NRECA
America's Electric Cooperatives

KEEPING THE LIGHTS ON

Reliability at a Glance

electric.coop

America is at an energy crossroads, and the reliability of our electric grid hangs in the balance. Bad public policy is forcing critical generation resources to retire faster than they can be reliably replaced. At the same time, electricity demand is surging as data centers and new manufacturing plants come online. Smart energy policies that keep the lights on are more important than ever.

Keeping the lights on is what we do. America's electric cooperatives deliver reliable and affordable power to some of the country's most rural, rugged and hard-to-reach areas. Our vision for America's energy future does three things:

- Addresses skyrocketing demand for electricity
- Removes regulatory burdens and
- Promotes the long-term well-being of rural communities.

The five infographics in this packet help explain the primary drivers behind growing concerns over the reliability and affordability of the nation's power supply.

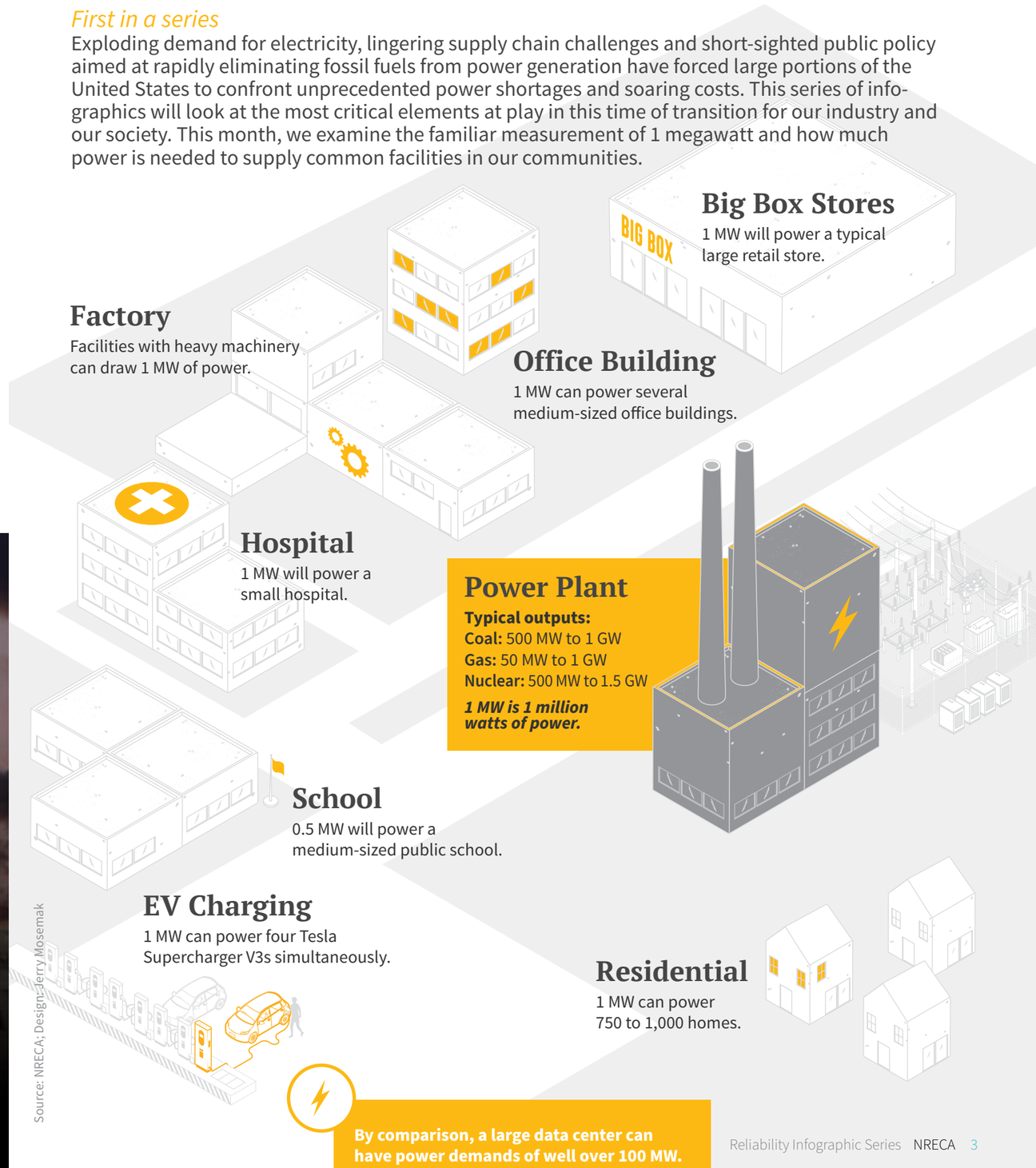
Electric co-ops are working hard to provide safe, reliable, affordable power and to empower local communities across the nation. I hope you find these graphics informative, useful and shareable.

—Jim Matheson, NRECA CEO

What Is 1 MW?

First in a series

Exploding demand for electricity, lingering supply chain challenges and short-sighted public policy aimed at rapidly eliminating fossil fuels from power generation have forced large portions of the United States to confront unprecedented power shortages and soaring costs. This series of infographics will look at the most critical elements at play in this time of transition for our industry and our society. This month, we examine the familiar measurement of 1 megawatt and how much power is needed to supply common facilities in our communities.



Big Box Stores

1 MW will power a typical large retail store.

Factory

Facilities with heavy machinery can draw 1 MW of power.

Office Building

1 MW can power several medium-sized office buildings.

Hospital

1 MW will power a small hospital.

Power Plant

Typical outputs:
Coal: 500 MW to 1 GW
Gas: 50 MW to 1 GW
Nuclear: 500 MW to 1.5 GW

1 MW is 1 million watts of power.

School

0.5 MW will power a medium-sized public school.

EV Charging

1 MW can power four Tesla Supercharger V3s simultaneously.

Residential

1 MW can power 750 to 1,000 homes.

By comparison, a large data center can have power demands of well over 100 MW.

Source: NRECA; Design: Jerry Mosemak

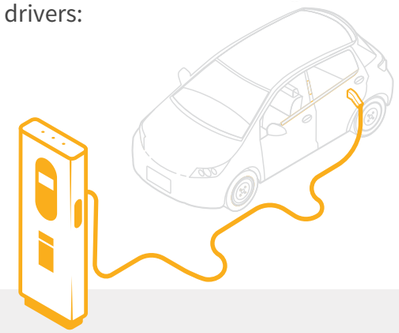
Soaring Demand

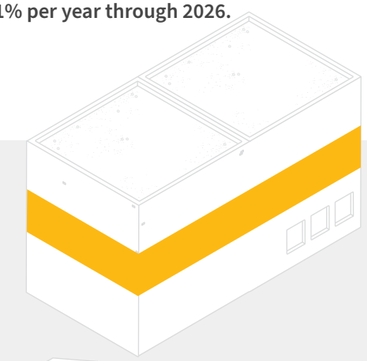
Second in a series

After decades of flat or declining electricity demand, the United States is in the midst of a boom in power use. Recent government data shows that power consumption nationwide is set to increase by at least 38 gigawatts between now and 2028. This trend would ordinarily be great news for the power industry. But government policies aimed at shutting down fossil-fuel-based generation, more extreme weather and years-long delays in permitting and siting for new transmission lines are turning this power boon into a capacity crisis. Here are the primary demand drivers:

Electrification

Electric vehicle adoption, electrification of home heating and industrial electrification are expected to increase overall U.S. energy consumption by 1% per year through 2026.





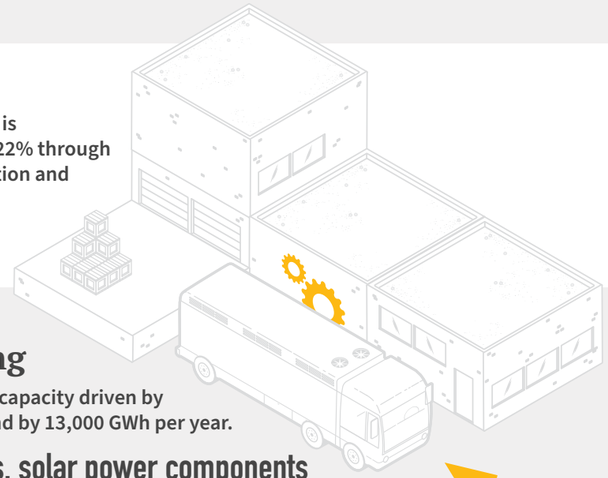
Data Centers

65%

Driven by explosions in artificial intelligence, cryptocurrency and cloud computing, total U.S. data center load is projected to increase by 65% by 2050.

Economic Growth

Residential power consumption is expected to increase by 14% to 22% through 2050 due to increases in population and steady economic growth.



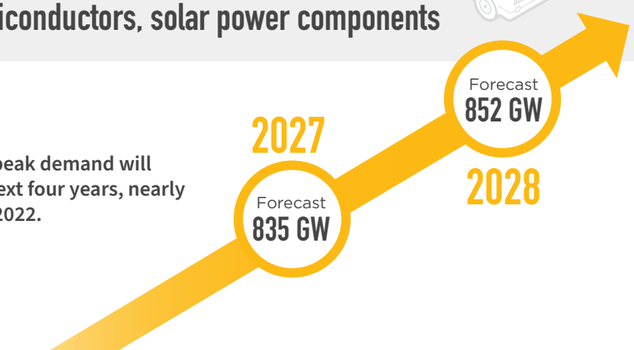
Manufacturing Growth/Onshoring

New, expanding and "onshored/reshored" manufacturing capacity driven by federal incentives is expected to increase industrial demand by 13,000 GWh per year.

Key products: EVs, batteries, semiconductors, solar power components

Total Demand

Analysts predicted in 2023 that U.S. peak demand will increase by at least 38 GW over the next four years, nearly double the growth rate predicted in 2022.



Sources: NRECA, EPRI, Grid Strategies, U.S. EIA, International Energy Agency; Design: Jerry Mosemak

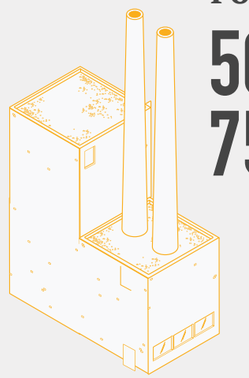
The Power Gap

Third in a series

Increases in data centers, electrification, new manufacturing and other sectors of the economy are expected to drive up U.S. peak demand for electricity by more than 38 gigawatts over the next four years. While meeting that demand will likely require a combination of new power plants, grid upgrades, energy storage and demand management, here's a look at how much generation would be needed to fill the gap.

Firm Power

Fossil Fuel Plants

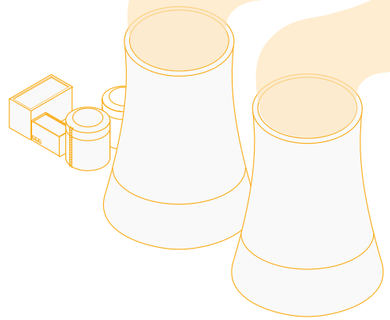


50 average-sized coal plants

75 average-sized gas plants

Nuclear

38 average-sized nuclear plants



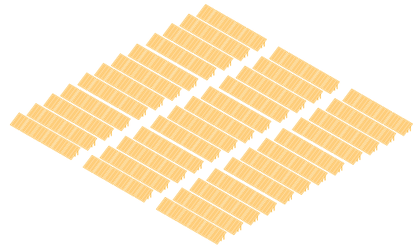
Source: NRECA and Grid Strategies; Design: Jen Wheeler and Jerry Mosemak

Intermittent Power

Solar

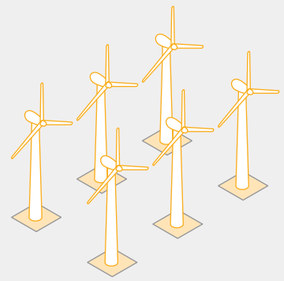
127,000,000 solar panels*

At ~6 acres per megawatt, this would require 228,000 acres (or 356 square miles) of land.



Wind

15,000 modern wind turbines*

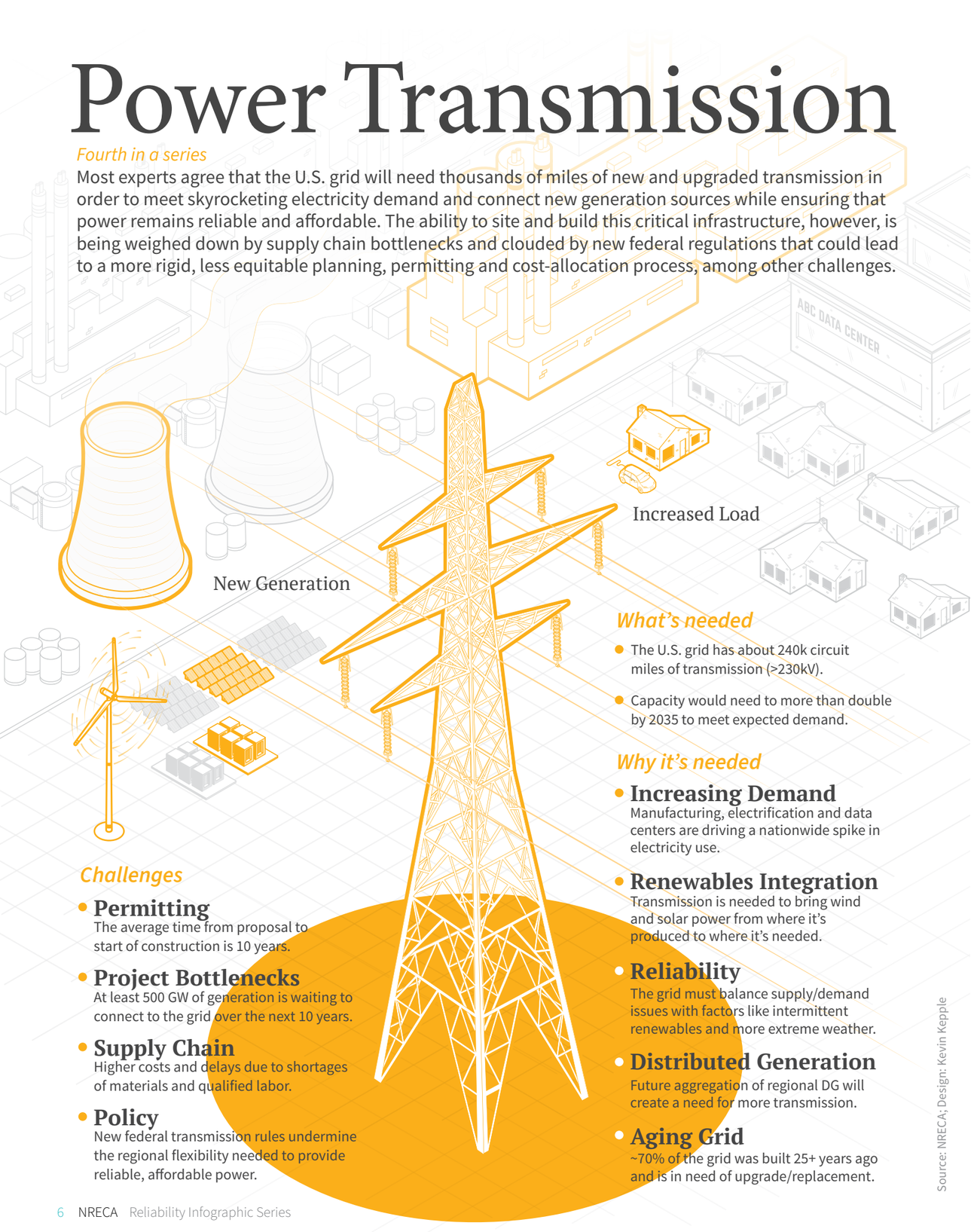


** Low capacity factor for solar (15-30%) and wind (30-40%) means facilities would need to be significantly overbuilt and incorporate large amounts of storage to preserve reliability.*

Power Transmission

Fourth in a series

Most experts agree that the U.S. grid will need thousands of miles of new and upgraded transmission in order to meet skyrocketing electricity demand and connect new generation sources while ensuring that power remains reliable and affordable. The ability to site and build this critical infrastructure, however, is being weighed down by supply chain bottlenecks and clouded by new federal regulations that could lead to a more rigid, less equitable planning, permitting and cost-allocation process, among other challenges.



Challenges

- **Permitting**
  The average time from proposal to start of construction is 10 years.
- **Project Bottlenecks**
  At least 500 GW of generation is waiting to connect to the grid over the next 10 years.
- **Supply Chain**
  Higher costs and delays due to shortages of materials and qualified labor.
- **Policy**
  New federal transmission rules undermine the regional flexibility needed to provide reliable, affordable power.

What's needed

- The U.S. grid has about 240k circuit miles of transmission (>230kV).
- Capacity would need to more than double by 2035 to meet expected demand.

Why it's needed

- **Increasing Demand**
  Manufacturing, electrification and data centers are driving a nationwide spike in electricity use.
- **Renewables Integration**
  Transmission is needed to bring wind and solar power from where it's produced to where it's needed.
- **Reliability**
  The grid must balance supply/demand issues with factors like intermittent renewables and more extreme weather.
- **Distributed Generation**
  Future aggregation of regional DG will create a need for more transmission.
- **Aging Grid**
  ~70% of the grid was built 25+ years ago and is in need of upgrade/replacement.

Source: NRECA; Design: Kevin Kepple

EPA Power Plant Rule

Fifth in a series

The North American Electric Reliability Corp. has found that energy policy is now among the top threats to reliable and affordable power. In April 2024, the Environmental Protection Agency finalized its new power plant rule that rapidly curtails carbon dioxide emissions from coal and gas plants. In March 2025, EPA announced it will be reconsidering the Power Plant Rule. At this time, however, the rule remains in effect. The rule is sure to lead to plant closures, higher power prices and significant reliability challenges as demand for electricity skyrockets in the coming years. Here are the key facets of the EPA rule and their likely impacts.

What's in the Rule?

- EPA relies on the Clean Air Act for its authority to regulate CO2.
- Existing coal plants that plan to operate after 2038 and baseload gas plants built after May 2023 must reach 90% carbon capture and storage by 2032.
- Coal units retiring before 2039 must co-fire with 40% natural gas beginning in 2030.
- Coal units retiring before 2032 need no new emissions controls.
- EPA deferred finalizing guidelines for existing baseload gas units.
- New peaking gas units must drastically limit operations.
- States must file implementation plans with EPA by May 2026.

Compliance Costs

CCS: Adding carbon capture and storage would cost at least $1 billion per plant and is currently untested at scale.

CO2 pipeline: An estimated 65,000 miles of new pipeline would be needed to move CO2 to where it can be stored to meet net-zero goals; only ~5,000 miles currently exist in the U.S.

Transmission: Some estimates say U.S. transmission capacity will need to grow two to five times from current levels by 2050.

New generation: A sharp increase in intermittent wind and solar and declines in always-available coal and gas generation are expected.

Hydrogen: New gas units can meet emissions requirements by co-firing hydrogen, but it is an unproven technology.

What Are the Impacts?

- Premature retirement of coal plants and limiting gas plant operations will hurt reliability, particularly during times of peak electric usage.
- Shifting generation to intermittent renewables will complicate resource planning and hurt reliability.
- Supply shortfalls are likely as demand for firm power skyrockets and peak U.S. load is expected to jump by around 38 GW in the next four years.

Legal Challenges

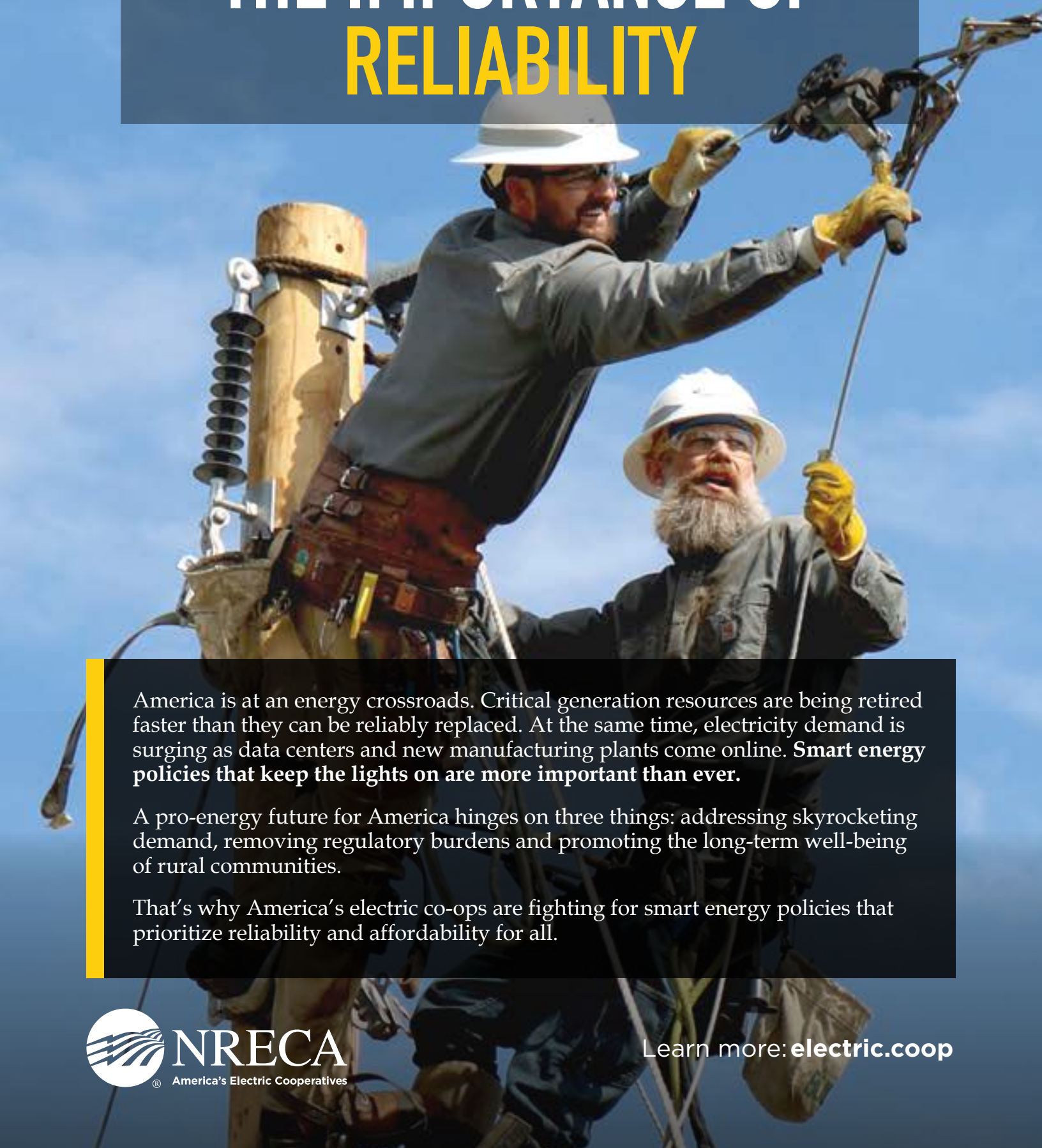
NRECA, states and others are suing EPA, saying the rule:

- Violates the Clean Air Act because EPA asserts vast new authority of major economic and political significance without a clear statement from Congress, going against the Supreme Court's ruling in West Virginia v. EPA.
- Requires the use of inadequately demonstrated technology, including 90% carbon capture.
- Mandates unrealistic and unachievable timelines.
- Includes compliance options that unlawfully require generation-shifting.

Source: NRECA; Design: Jen Wheeler

America's Electric Cooperatives

THE IMPORTANCE OF RELIABILITY



America is at an energy crossroads. Critical generation resources are being retired faster than they can be reliably replaced. At the same time, electricity demand is surging as data centers and new manufacturing plants come online. **Smart energy policies that keep the lights on are more important than ever.**

A pro-energy future for America hinges on three things: addressing skyrocketing demand, removing regulatory burdens and promoting the long-term well-being of rural communities.

That's why America's electric co-ops are fighting for smart energy policies that prioritize reliability and affordability for all.

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Learn more: **electric.coop**