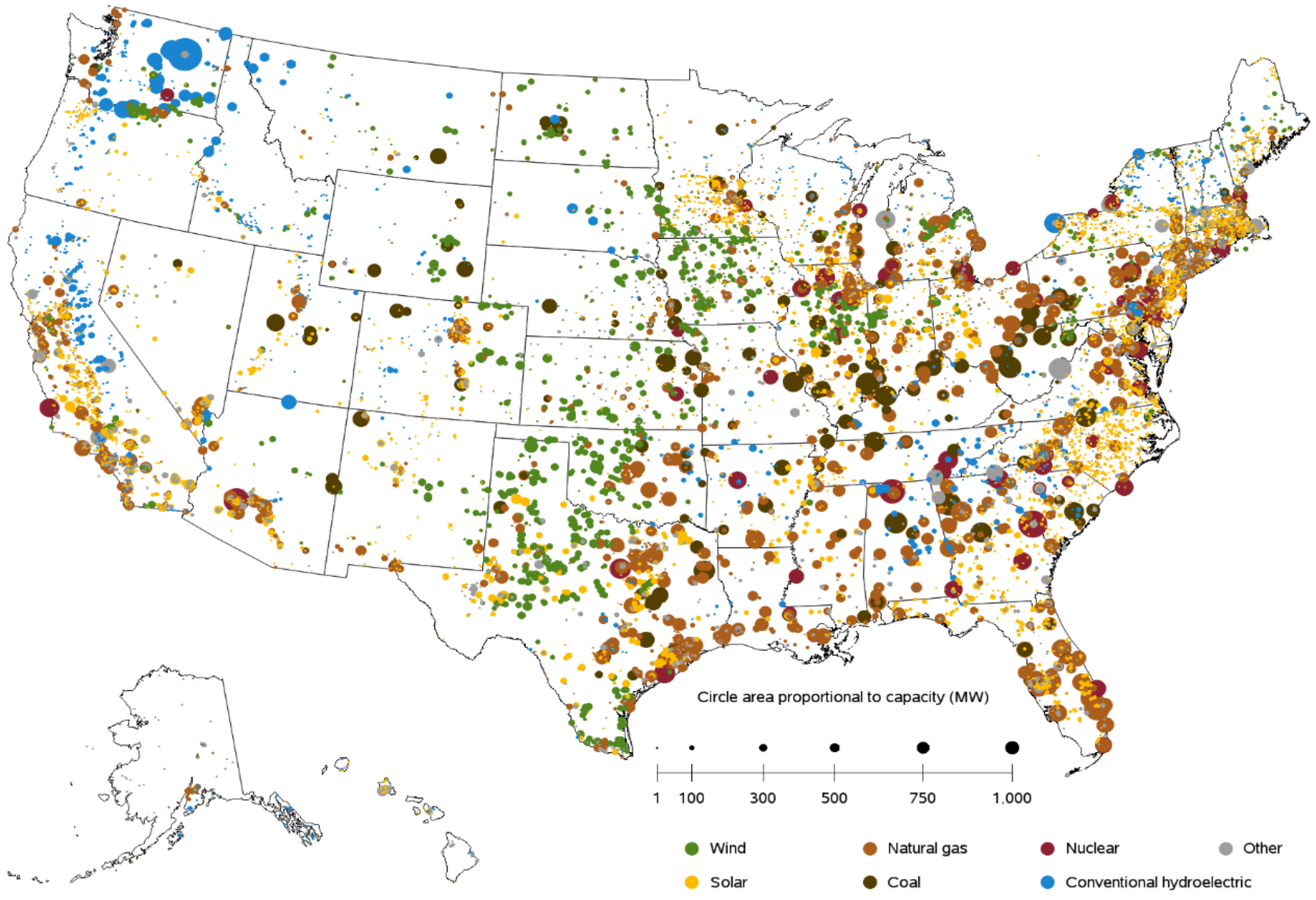


U.S. Power Plant Geography

Geographic factors can play a major role in determining the most effective solution for power generation in certain regions.

Source: EIA

Operable utility-scale electric generating units, as of April 2025

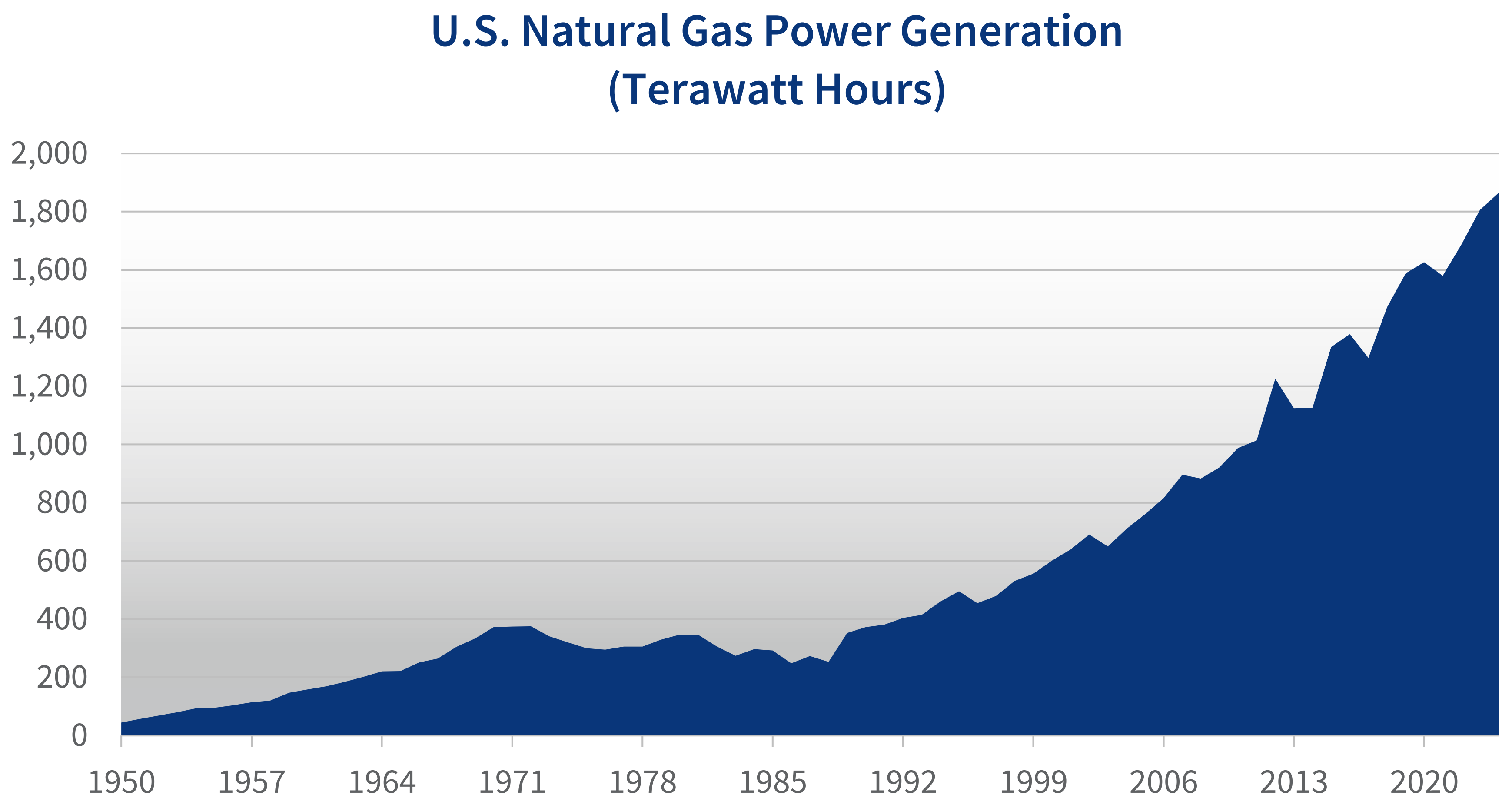


Data sources: U.S. Energy Information Administration, Form EIA-860, 'Annual Electric Generator Report' and Form EIA-860M, 'Monthly Update to the Annual Electric Generator Report.'

Natural Gas

Natural gas power generation in the U.S. has seen a significant increase over the last 30 years given the reliability of the power and the low-cost and abundant nature of natural gas as a feedstock for power generation.

Source: EIA: April 2025 Monthly Energy Review



Natural Gas Power Plants

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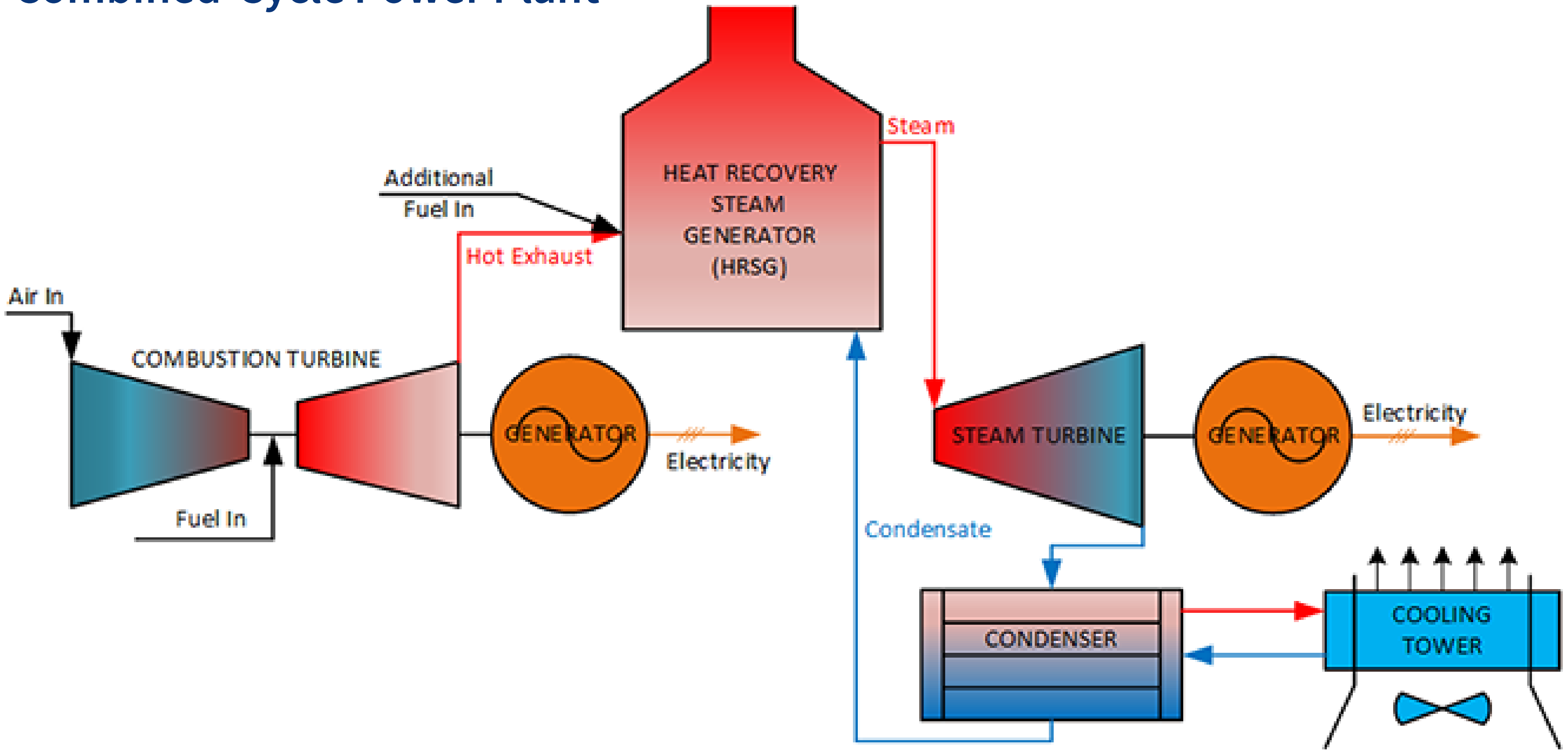
There are two main types of natural gas plants: simple-cycle plants and combined-cycle plants.

Combined-cycle plants are much more efficient and are typically relied upon to meet baseload power demands.

Source: Bridgestone Associates, Combined Cycle Power: History, Description & Uses

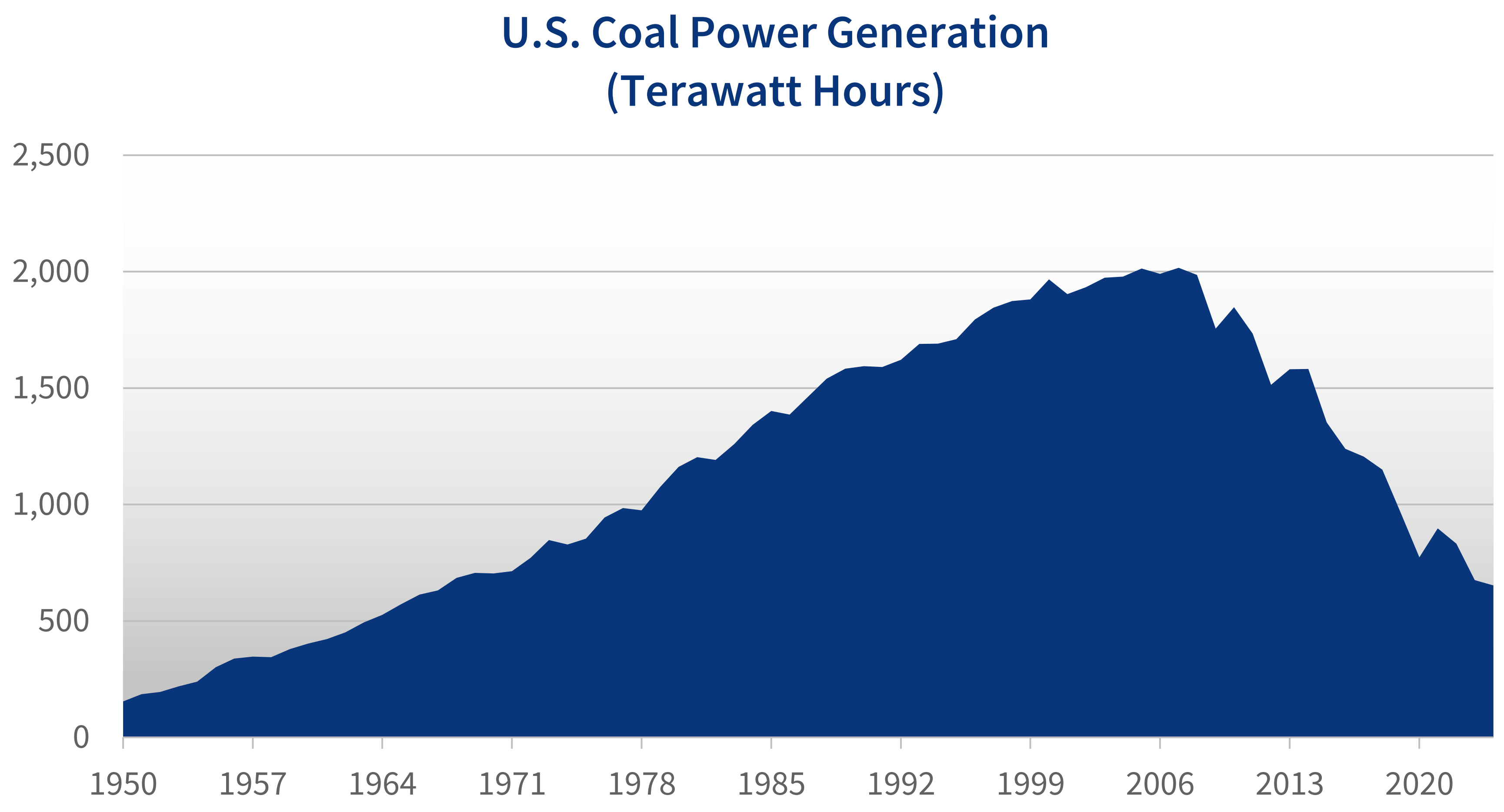
Combined-Cycle Power Plant



Coal

Coal-fired power generation in the U.S. has seen a significant decline over the last 15 years as natural gas and renewables have taken market share away from the coal sector.

Higher CO2 emissions from coal plants have also contributed to a decline in coal-fired power generation.



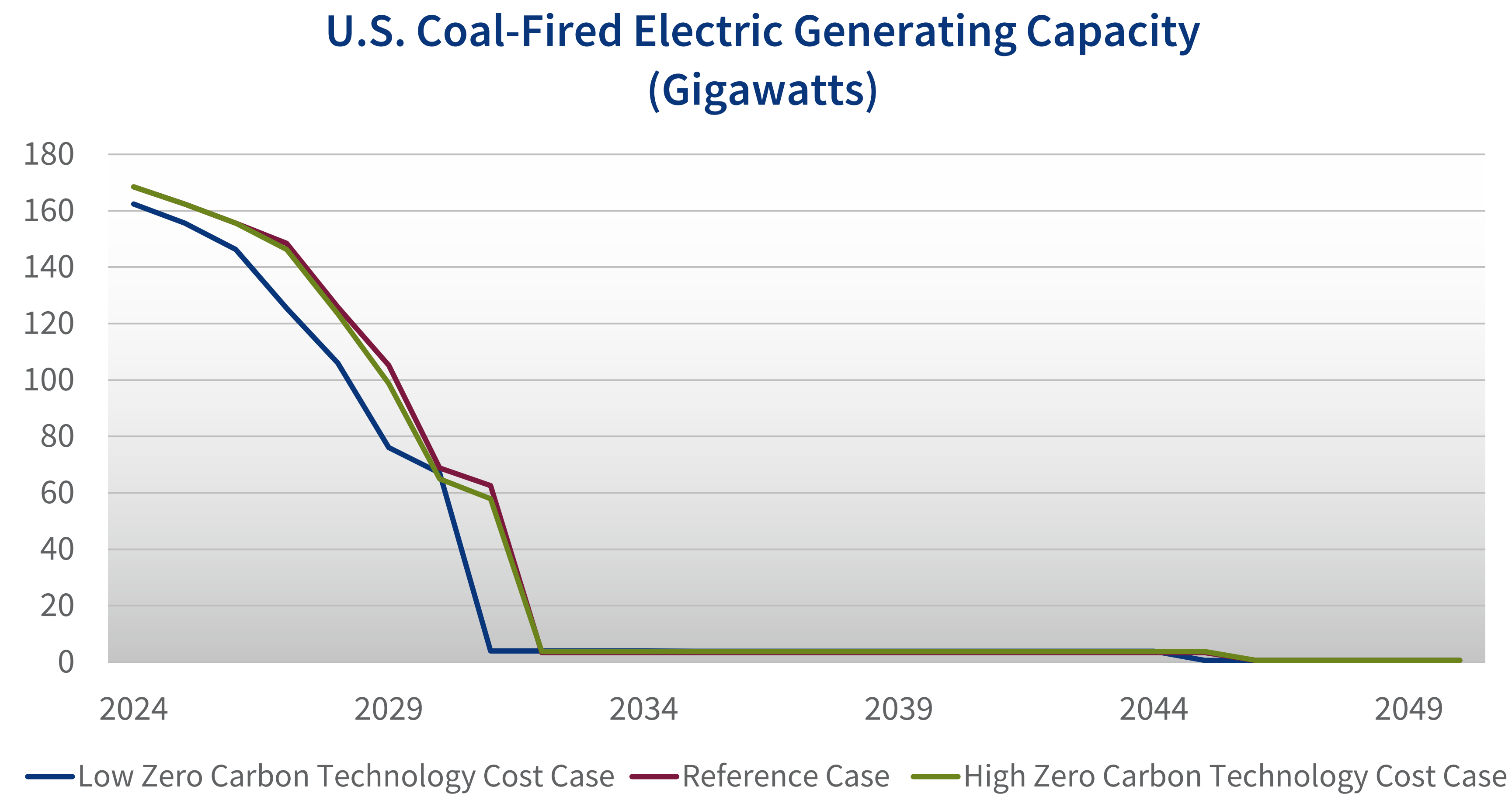
Source: EIA: April 2025 Monthly Energy Review

Coal Capacity Outlook

The EIA forecasts coal-fired power generation capacity to decline by ~95% over the next decade.

These forecasted retirements are a function of tighter emissions regulations, an aging fleet of assets, and competition from natural gas, solar, and wind.

Source: EIA, Annual Energy Outlook 2025



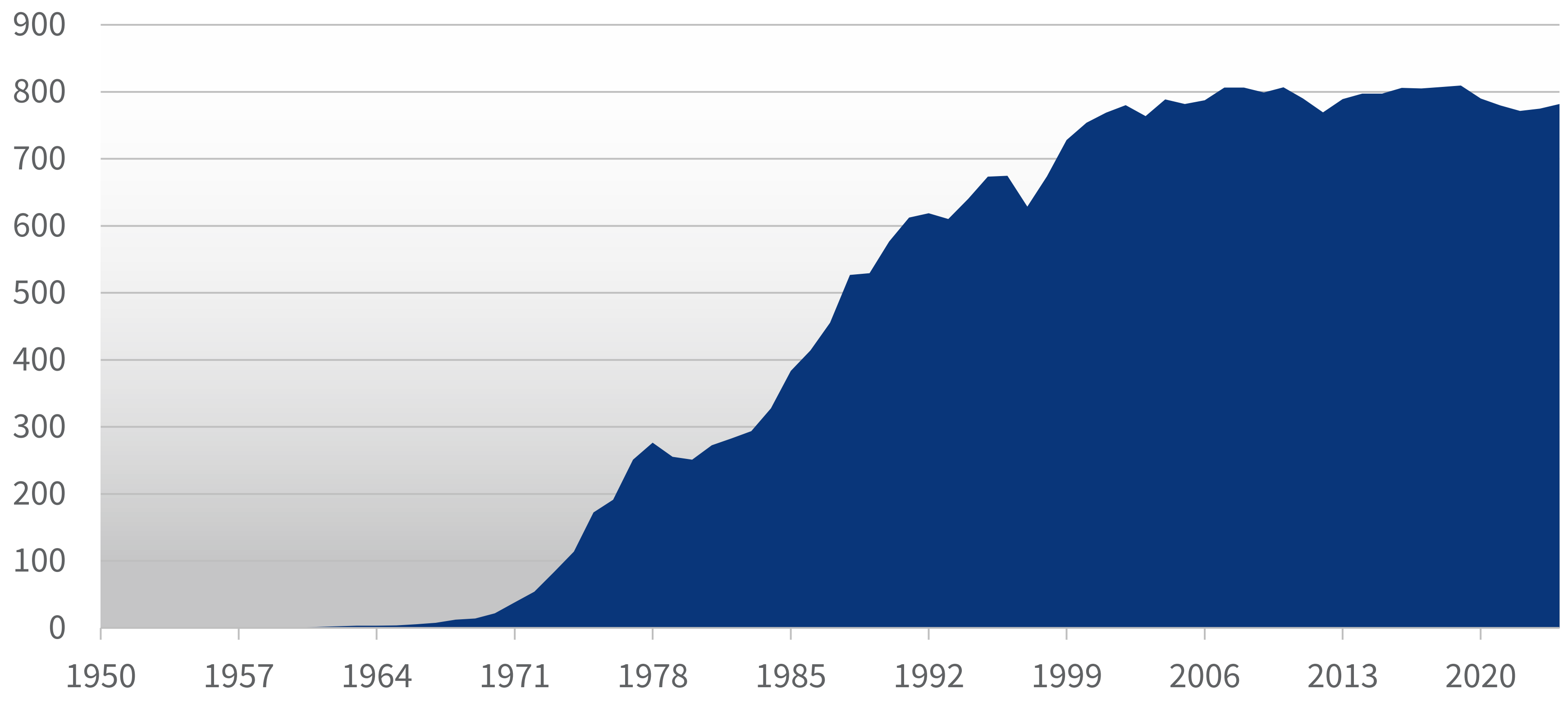
Nuclear

Nuclear power generation in the U.S. has remained relatively stable over the last 20 years.

Nuclear power generation can provide baseload power to the grid with an added benefit of zero carbon emissions.

Source: EIA: April 2025 Monthly Energy Review

U.S. Nuclear Power Generation (Terawatt Hours)



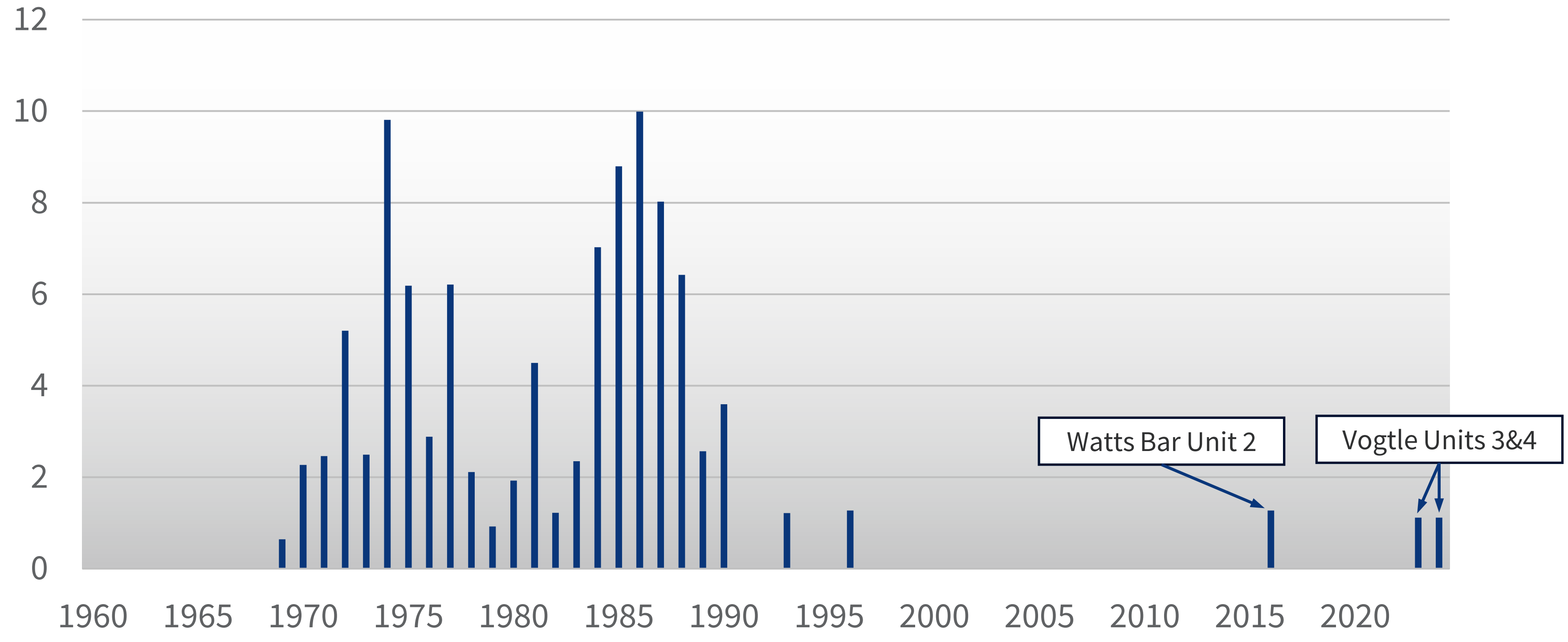
Nuclear Capacity Additions

Due to significant cost and permitting requirements, there have only been 3 new nuclear facilities constructed over the last 20 years.

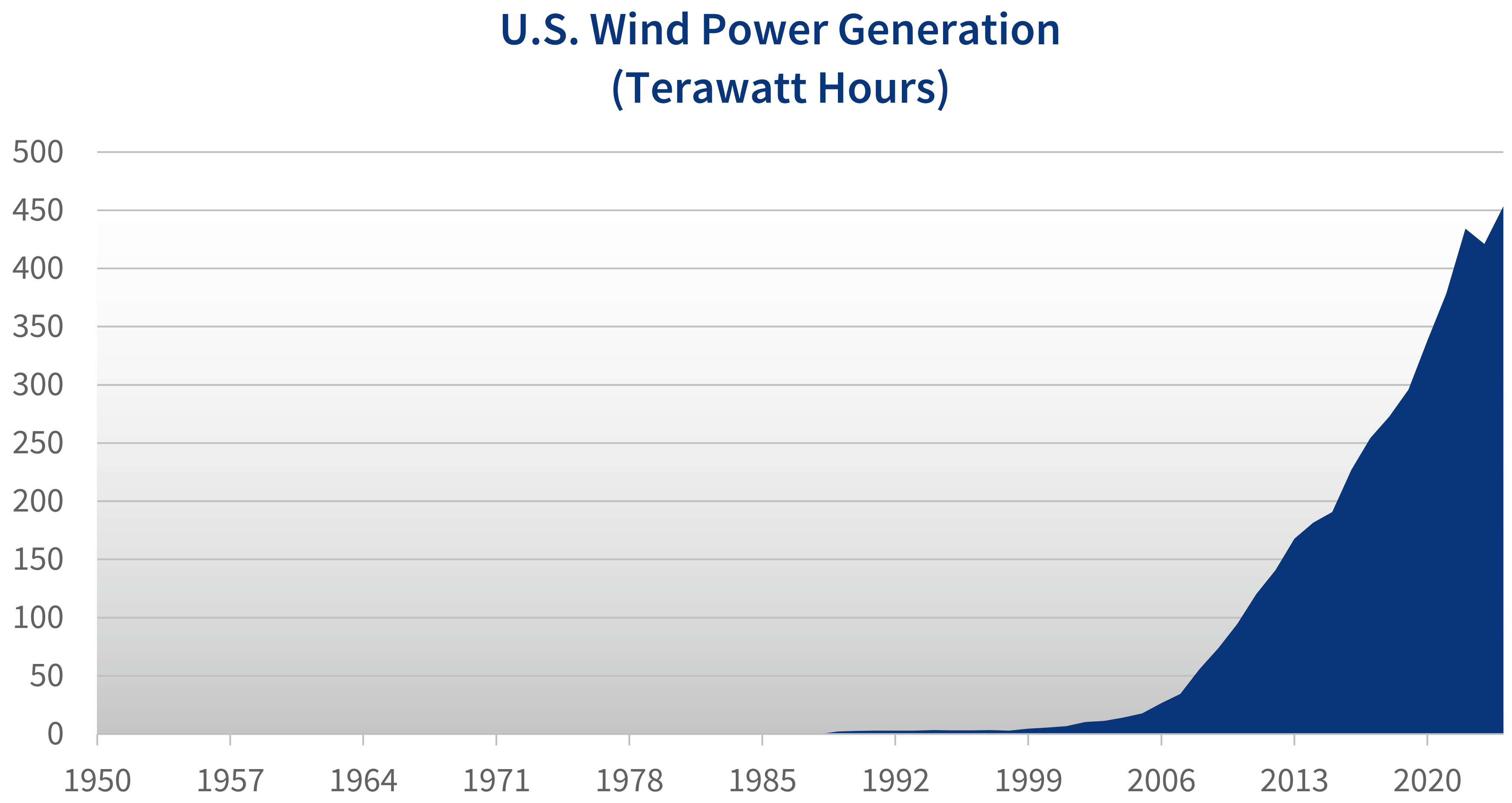
The Vogtle plants were initially estimated to cost ~$14bn and ended up with a final cost over $30bn due to construction delays and cost overruns.

Source: EIA , Annual Electric Generator Report

Annual U.S. Nuclear Capacity Additions by Year (Gigawatts)



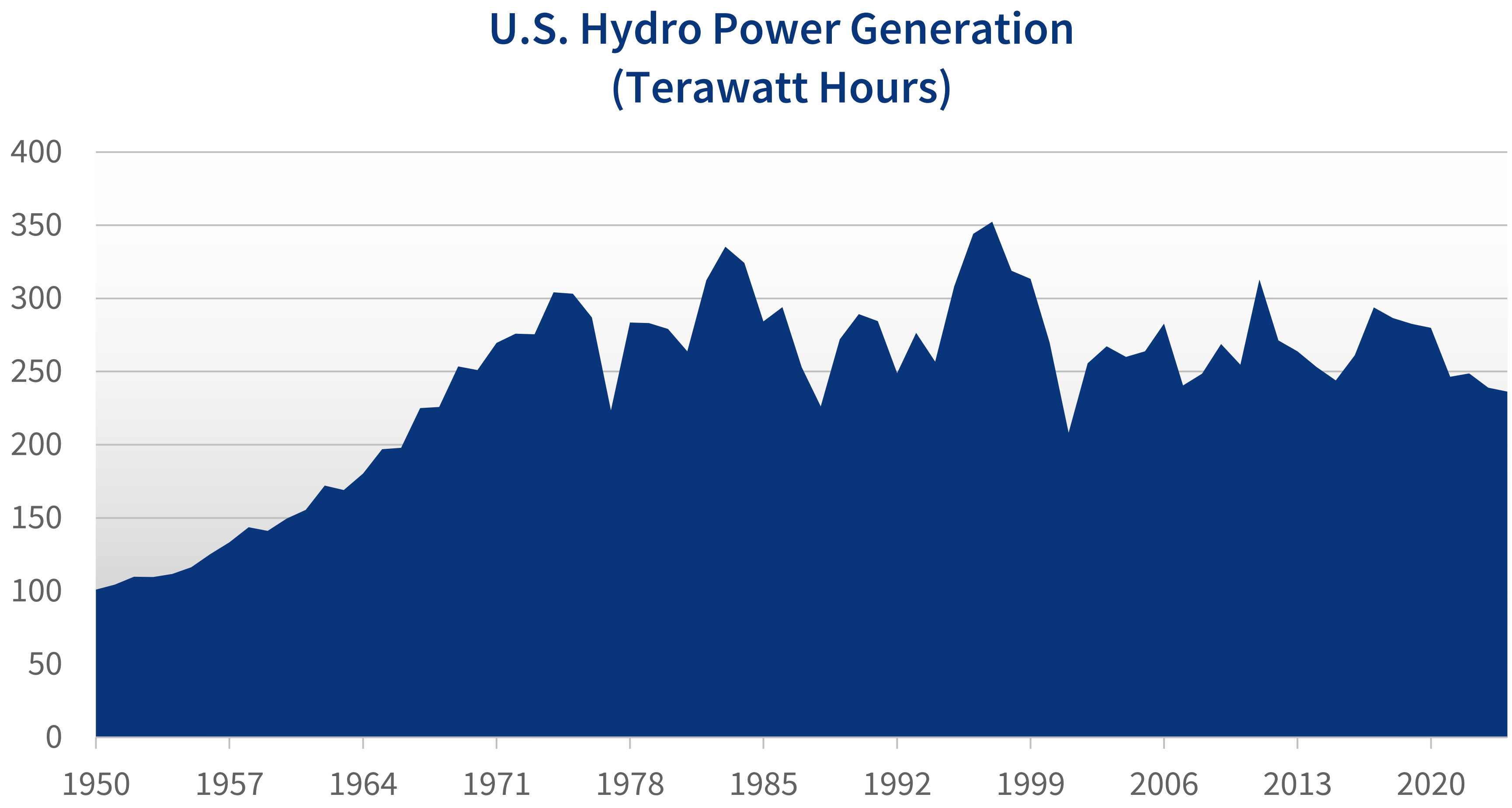
The buildout of wind generation capacity accelerated rapidly over the last 20 years, but the industry development has started to slow down due to higher costs and lower economics.



Source: EIA: April 2025 Monthly Energy Review

Hydropower generation has been a steady source of power in the U.S. over the last 50 years.

However, power generation output from hydro can vary significantly depending on weather, especially precipitation levels.

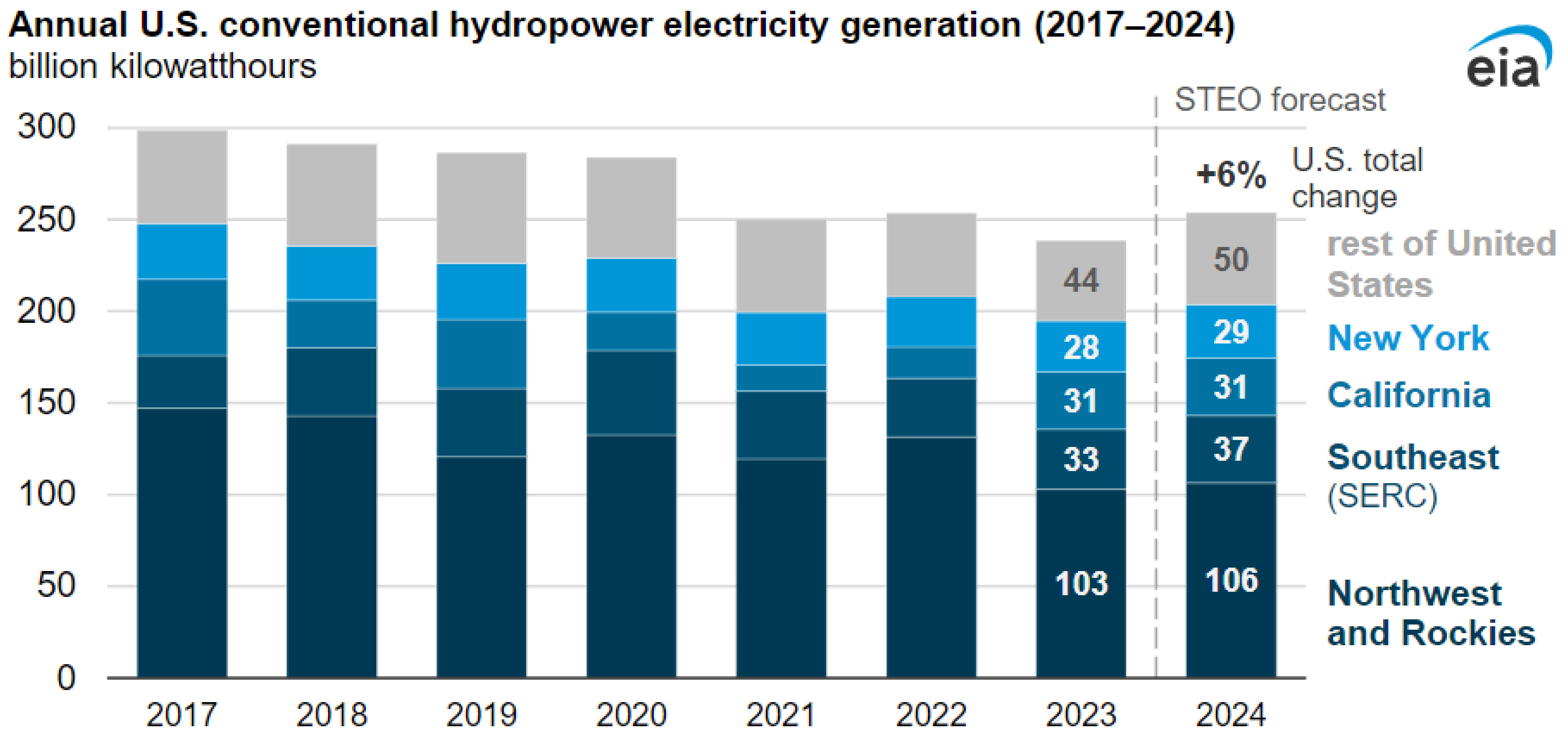


Source: EIA: April 2025 Monthly Energy Review

Hydro Generation by Region

The Northwest region, specifically Washington and Oregon, has historically generated the most hydro power in the US given its proximity to large amounts of snowpack that provide a steady source of water to nearby rivers.

Source: EIA, U.S. hydropower generation expected to increase by 6% in 2024 following last year's lows



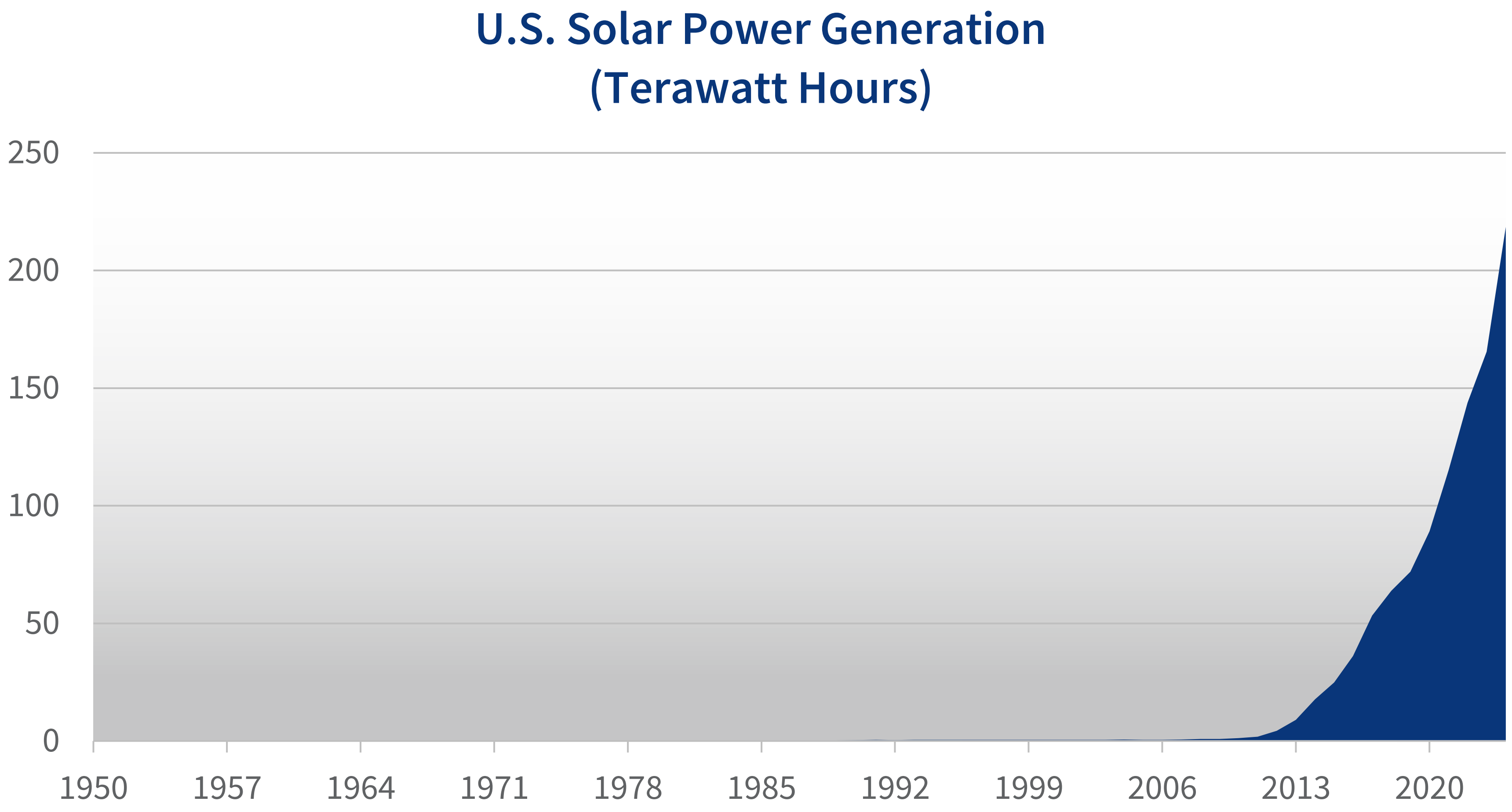
Solar

Solar power generation has been the fastest growing sector in the U.S. over the last decade.

The adoption of solar power has been driven by both the residential and commercial sectors.

Even with this rapid rate of growth, solar represents ~5% of total power generation as of 2024.

Source: EIA: April 2025 Monthly Energy Review

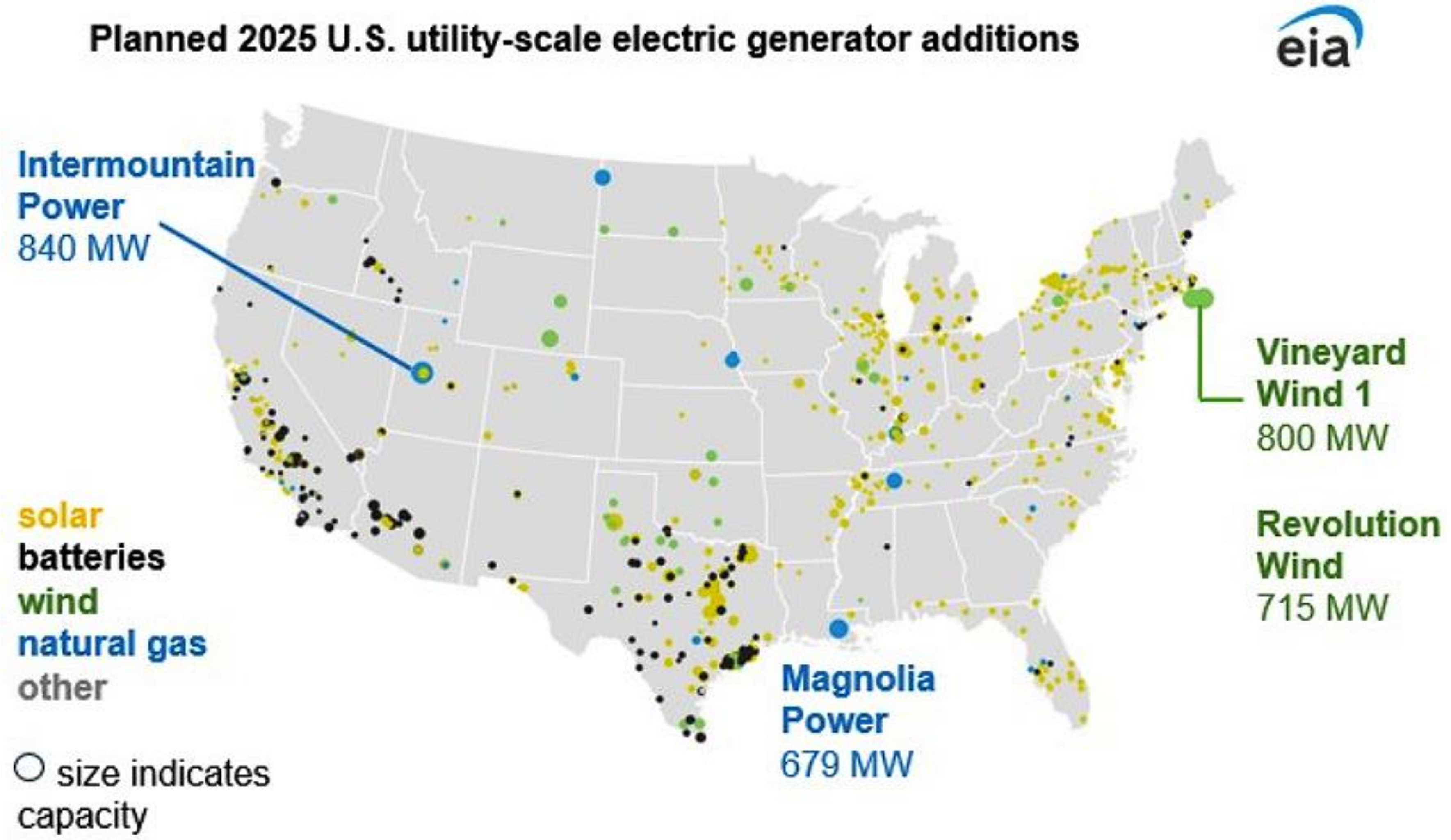


Power Plant Additions

Solar power generation capacity is expected to make up ~50% of new capacity additions in 2025.

California, Florida, and Texas have been the states with the largest buildout of utility-scale solar, but other states and regions are starting to build out a meaningful footprint.

Source: EIA, Today in Energy February 2025



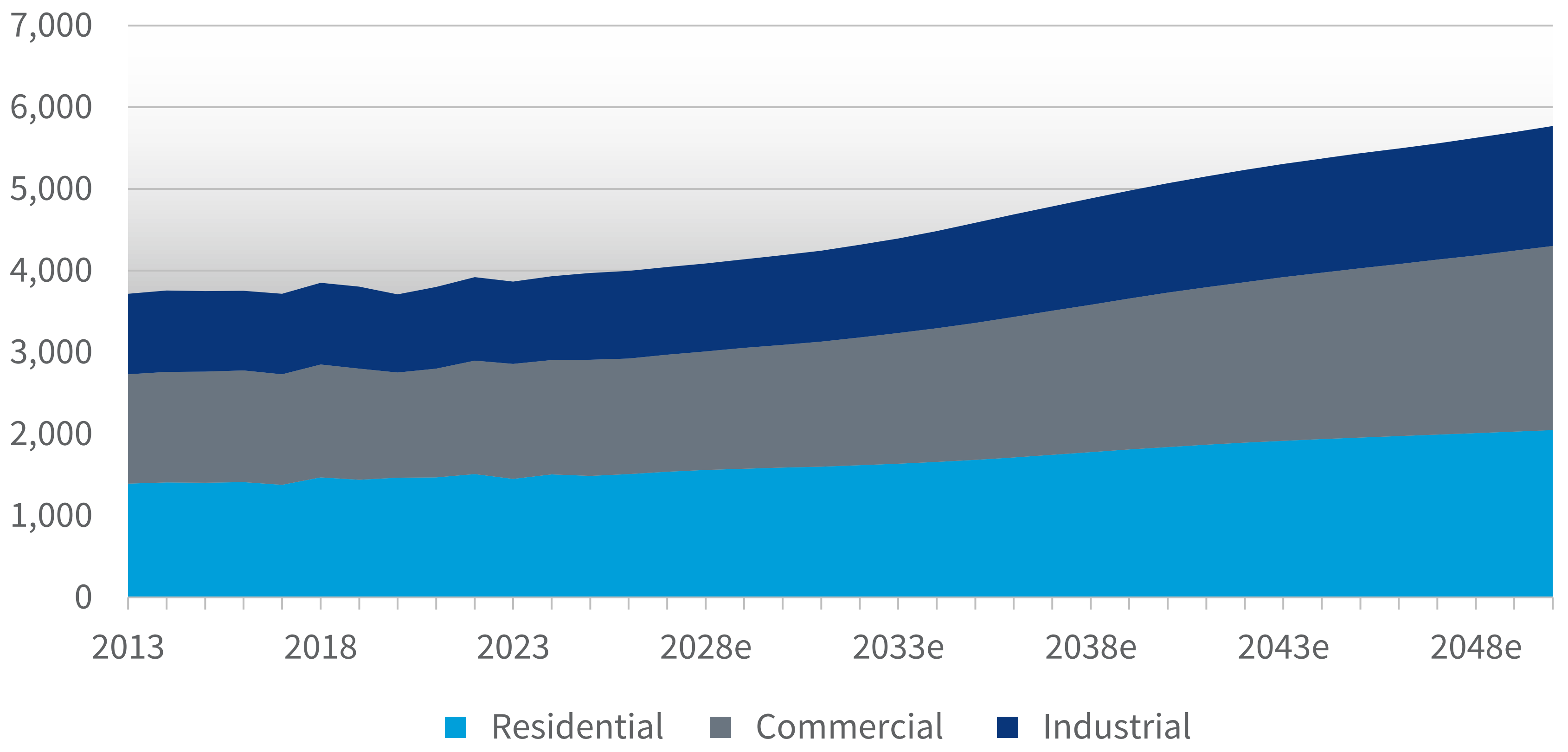
U.S. Electricity Demand Outlook

While U.S. electricity demand has been relatively flat over the last two decades, the EIA is forecasting a 1.5% CAGR for electricity demand through 2050.

This demand growth is expected to happen in all major sectors of U.S. power consumption.

Source: EIA Today in Energy, U.S. hourly electricity demand peaked in July with widespread heatwaves

U.S. Electricity Demand by Sector (Terawatt Hours)



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AEO is the Annual Energy Outlook published by the EIA.

Bn is billion.

CO2 is the chemical formula for carbon dioxide.

CAGR is compound annual growth rate.

EIA is the U.S. Energy Information Administration.

Gwh is gigawatt hours of power.

Hydro is hydroelectric power and can also be referred to as water power.

MW represents a megawatt of power.

STEO is the Short Term Energy Outlook published by the EIA.

Twh is terawatt hours of power.

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