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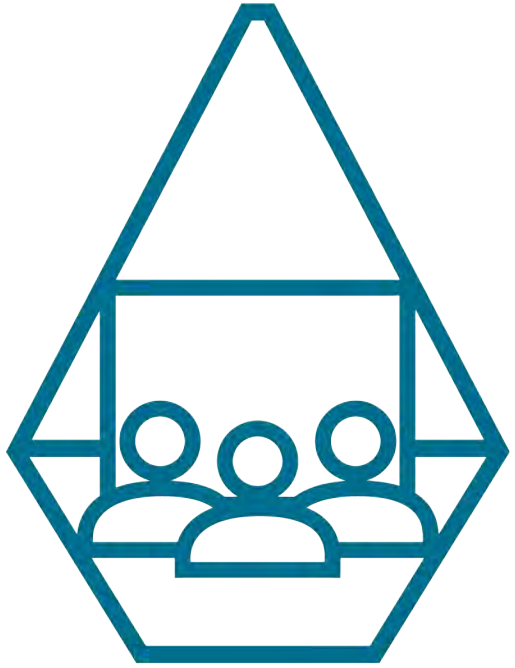

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2026 Southwest Land Institute

The Energy Transition: What is it, What's Real, and What's Next

*This presentation was prepared with the assistance of Artificial Intelligence.

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The Doré Law Firm, LLC

August 3, 2026

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2026 Southwest Land Institute

Understanding “The Energy Transition”

The Energy Transition: What is it?

A structural change in how energy is supplied and consumed.

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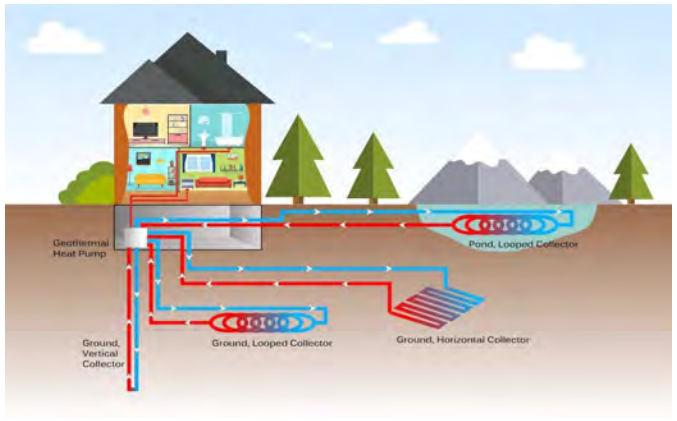
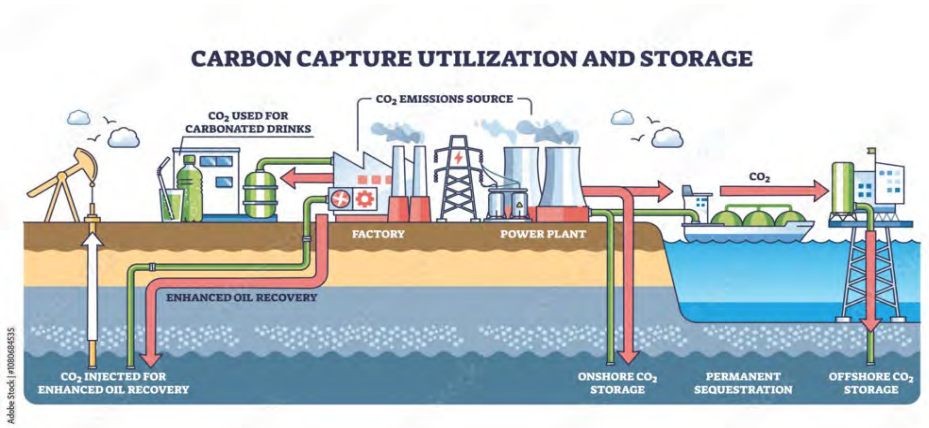
The Energy Transition: What is it?

Notice I said “energy” and not “electricity”. That’s because the transition isn’t limited to electricity generation, it also includes transportation, heating, and industrial processes, among others.

For example: public transportation switching from diesel to natural gas or electric; geothermal heating systems; CO2 removal and storage)





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The Energy Transition: What is it?

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The Energy Transition: What is it?

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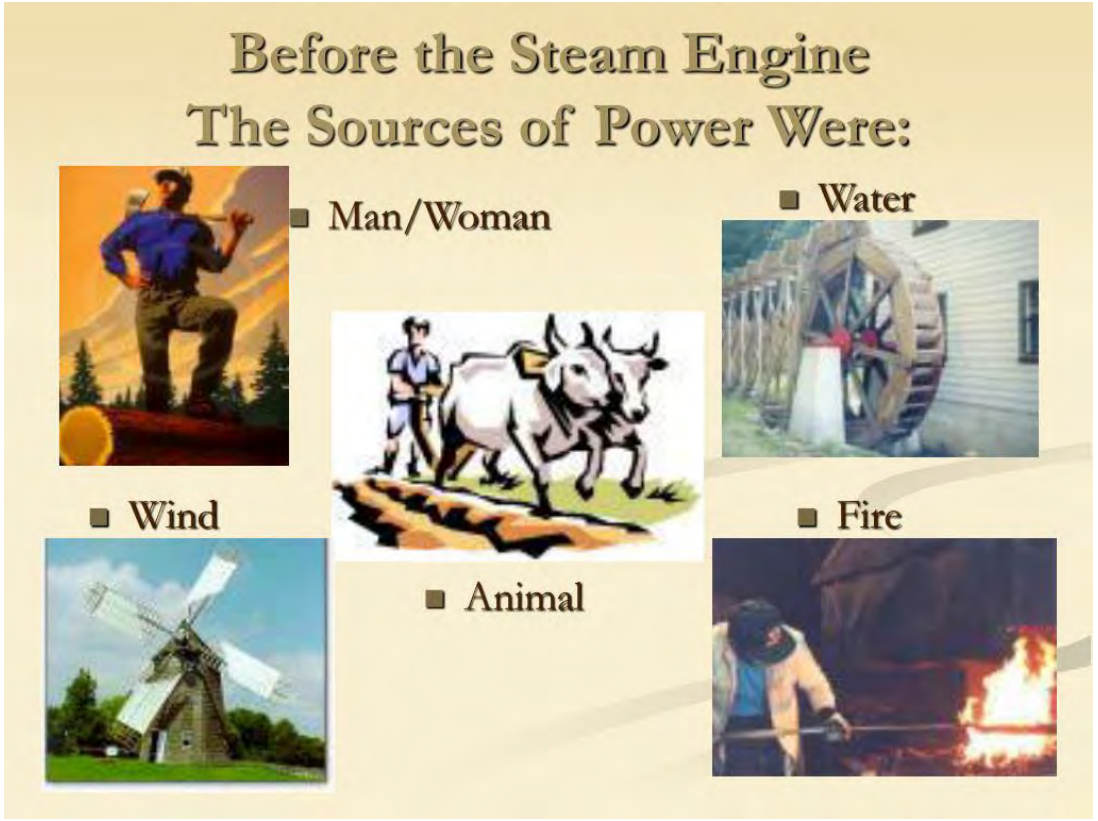
The Energy Transition: What is it?

So….historically, what were our energy sources?



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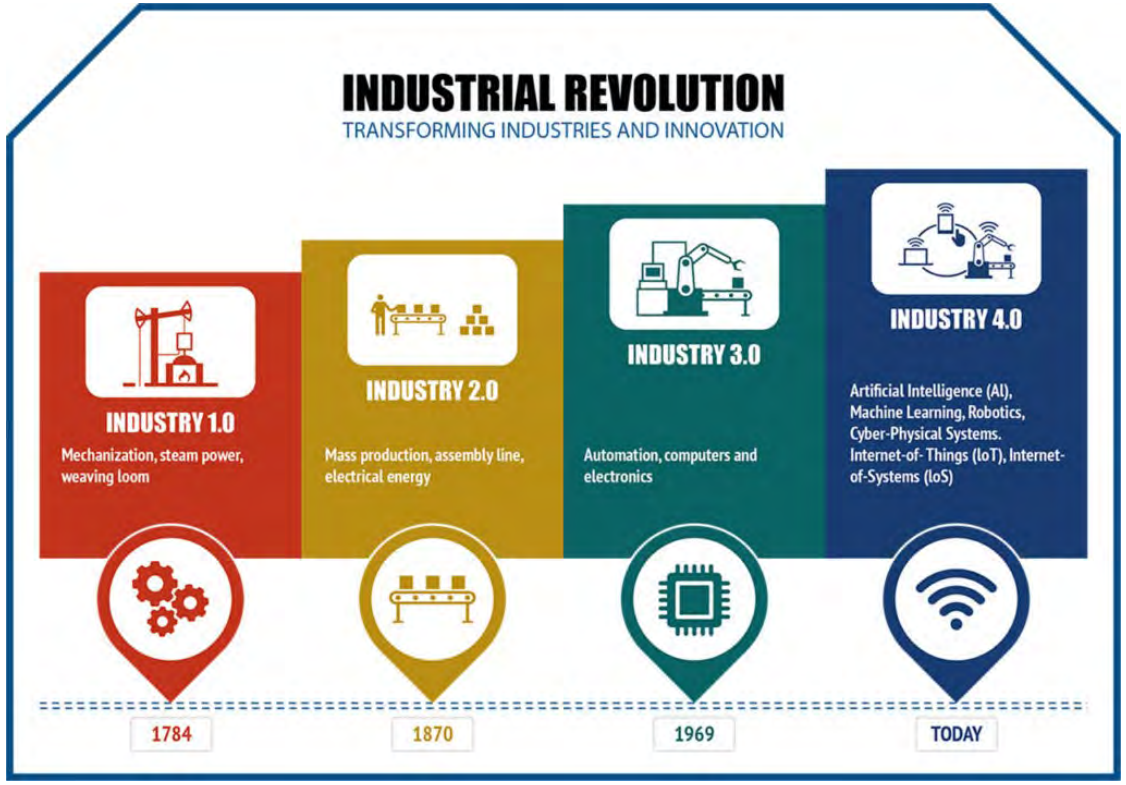
The Energy Transition: What is it?

Traditionally, energy transitions have occurred at times of major technological shifts.

- However, this current energy transition has its beginnings in the late 1970's because of the oil embargo, exposing vulnerability in fossil fuel dependence from outside the US.
- It gained its greatest traction in the US under Presidents Clinton, Obama, and Biden.



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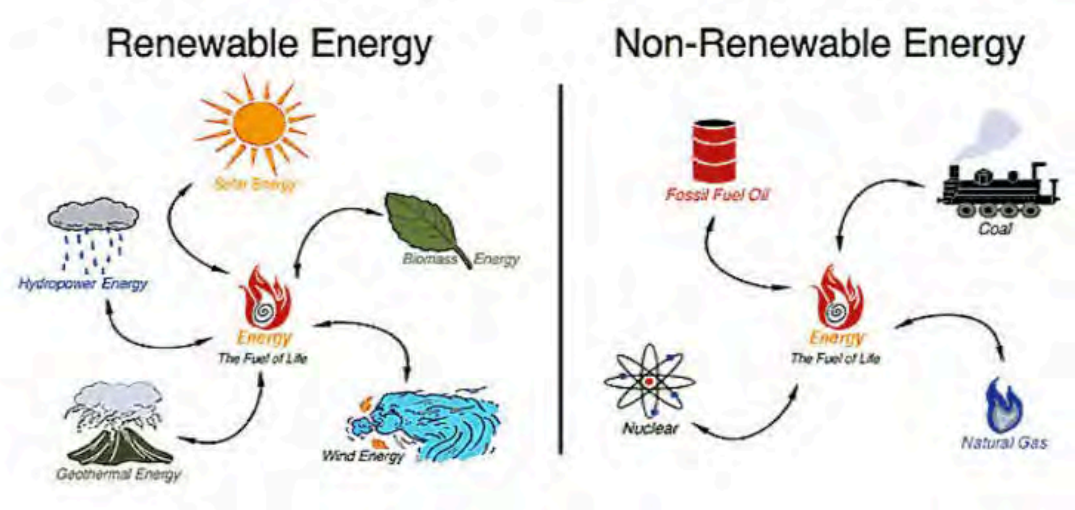
The Energy Transition: What is it?

Today, it is generally understood to be the global shift from conventional energy sources to renewable and low carbon energy supplies to reduce greenhouse gas emissions, enhance energy security, and create a sustainable energy ecosystem.



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The Energy Transition: What is it?

Key Drivers of the current Energy Transition:

- Worldwide climate change initiatives like the Paris Accords
- Falling costs associated with renewables due to technological advancements, such as improved efficiency of solar panels and/or wind turbines, improvements in battery storage technology, the implementation and use of AI and smart grids, along with the increase demand of electricity production
- Government investments, such as tax credits, rules, regulations, and/or laws requiring investments and/or diversification into the use of renewables
- Consumer demand. Increase in European and Asian countries for products made using renewable products or renewable fuel sources

The Energy Transition: What is it?

Conventional Energy Sources

- Coal
- Oil
- Natural Gas
- Nuclear

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The Energy Transition: What is it?

Pros of Conventional Energy Sources:

- Highly Efficient – a large amount of energy per unit
- Reliable – continuous 24/7 power
- Established Infrastructure – Global Upstream, midstream, and downstream networks
- Affordability - Due to the three listed above, the cost/price to extract, transport, and process is traditionally lower

Cons of Conventional Energy Sources:

- Finite Resource – Overuse can lead to depletion of a supply of fossil fuels
- Political Risks – Due to global dependance, conflicts in certain regions can have significant impacts on costs/price
- Environmental Impact – Fossil Fuels have emission issues, while Nuclear has a disposal issue

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The Energy Transition: What is it?

Renewable Energy Sources

- Solar
- Wind
- Hydro/Geothermal
- Biomass/Biofuels

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The Energy Transition: What is it?

Pros of Renewable Energy Sources:

- Potential for a sustainable/long term supply – tapping into nature for a replenishing energy source
- Energy Security – build out of solar and/or wind farms can help offset high demand/high prices and offer more energy independence
- Costs - arguably lower operating and/or maintenance costs over time
- Lower Environmental Impact – lower carbon footprint, but not zero.

Cons of Renewable Energy Sources:

- Reliability– reliance upon the sun and/or wind can create intermittent energy production
- No Established Infrastructure – global upstream, midstream, and downstream networks do not currently exist at scale to support a larger transition to renewables.
- Affordability – High upfront costs for access, installation, and maintenance. Additionally, necessity for grid upgrades to support renewable energy connections can add significant costs
- Environmental Impact – arguably lower than conventional resources but not zero due to manufacturing, transportation, and maintenance and/or disposal of solar panels, wind turbines, geothermal plants, etc.

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Facts from Fiction

The Energy Transition: What's Real?

The "reality gap" in the world of Energy Transition concerns the widening difference between the global "net zero" targets and the actual deployment of renewable and low carbon energy supplies.

Additionally:

- All renewable energy touch fossil fuels in one form or another.
- Solar Panels modules are made using plastics. The glass and silicon purification to make the Photovoltaic panel utilizes fossil fuels.
- Wind turbines require steel, concrete, lubricants, and transportation to their destinations, all of which are utilize fossil fuels.
- Hydroelectric/Biomass/Geothermal all rely upon fossil fuels for the construction/harvesting & transpiration/drilling.

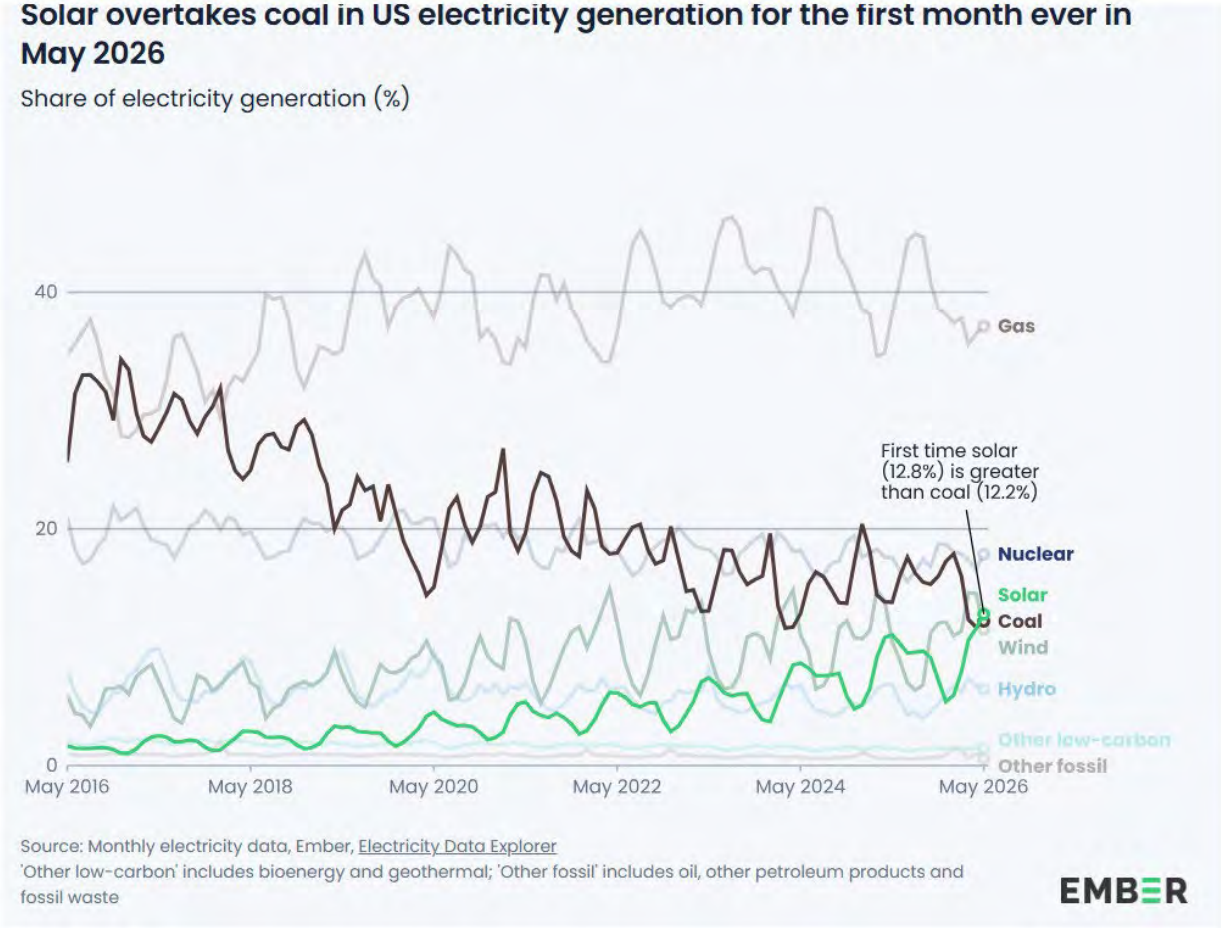
The Energy Transition: What's Next?

- According to the U.S. Energy Information Administration (EIA) and American Public Power Association (APPA) data, by May 9, 2025, the number of Utility-Scaled Power plants under construction in the US were as follows:*:
  - **Under construction or permitted:** ~143,247 MW (143 GW)
  - **Proposed/pending application:** ~325,335 MW (325 GW)
  - **Total under development:** ~468,582 MW (468 GW)
- Fuel Type Breakdown
  - **Solar:** ~55% of all new capacity under development (the largest single source)
  - **Wind:** ~26%
  - **Natural gas:** ~11%
  - Other sources (coal, hydro, nuclear, biomass, etc.) make up the remainder (~8%)
- Trends
  - Solar has been the dominant new build source for several years, with the largest share of projects in the construction stage.
  - Battery Storage is growing alongside Solar to help balance out the intermittent supply and improve grid stability overall.
    - 15 GW of battery storage was added to the grid in 2025 with an additional 24 GW predicted to be added for 2026.
    - Over 50% of planned battery storage capacity can be found in Texas.
  - Wind capacity is more likely to remain in the proposed stage, meaning a smaller proportion is actually under construction compared to solar.
  - Natural gas capacity under development has been **increasing**, reflecting both market demand and policy factors.
- Retirements and Cancellations
  - 38,000 MW of planned generation were cancelled in 2024, with 43% of that total being solar projects
  - Approximately half of all retired generation capacity has been from coal-fired plants.

*https://www.publicpower.org/periodical/article/appa-reports-468582-mw-new-generation-capacity-under-development-us

The Energy Transition: What's Next?

- In May 2026, the US generated more power from solar (12.8%) compared to coal (12.2%) for the first time, according to a report by Ember*, a think tank focused on the clean energy transition.
- However, since 2017, approximately 83 GW of coal fired generation plants have been retired, with an addition 56 GW of coal fired generation capacity to be retired by 2029, for a total of approximately 139 GW of retired coal fired generation.



*https://ember-energy.org/latest-updates/solar-overtakes-coal-in-us-electricity-for-the-first-month-on-record/

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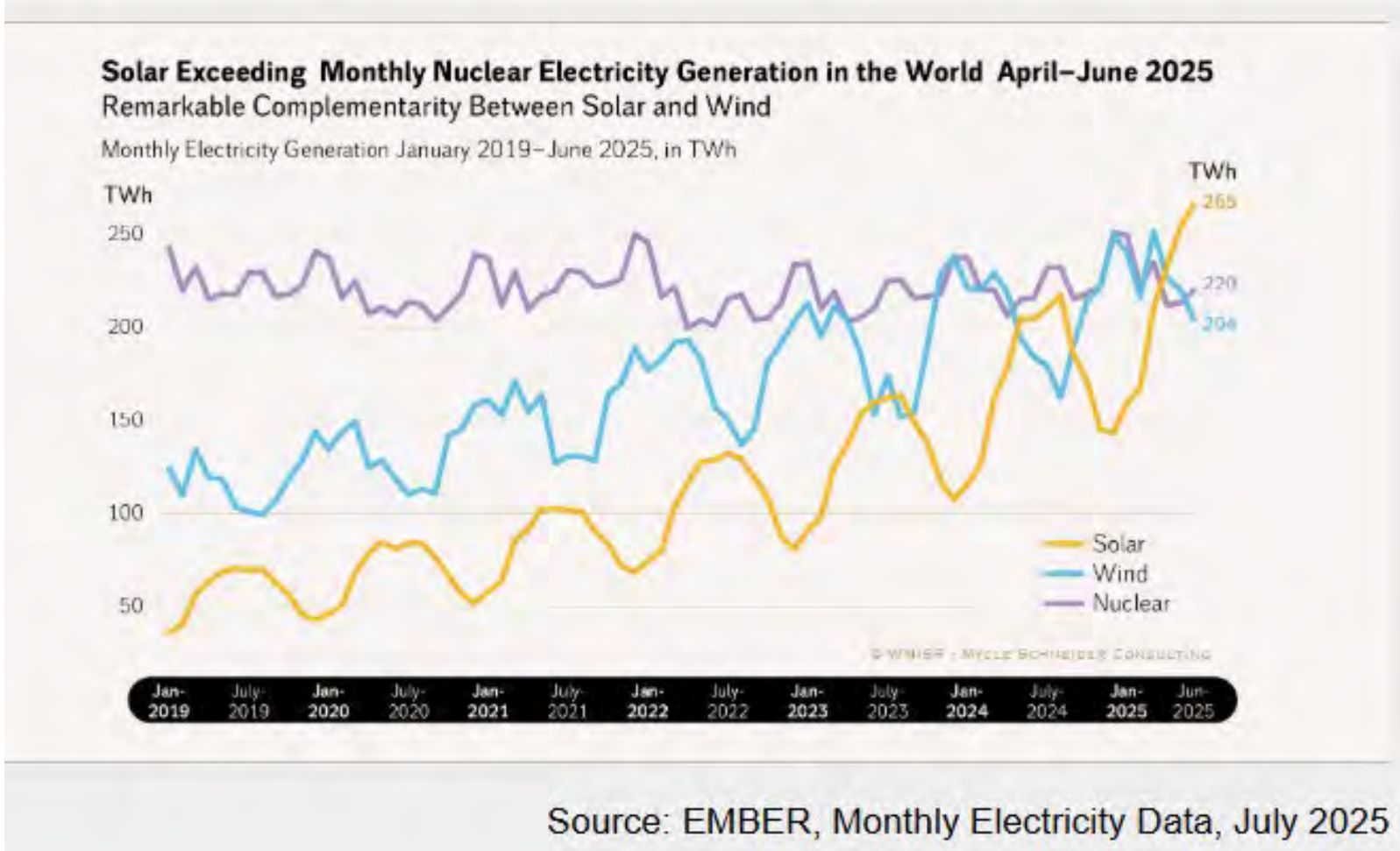
The Energy Transition: What's Next?



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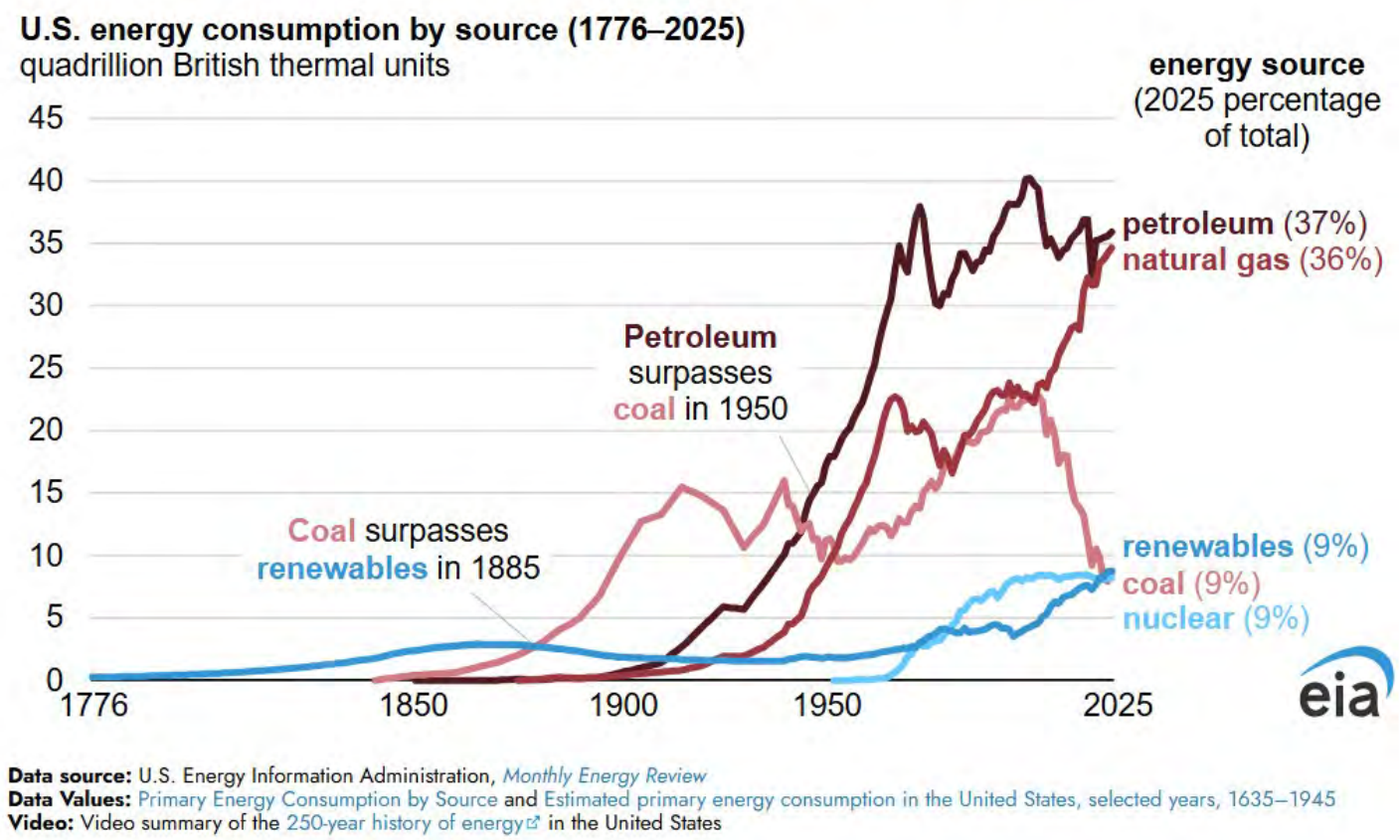
The Energy Transition: What's Next?

JUNE 30, 2026

The 250-year history of U.S. energy consumption



Data source: U.S. Energy Information Administration, *Monthly Energy Review*
Data Values: Primary Energy Consumption by Source and Estimated primary energy consumption in the United States, selected years, 1635–1945
Video: Video summary of the 250-year history of energy in the United States

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The Energy Transition: What's Next?

Current Number of Utility-Scale Power Plants in the U.S. (updated July 2026):*

- Total Natural Gas Fueled Power Plants in the US:
  - **2,102 plants with a total capacity – 583 GW**
  - **An additional 865 planned with a total capacity – 266 GW**
- Total Solar Farms in the US:
  - **7,498 solar farms with a total capacity of – 165 GW**
  - **An additional 3,484 planned with a total capacity – 576 GW**
- Total Battery Storage Projects in the US:
  - **1,044 projects with a total capacity – 51 GW**
  - **An additional 2,507 planned with a total capacity – 464 GW**
- Total Wind Farms in the US:
  - **1,385 wind farms with a total capacity of – 166 GW**
  - **An additional 636 planned with a total capacity – 162 GW**
- Total Nuclear Power Plants in the US:
  - **56 operating plants with a total capacity of – 103 GW**
- Total Coal Power Plants in the US:
  - **213 operating plants with a total capacity of – 185 GW**

*https://www.cleanview.co/power-projects

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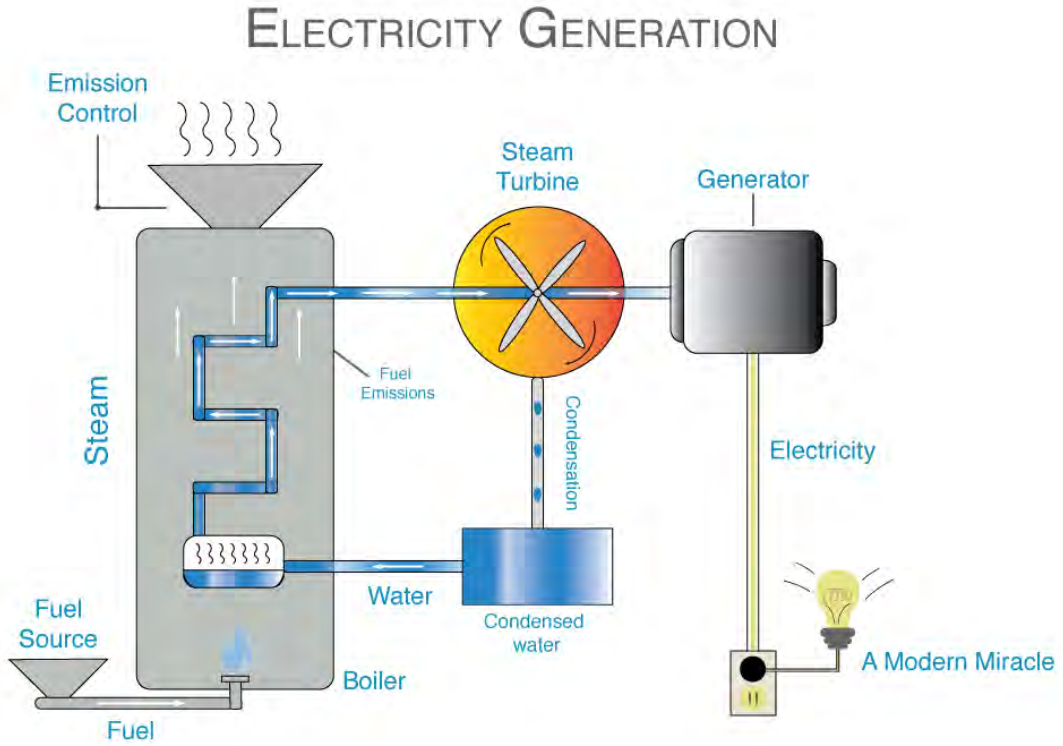
What’s Next?

The Energy Transition: What's Next?



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The Energy Transition: What's Next?

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The Energy Transition: What's Next?

- **Gigawatt**
  - A **watt** is a standard unit of power.
  - A **gigawatt** (GW) is a very large unit of power equal to one billion watts, or 1,000 **mega** watts (MW)
  - So, 1 GW = 1,000 MW = 1,000,000 kW
  - You should be familiar with kilowatt-hour (kWh). This is the standard measurement of electricity used in connection with your homes.
  - 1,000 watts = 1kW

The Energy Transition: What's Next?

- **Real-World Examples**
  - A **large coal or nuclear plant** typically produces around **0.5 – 1.6 GW**. completeera.com
  - The **Bhadla Solar Park** in India peaks at **2.2 GW**. completeera.com
  - A 1 GW plant running continuously could power **~876,000 U.S. homes per year** (based on 10,000 kWh annual usage). www.carboncollective.co

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The Energy Transition: What's Next?

A Department of Energy (DOE) blog article dated August 21, 2024, entitled:

"How Much Power is 1 Gigawatt?"* gave the following examples:

- 1 GW is equal to:
  - 1.887 Million Photovoltaic (PV) Panels
  - 294 Utility-Scale Wind Turbines
  - 103 Offshore Wind Turbines
  - 100 Million LED Bulbs
  - Approximately 1.3 Million Horses!
  - About 1/2 of the amount of electricity produced by the Hoover Dam
  - OR……

*How Much Power is 1 Gigawatt? | Department of Energy (https://www.energy.gove/cmei/articles/how-much-power-1-gigawatt)

The Energy Transition: What's Next?

- You need 1.21 GW to make Time Travel Possible

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The Energy Transition: What's Next?

What is driving the demand for Electricity?

- **Electrification of Things** – from transportation, both personal and commercial, to buildings and industrial processes.
- **Data Center Expansion** – powered by AI proliferation
- **Increase in domestic manufacturing/Peak Demand** – the return of US manufacturing has put additional demand on the grid and general increase peak consumer demand. According to a Deloitte analysis, peak demand is projected to grow by approximately 26% by 2035.*

*Deloitte analysis of Regional Transmission Organization and Independent System Operator websites and their latest forecasts, as of June 2025.

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The Energy Transition: What's Next?

Electrification of Things/Increase in Peak Demand

- Converting energy consumption away from non-electric sources to electric sources
  - **Transportation** – EVs, buses, trains, airplanes, commercial vehicles
  - **Agriculture** – tractors, irrigation pumps, other processing equipment

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The Energy Transition: What's Next?

Data Centers

- Rendering of Proposed Meta Data Center, the "Hyperion Campus", in Louisiana

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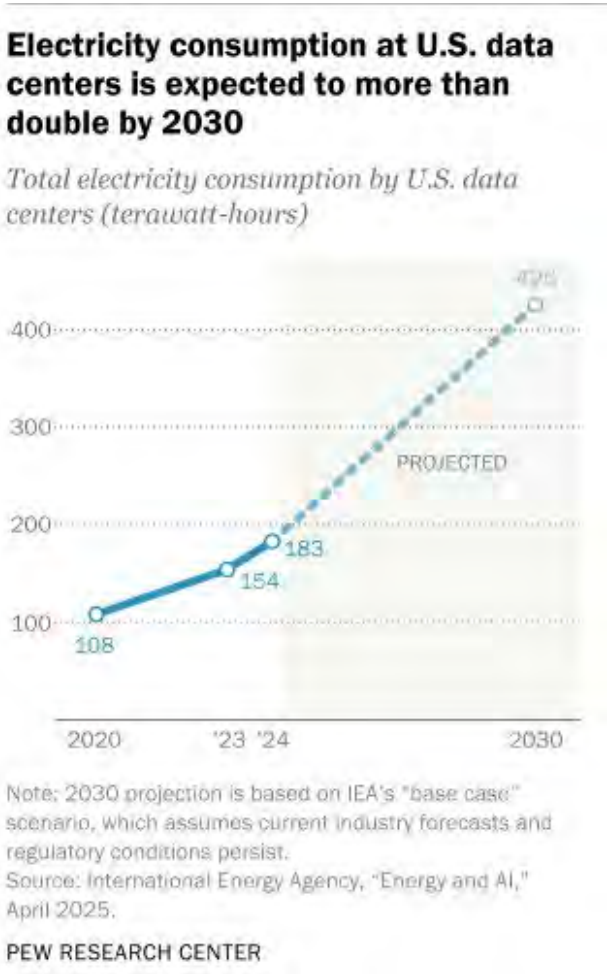
The Energy Transition: What's Next?

- According to International Energy Agency (IEA), domestic data centers consumed 183 terawatt-hours (TWh) of electricity in 2024.
- That is nearly 4% of the U.S.'s total electricity consumption for 2024.
- That 4% is also about approximate annual energy demand of the entire nation of Pakistan.
- The IEA believes that by 2030, data centers energy consumption is predicted to grow by 133% to 426 TWh.
- 1 TW = 1,000 GW
- However, just this month, the State of New York banned construction of new data centers for one year.



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The Energy Transition: What's Next?

Solar Farms & Utility Scale Battery Storage

- Total Solar Farms in the US:
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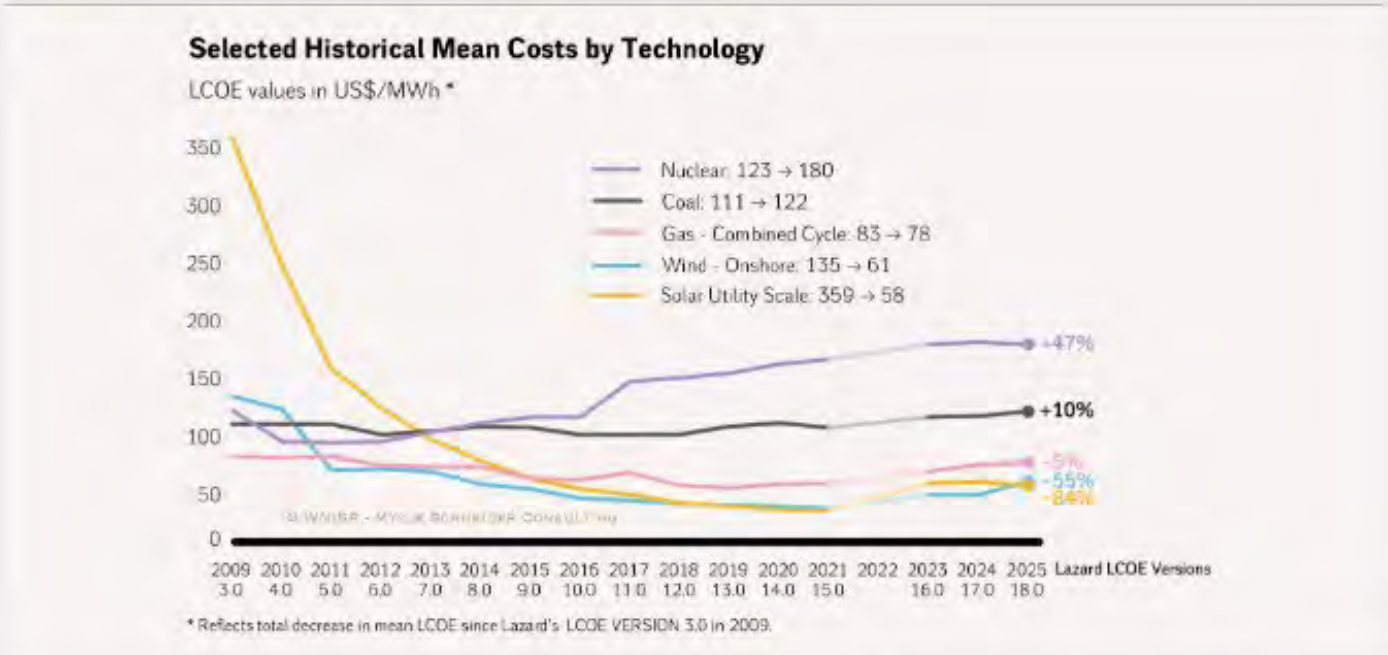
The Energy Transition: What's Next?



Source: Lazard Estimates, 2025

Notes: **LCOE**: Levelized Cost of Energy

*This graph reflects the average unsubsidized LCOE values in current dollars (not adjusted for inflation) for a given version of LCOE study. It primarily relates to the North American energy landscape but reflects broader, global cost developments.

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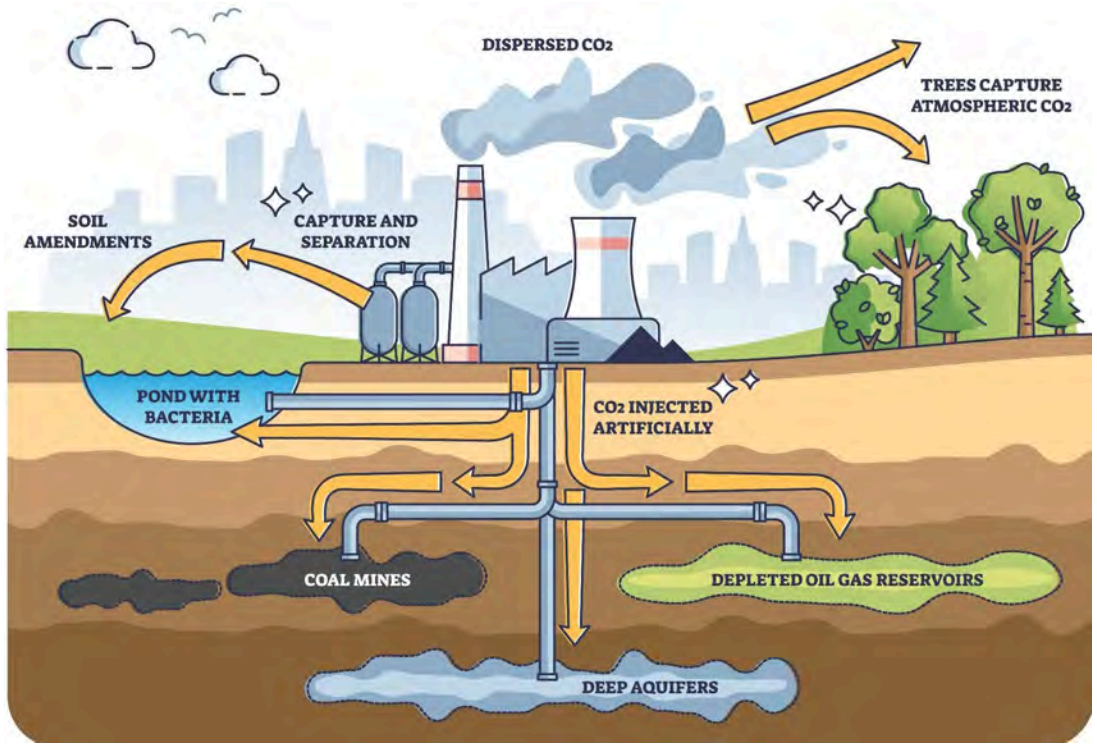
The Energy Transition: What's Next?

- Carbon capture, utilization, and storage (CCUS) is the process of seizing produced or atmospheric carbon dioxide ("CO2") and/or other carbon oxides, and storing (or sequestering) these gases in physical formations underground.
- Generally, CO2 is the byproduct formed during power generation or industrial processes, and CCUS is one of the most direct, available, and practical ways to minimize its removal from the environment.



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The Energy Transition: What's Next?

- How does CCUS fit into the Energy Transition?
  - According to a recent survey that was reported on in a June 23, 2026 article on Carbon Herald's website*, "...31% of onsite-powered data center facilities are expected to incorporate carbon capture, utilization, and storage (CCUS) technologies by 2030, with that figure projected to climb to 41% by 2035…"
  - Further, "…about one-third of all US data centers are expected to operate entirely on independent, onsite power by 2030…While going off-grid solves the immediate issue of power availability and speed-to-market, it introduces massive compliance and emissions challenges for companies bound by strict net-zero targets…"
  - Lastly, the article noted a competitive shift away from computational capacity to "…how quickly operators can navigate permitting, earn community support, and manage local emissions…"

*https://carbonherald.com/41-of-onsite-data-centers-forecast-ccus-integration-by-2035/

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The Energy Transition: What's Next?

- Nuclear energy remains the largest source of carbon emission free energy production.
- The US Department of Energy estimates that an additional 200 GW of new nuclear capacity will be needed by 2025 to meet "net-zero" targets.

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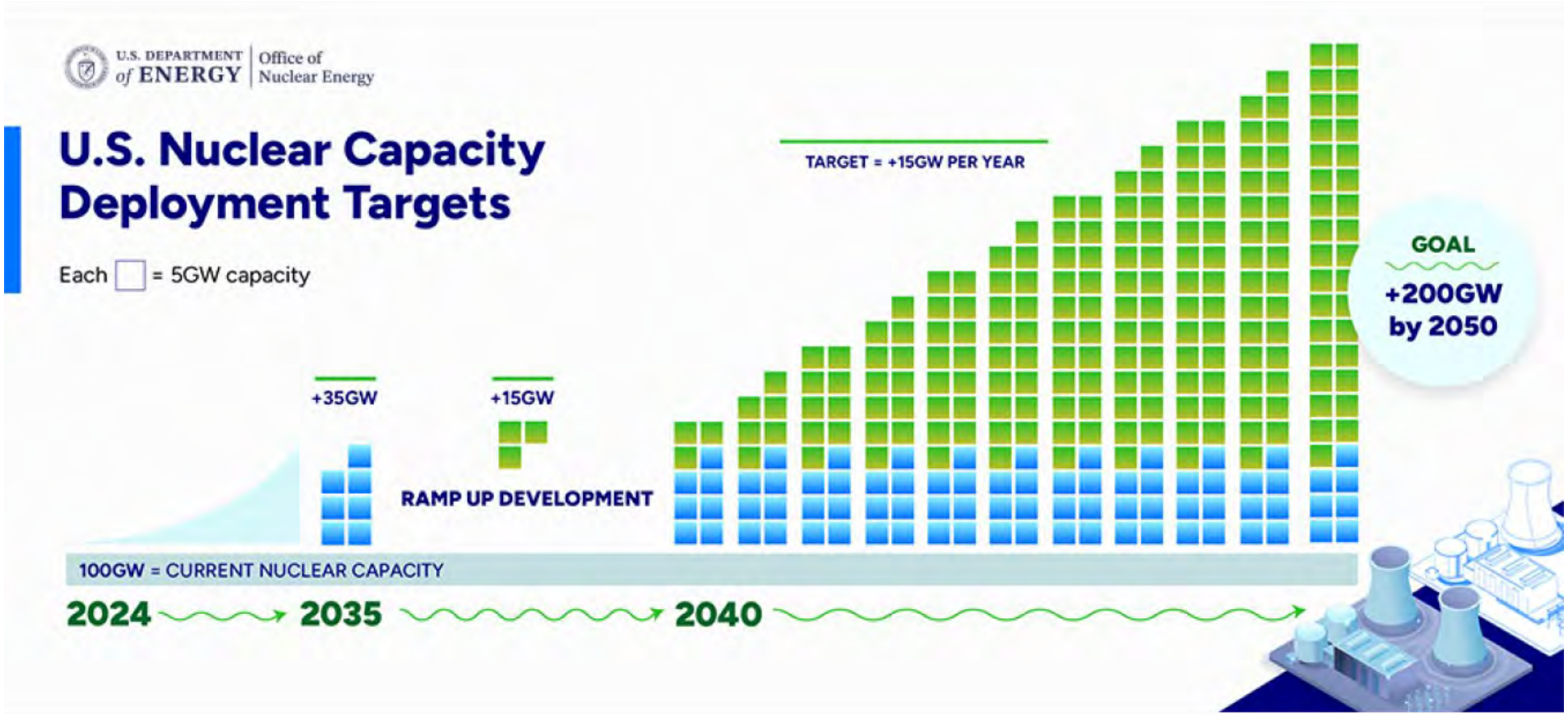
The Energy Transition: What's Next?



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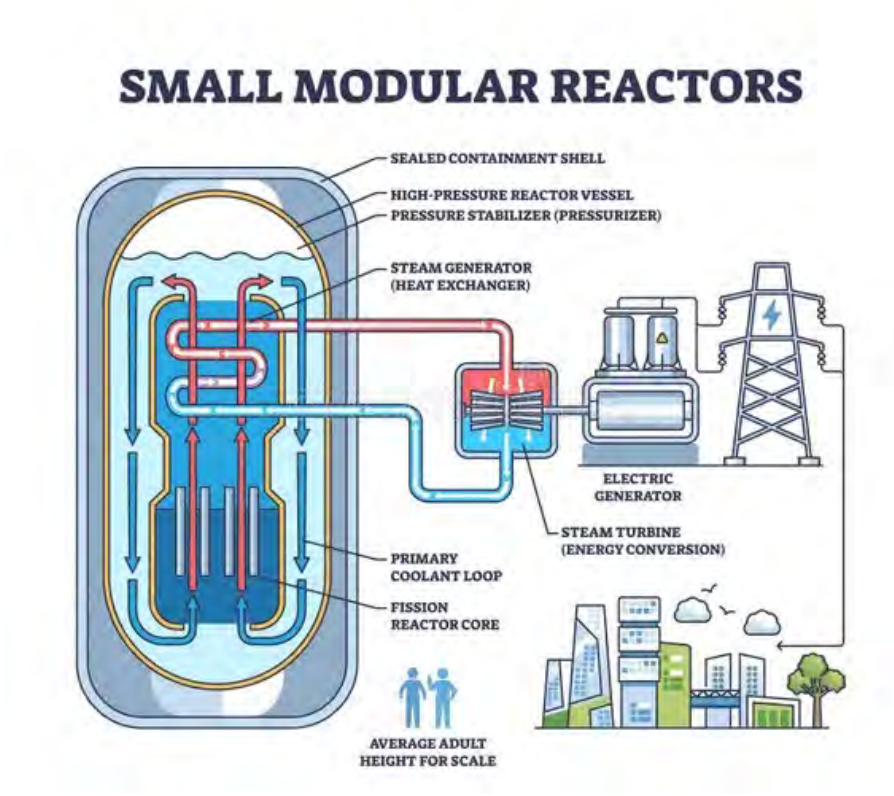
The Energy Transition: What's Next?

- Two (2) main types of reactors. Traditional and Small Modular Reactors.
- A single small modular reactor (SMR) can produce approximately 300 MW of electricity per module.
- For comparison, a traditional nuclear reactor has capacity to produce up to 1 GW of electricity (although typically they do not produce at full capacity).
- Various types (approximately 12 +/-), but the most talked about are:
  - Light Water Reactor (LWR), which uses low-enriched uranium and light water as its coolant (only type certified by the Nuclear Regulatory Commission).
  - Sodium-Cooled, uses molten salt and is high-temperature gas cooled.



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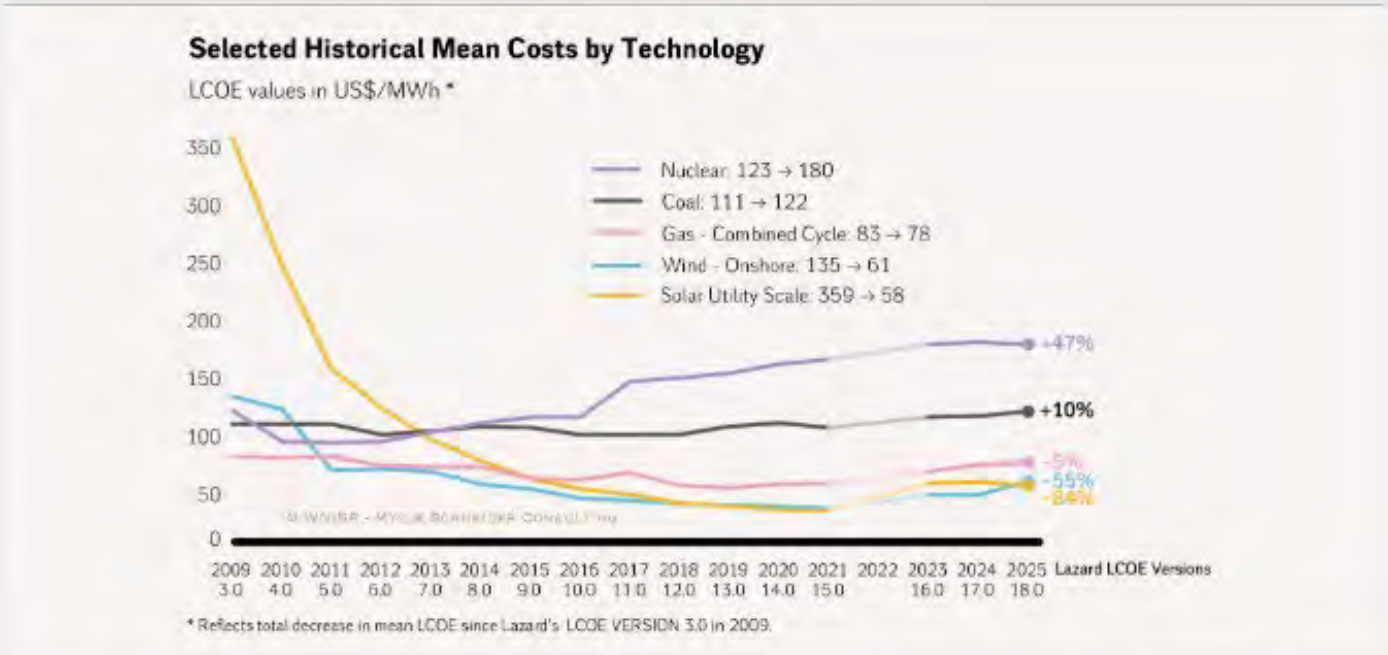
The Energy Transition: What's Next?

- The most recent nuclear power plants built in America are called the Vogtle Unit 3 (July 31, 2023) and Vogtle Unit 4 (April 29, 2024) both at the Alvin W. Vogtle Electric Generating Plant near Waynesboro, Georgia.
  - Altogether, the Vogtle Electric Generating Plant has generating capacity of nearly 5 GW.
  - The Vogtle Unit 4 alone cost more than $30 Billion dollars to complete. However, initial cost estimates were $14 Billion.
  - According to the Nuclear Regulatory Commission, prior to 2023, the last nuclear reactor to deliver energy to the power grid was in October 2016 for the Tennessee Valley Authority Watts Bar Unit 2. Prior to that was the Watts Bar Unit 1 in May 1996.*

*https://www.cnbc.com/2023/07/31/vogtle-unit-3-nuclear-reactor-long-delayed-starts-delivering-power.html

The Energy Transition: What's Next?



Source: Lazard Estimates, 2025

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The Energy Transition: What's Next?

- As you can see from the previous chart, in the US, each unit of electrical energy from new nuclear reactor costs approximately three times the corresponding energy from solar and wind.
- Additionally, Nuclear power projects have historically been delayed and cost more than initially anticipated. One study** examined 180 nuclear power projects and found that 175 had exceeded their initial budgets and timelines.*
- This becomes more likely due to the proposed implementation of so-called advanced reactor designs and small modular reactors. The reason being is that there is little or no experience with building such plants.

*https://thebulletin.org/2026/07/data-centers-powered-by-next-gen-nuclear-dont-fall-for-big-techs-pr-hype/

**https://www.sciencedirect.com/science/article/abs/pii/S0360544214008925

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