

# Renewable Energy Makes the Grid More Reliable



**Renewable energy sources make important contributions to the country's electricity mix and help keep the lights on in a cost-effective manner for millions of American families and businesses.**

Renewables diversify the country's energy mix and help ensure predictable rates for consumers. We need to make smart, necessary investments in our electrical grid in order to ensure the continued reliability of clean energy in the U.S.

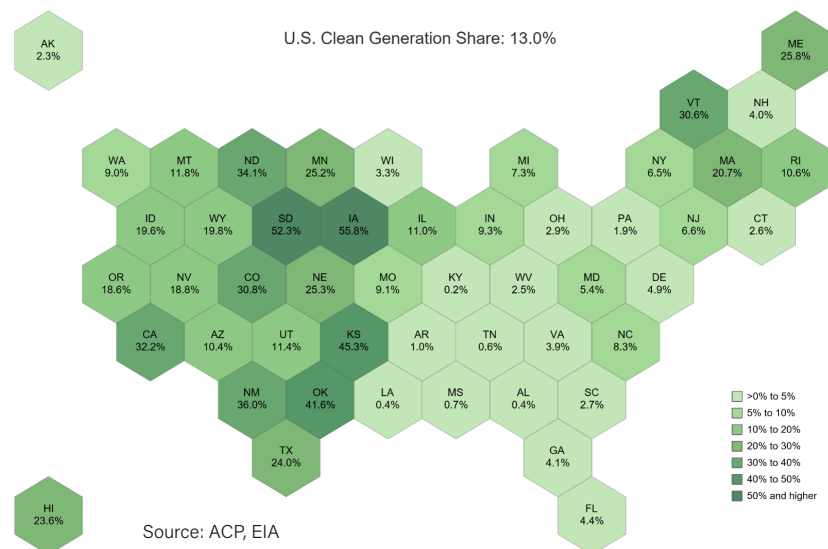
Extreme weather events are becoming more common in the United States. Regardless of energy source, these weather events, coupled with America's aging energy infrastructure, pose a threat to grid reliability. Wind, solar and energy storage are a part of the solution and have proven time and again that they can help the grid meet the challenge when demand peaks during severe weather.

As energy demand continues to remain stable or increase throughout the United States, continued investments in renewables, transmission and storage and energy—are key to providing more market flexibility and predictability, making the grid more reliable.

In many parts of the country, renewables consistently provide the majority of electricity with no reliability issues. Renewables already provide a significant portion of the electricity used in many parts of the country, such as Iowa, Kansas, Texas and California.

In addition to enhancing reliability, clean energy provides many benefits. Clean power invests in local communities across the country, providing property, state and local taxes in 2021 totaling **\$1.2 billion**. Renewables also generated nearly **\$1.3 billion in land lease payments** to local farmers and land owners in 2020. The clean power workforce currently **employs over 415,000 Americans** and wind turbine technician and solar installer are the first and third fastest-growing jobs in the United States, according to the [U.S. Bureau of Labor Statistics](#).

**U.S. Wind and Solar Energy Share of Electricity Generation, By State**



# Clean energy provides key reliability services

The electrical power system is in the midst of a digital revolution. Technology advances like smart inverters and fast controls expand the reliability services clean power sources can cost-effectively supply to the market. Advanced power electronics and output controls enable clean energy sources to provide automatic generation control and fast frequency response, among other services. The chart below provides a concise comparison of the ability to provide grid reliability services across different generation technologies and is derived from recent and ongoing efforts by the North American Electric Reliability Corporation (NERC), which sets the reliability rules for the power system.

Sources of Grid Reliability Services								
	Inverter-Based			Synchronous				Demand Response
	Wind	Solar PV	Storage/Battery	Hydro	Natural Gas	Coal	Nuclear	Demand Response
Disturbance ride-through	Excellent	Limited	Limited	Excellent	Good	Good	Good	Good
Reactive and Voltage Support	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Limited
Slow and arrest frequency decline (arresting period)	Limited	Limited	Limited	Limited	Good	Good	Limited	Good
Stabilize frequency (rebound period)	Limited	Limited	Limited	Limited	Excellent	Limited	Limited	Good
Restore frequency (recovery period)	Good	Good	Good	Excellent	Excellent	Limited	Incapable	Good
Frequency Regulation (AGC)	Limited	Limited	Excellent	Excellent	Excellent	Limited	Incapable	Excellent
Dispatchability/Flexibility	Good	Good	Excellent	Excellent	Limited	Limited	Incapable	Good

These services also contribute to frequency restoration, but are also considered essential reliability services on their own.



Source: ACP, Milligan Grid Solutions