

Hurricane Maria offered an opportunity to make Puerto Rico's electric grid more resilient: It hasn't happened

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After Hurricane Maria razed the electrical grid in Puerto Rico nearly six years ago, there was a lot of talk about making the energy system more

resilient in the face of climate change and sure-to-occur future calamities.

"In practice, the opposite occurred," says Northeastern doctoral candidate Alaina Kinol, who with professor Laura Kuhl co-authored an analysis published this July in *Current Research in Environmental Sustainability*.

The researchers say the aftermath of the Category 4 hurricane actually reinforced prevailing power structures and technological systems.

"This is an enormous problem, because we know that transforming existing systems to be more resilient is essential to limit human and environmental harm as [climate change](#) continues and we see increasing frequency and intensity of disasters," Kuhl says.

Some climate policy experts may cling to the idea that disasters have the potential to quickly transform policies to increase resilience to future events, Kuhl and Kinol say.

The analysis shows that in Puerto Rico, "they are rebuilding their previous system, despite public calls for decentralized [solar energy](#) that would be better equipped to handle another hurricane in the future," Kinol says.

The researchers came to their conclusions after reviewing the texts of policy changes and laws in Puerto Rico in the aftermath of Hurricane Maria's September 2017 strike on the island territory of the U.S., where power was not fully restored for nearly 11 months.

Puerto Rican legislators have set a goal of reaching 100% of the island's electricity needs with renewable energy by 2050. But in the meantime, Kuhl says, the island is relying heavily on [fossil fuels](#), including natural

or methane gas.

A 'cautionary tale'

And instead of becoming decentralized and theoretically less susceptible to island-wide blackouts, the grid has become privatized both in terms of generation and transmission and distribution.

"The motivation was to maintain stability. When you are thinking about energy, that's understandable," says Kuhl, an assistant professor of public policy and urban affairs and international affairs in Northeastern's College of Social Sciences and Humanities.

"The challenge that we saw is that (focus) came into competition with more radical changes" that have the potential to secure [energy systems](#) as well as reduce greenhouse gas emissions driving extreme weather events in Puerto Rico and around the world, Kuhl says.

"Our research offers a cautionary tale," she says.

"There's been this kind of hope that if things just get bad enough, it will make people want to finally act quickly. There'll be this urgency, and now we'll finally act," Kuhl says.

"But what we saw was that the crisis of a hurricane actually caused people to pull back and focus on maintaining the electric system. Let's just hunker down and not be ambitious.

"For academics, for modelers, for policy makers, I think this might require us to pause on some of the optimistic models of how quickly some of these transitions can happen. We're baking a lot of assumptions into these models, that we can just roll out these technological changes really fast."

At the federal level, for instance, climate policy models under the Inflation Reduction Act "are really aggressive" in their depiction of how quickly new technologies will be adopted, Kuhl says.

"What this paper suggests is that as climate impacts get more and more intense, it's going to be harder and harder to move quickly."

Continuing blackouts

Puerto Rico's electric grid was outdated and faulty even before Hurricane Maria struck.

Since June 1, 2021, a company named LUMA Energy has operated the electric power and transmission system in Puerto Rico.

LUMA's website calls it a Puerto Rican company, but the Associated Press says it's a consortium "made up of Calgary, Alberta-based Atco and Quanta Services Inc. of Houston."

In January, Puerto Rico also privatized the production of electric power, selecting Genera PR to take over operation and maintenance of state power generation units, according to the AP.

Handing distribution over to LUMA "has not improved reliability. There continue to be significant blackouts," Kuhl says.

She says that the Northeastern study focuses on policy narratives and is not an examination of the costs of maintaining the current system versus funding alternatives.

"The Department of Energy has launched a study to address these questions, [called the PR100 Study](#)," she says.

"Continued investment in new fossil fuel infrastructure is irresponsible policy given the known need to transition to renewables," Kuhl says.

"This summer we're watching [heat waves](#) roll out, and flooding, and we're seeing how urgent that transition process needs to be. We also know that places like Puerto Rico are on the frontlines of experiencing those impacts."

Kinol says the rebuilt system "also has massive non-monetary costs" in terms of health burdens from pollution, high costs to consumers, human morbidity and mortality from continued outages and lost productivity due to the system's unreliability.

"The issue isn't just that they're sticking with the existing system, it's that FEMA funded Puerto Rico to rebuild the system that broke down due to Hurricane Maria, despite it not aligning with Puerto Rico's short- and long-term climate policies including the mandate for 40% renewable by 2025 and 100% renewable by 2050," she says.

And most importantly, it remains vulnerable to hurricanes in the exact same ways as the old system, so is likely to break again—(and has failed multiple times including during Hurricane Fiona— despite \$13 billion of investment," Kinol says.

"Those who were able to independently install solar panels have had more reliable power, including through storms, since [hurricane](#) Maria," as described in an NPR article.

There also needs to be more focus on the socio-political aspects of what makes communities feel resilient, says Kuhl, who says smaller-scale solar projects are in the works in different areas of Puerto Rico.

"We focus on short-term technology issues or we focus on the short

financial investments and returns," Kinol says.

When it comes to climate change, she says, "we really need to be preparing for what is going to help communities survive—what will help poorer communities and communities of color that are more vulnerable be better able to deal with these major challenges that they didn't cause," Kinol says.

And building resilience isn't just about preparing for hurricanes but also for heat waves and floods and other events, she says.

"We can't focus on making our systems resilient around one type of climate catastrophe. They need to be much more broadly resilient," Kinol says. "What is a bigger, society-wide shift that is going to prepare people for the many different impacts of climate change?"

More information: Alaina D. Kinol et al, The role of disasters in shaping narratives of resilience and transformation in Puerto Rico, *Current Research in Environmental Sustainability* (2023). [DOI: 10.1016/j.crsust.2023.100227](https://doi.org/10.1016/j.crsust.2023.100227)

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