

FUEL DIVERSITY

AVERTING AN ELECTRICITY RELIABILITY CRISIS

The electricity grid is facing a reliability crisis. Increasing reliance on intermittent power, and just-in-time fuel delivery through oversubscribed pipelines, too often leaves the grid short of the capacity required to deliver reliable power. **Better valuing the fuel diversity and security the existing U.S. coal fleet offers will be critical to managing the energy transition.**



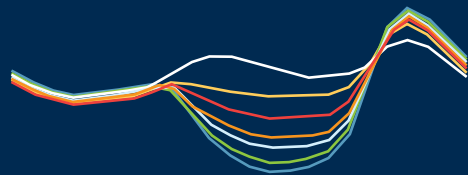
THE UNITED STATES' RELIABILITY CRISIS

Blackouts, or the threat of them, are now a near-constant reality for residents from California and Oregon to Texas and New York. But why? **A greater reliance on weather-dependent and just-in-time power sources, before sufficient infrastructure can be built or affordable battery technology is available, has introduced new vulnerabilities to the grid.**

 **70%**
WITHOUT POWER

JUST-IN-TIME FUEL DELIVERY

In February 2021, **70% of Texas lost power** during a winter freeze. While their frozen pipelines halted the just-in-time delivery of natural gas, the Midcontinent Independent System Operator (MISO) kept Americans warm with **45GW of coal-generated power across its 15-state grid.**



INTERMITTENCY OF RENEWABLE POWER

High solar adoption results in extreme peaks in solar power in the need for utility-generated power. Known as the **Duck Curve**, the trend forces grid operators to scramble to ensure back up generation is ready to ramp and backfill generation gulfs when they appear—posing sharp challenges to reliability.

 **102% INCREASE**
IN CYBERATTACKS IN 2021

RISING ENERGY CYBERATTACKS

In May 2021, the Colonial Pipeline cyberattack **halted 5,500 miles of pipeline service that carries over 3 million barrels of fuel a day.** The result was widespread gas shortages and price spikes for residents from Texas to New Jersey.



CHALLENGES WITH PROPOSED SOLUTIONS

Renewable energy advocates point to grid-scale energy storage and the addition of high-voltage transmission lines as solutions to the intermittency challenge. **However, both options face their own technological or political setbacks.**

A LACK OF ENERGY STORAGE

Grid-scale energy storage remains in its infancy. The batteries currently available to the grid can only store hours of power. This is a problem when uncooperative weather conditions can mean weeks with reduced generation from solar and wind sources.

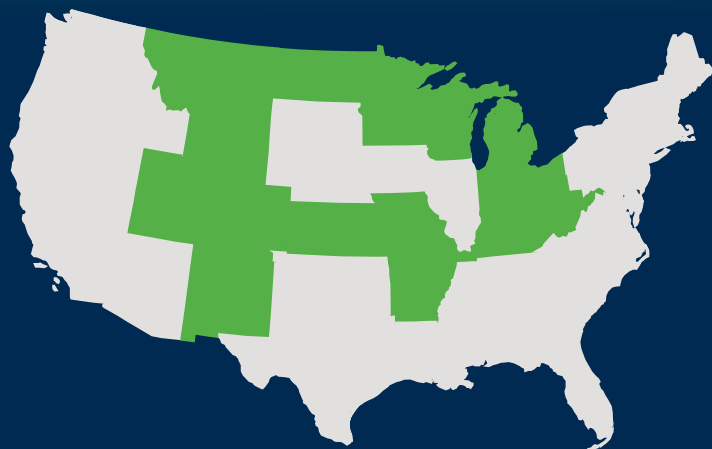
For example, many current **lithium-ion energy storage systems economically max out at 4 to 6 hours**, making them unable to meet long-term demand. So, in a scenario where 80% of electricity comes from renewables, the U.S. would **need an estimated 120 gigawatts of storage by 2050.** As of 2019, we only had 1.2 gigawatts of storage available.

THE TRANSMISSION LINE HURDLE

New high-voltage transmission lines are key to moving power supplies from areas of surplus to areas of deficit. However, permitting and building new transmission lines has grown increasingly difficult. Estimates show that an additional **200,000 miles** of high-voltage transmission would need to be constructed to achieve wind and solar ambitions.

And instead of the rate of transmission-line additions going up, it is going down with **only about 1,300 miles completed** in 2018 versus a peak of approximately 4,500 miles in 2013.

COAL PROVIDES BALANCE AND SECURITY



DID YOU KNOW THAT...

16 states use coal as their **leading source of electricity** and that **coal plants generate nearly 24% of U.S. power.**



ON-SITE FUEL STORAGE

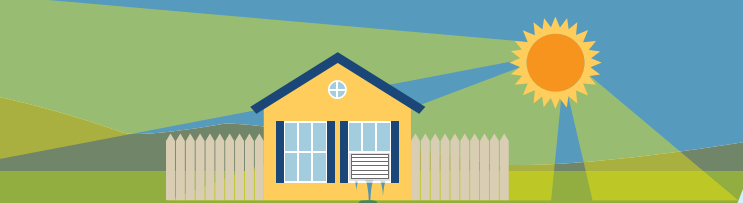
Coal plants store months of fuel on site reducing the possibility of immediate supply disruptions, unlike just-in-time-fueled natural gas plants or weather-dependent renewable sources of generation.



ELECTRICITY ON DEMAND

Coal plants can adjust their power output, ramping up production during periods of peak demand. This is particularly important in periods of peak demand—like bitter cold or scorching heat—when consumers need reliable power most.

DISPATCHABLE FUEL DIVERSITY IS INVALUABLE



In June 2021, with natural gas prices rising, coal generation on the PJM grid, which is the nation's largest, **hit a three-year high.** Simultaneously, coal demand on the MISO grid **rose 37%** and the Southwest Power Pool grid saw a **42% increase.**



In February 2021, the coal fleet came to the rescue across the country when deep freezes tested the nation's energy supply. **On the MISO grid, coal supplied more than half of daily power demand.**

Managing the energy transition will require better valuing the insurance provided by the nation's coal fleet. **The fuel security and resilience offered by coal generation offers balance we can't take for granted.**

POLICYMAKERS MUST PRIORITIZE COAL-ENABLED FUEL DIVERSITY

SOURCES: Argus Media; Greentech Media; MISO Energy data; National Mining Association; U.S. Energy Information Agency (via New York Times); U.S. National Renewable Energy Laboratory; U.S. White House; Wood Mackenzie; Yale Environment 360

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