

Q&A: Weather-related power outages are on the rise. Here's why, and what to expect in the future

July 24 2024, by Yvaine Ye



Credit: Pixabay/CC0 Public Domain

When Hurricane Beryl swept across Texas in early July, it left more than 3 million homes and businesses without power for days or longer. Local

hospitals [reported a spike](#) in heat-related illnesses amid the widespread power outages, and at least seven people died from extreme heat.

The crisis in Texas is the latest example of extreme weather knocking out America's power. While hurricanes can damage power lines and poles, utility companies may also preemptively shut off power to reduce damage. For example, in April, a Colorado utility [cut power](#) to tens of thousands of people on a high-wind day to prevent power lines from sparking wildfires.

[One estimate shows](#) that about 80% of major power outages reported in the U.S. between 2000 and 2023 were caused by weather. As [climate change](#) makes [extreme weather events](#) like hurricanes, wildfires, [extreme heat](#), and severe floods more frequent and intense, such blackouts will likely become more prevalent, said Kyri Baker, an associate professor in the Department of Civil, Environmental, and Architectural Engineering.

"The [power grid](#) is one of the most critical pieces of infrastructure," said Baker. "Keeping that system safe, secure, and reliable is not only convenient but also life-saving."

CU Boulder Today sat down with Baker, a fellow with the Renewable and Sustainable Energy Institute, to discuss the importance of the power grid, how climate change threatens aging infrastructure and what upgrades are needed to support a future powered by [renewable energy](#).

How do extreme weather events affect the power grid?

Extreme and unpredictable weather is a huge issue for the power grid, especially in areas like Texas that didn't traditionally have a lot of winter storms, or areas that didn't used to have heat waves. In 2021, Texas had a

massive cold snap that froze a lot of natural gas infrastructure. So they were unable to pump gas to deliver heat to homes or run [power plants](#).

This compounding effect, where people couldn't heat their homes or use electricity, caused billion-dollar impacts. This month, when Hurricane Beryl crashed the state's power grid, millions of people were left without power to cool their homes, resulting in tragic, heat-related deaths.

Why should the grid be included in discussions about reducing emissions?

The power system is the second-largest source of emissions in the U.S. We are using more power, especially with the increasing number of artificial intelligence data centers and electric vehicles. While these technologies can be beneficial for the environment, they also present a chicken-and-egg problem. Therefore, it is crucial to decarbonize our grid.

Can the current grid handle the transition to wind and solar?

Wind and solar are challenging because they are not controllable in the same way as coal, gas, or nuclear plants. The main issue is intermittency—sunlight and wind are not always available.

The grid requires a constant balance between supply and demand. Unlike roads, where excess traffic can simply slow down, power lines cannot store electricity. This means supply and demand must be balanced almost instantaneously. With renewable energy sources that fluctuate, maintaining this balance becomes even more difficult. If there's too much generation or too much demand for even just a second, the power grid can fail, leading to blackouts.

How do we prepare the grid for the future?

Currently, blackouts are not caused by renewable energy. Most are due to weather-related issues, such as failing components or power lines touching trees and causing fires. So the infrastructure itself is becoming a big bottleneck to providing reliable energy, regardless of the power source feeding into the grid.

Our grid is aging, with some components in the U.S. being over 50 years old. It's going to take decades to upgrade the whole grid to fully decarbonize and have a reliable system. Some of this upgrading includes putting [power lines](#) underground to make them less susceptible to high winds and wildfire risks. Upgrading people's home energy systems is also part of the process.

Will preemptive power shutoffs become more common?

Colorado had their first so-called public safety power shutoff in April. This has been going on in California for years, so they have a more robust and streamlined plan for which areas they turn off, and how they do vegetation management. Colorado will need to move in that direction because we are also a dry, hot, windy area with a power infrastructure that comes very close to trees and buildings.

First, Colorado will need a formal protocol. Secondly, we need to educate the public because people don't always understand why their power was cut off, but their neighbor's power was not. Deciding which area to turn off is a very challenging problem because you want to be safe but also make sure that the people whose health could be impacted during an outage are safe.

Ideally, there will be a good balance between inconveniencing people and making sure we're not causing another Marshall fire disaster.

What can consumers do?

One of the biggest things consumers can do is to educate themselves on issues related to the power grid. Respecting that the utility companies have a challenging problem to solve is the first step. And then pursuing clean energy technologies, like electrifying your car or biking more, is one major step you can take to lower your carbon footprint. Switching from gas appliances in your house to electric ones can also help lower your carbon footprint.

These devices are easier to run on things like rooftop solar. If the power in your area went out and you had rooftop solar, being able to disconnect from the grid and power your stove or water heater would be extremely helpful.

Provided by University of Colorado at Boulder

Citation: Q&A: Weather-related power outages are on the rise. Here's why, and what to expect in the future (2024, July 24) retrieved 24 July 2024 from <https://techxplore.com/news/2024-07-qa-weather-power-outages-future.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--