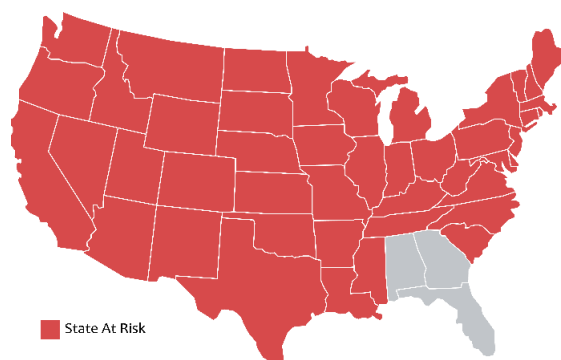


FREQUENTLY ASKED QUESTIONS ABOUT GRID RELIABILITY

What is the grid? The grid refers to power plants, long-distance power lines, local distribution lines, transformers, and substations that operate together as a system to provide electricity to homes and businesses. Some people call the U.S. grid the largest man-made machine ever built. Kentucky is part of the Eastern Interconnection, one of three major U.S. grids. Kentucky is also part of the PJM and MISO systems, which operate the grids in their respective regions and make up a large part of the Eastern Interconnection.

What does “reliability” mean? Practically speaking, reliability means that when you flip the switch, the lights, air conditioning, and other equipment come on and stay on. To technical experts, reliability means two things: “resource adequacy” and “operating reliability.” Resource adequacy simply means having enough electricity, especially when electricity demand peaks at certain times of the day and during extreme weather. Operating reliability means preventing such problems as short circuits, brownouts and blackouts. A blackout is a complete loss of power. A brownout is a reduction in voltage that causes lights to dim and other appliances to malfunction or shut down.

Do we have a reliability problem? Officials responsible for the reliability of the grid have warned that many parts of the country face the risk of electricity shortages and other reliability problems, especially during extremely hot or cold weather. In fact, 45 of the lower 48 states face some risk of electricity shortages or have had rolling blackouts in the past (map below). The North American Electric Reliability Corporation, the national organization responsible for the reliability of the U.S. grid and parts of the Canadian grid, has been warning about potential reliability problems for the past five years. In addition, Commissioners from the Federal Energy Regulatory Commission have testified before Congress about the “reliability crisis,” as one Commissioner said, that is facing the country. The primary reason for the pending crisis is the premature closure of traditional electricity sources without having equally reliable electricity sources to replace them at the same time.



Which sources of electricity are the most reliable? Right now, traditional sources of electricity – coal, natural gas and nuclear power – are more reliable than wind and solar power. For example, traditional sources provided 99% of the additional electricity that was needed when Winter Storm Elliott peaked in December 2022. Traditional sources are sometimes referred to as dispatchable or controllable because they can be ramped up or down, depending on the demand for electricity. On the other hand, without additional technologies, wind and solar depend on weather conditions which cannot be controlled. If the wind is not blowing, wind farms cannot produce electricity. Likewise, solar panels cannot produce electricity without sunshine.

Officials who operate regional grids rate the dependability of different electricity sources. Based on these ratings, traditional sources of electricity are two to ten times more dependable than wind or solar power, depending on the season. While battery storage can improve the dependability of wind and solar power, the cost of batteries needs to be lower before they can be used widely to make wind and solar power dependable. In addition, battery storage cannot provide electricity for longer than four to eight hours, which is not adequate during extended periods. This is why we need traditional sources and wind/solar to work together for the foreseeable future to make sure the grid is reliable and electricity prices are affordable.

Why can't we get all of our electricity from wind and solar now? In 2022, wind and solar power provided almost 14% of U.S. electricity, while traditional sources of electricity provided close to 80%. It will take several years before wind and solar can provide the same level of reliability that traditional sources provide. In the meantime, a gradual grid transition allows time for other technologies – such as carbon capture and hydrogen – to be fully developed and deployed.

What do wind and solar cost? Wind and solar have no fuel costs, whereas traditional sources rely on coal, natural gas and enriched uranium. Once they are built, the cost of generating a kilowatt-hour of electricity with wind turbines or solar panels is very reasonable. However, wind farms and solar panels are expensive to build. To illustrate, replacing Kentucky's gas and coal power plants (which provide more than 90% of the Commonwealth's electricity) with either wind farms or solar panels would cost Kentucky ratepayers more than \$20 billion. Also, additional transmission lines could be necessary to tie wind and solar into the existing grid. This would also increase the cost of replacing traditional electricity sources with wind and solar power.

What can we do to help prevent reliability problems? You should join *Dependable Power First Kentucky* to stay up to date on developments that can affect reliability. In addition, please let your public service commissioners and elected officials know that you expect them to make sure Kentucky's electricity supply stays reliable and affordable.

For more information, please visit www.dependablepowerky.com.