

With gas prices and power blackouts on the rise, is green technology the solution?

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“We know what can work. It's just a question of building the right infrastructure and having the right software solutions,” says Amy Myers Jaffe, a research professor at The Fletcher School. Credit: Amy Myers Jaffe

In recent months, energy shortages in China have disrupted manufacturing and resulted in rolling blackouts in parts of the country. Meanwhile, electricity costs are skyrocketing in Europe and U.S. gas prices have more than doubled. The effects of these rising prices and

energy shortages are rippling across the world, sparking fears of an escalating global energy crisis just in time for winter.

China has already sold some of its [oil reserves](#) to reduce prices and the U.S. could make a similar move, "but we would like to have solutions that are not going to make greenhouse gases worse. And that's a much trickier proposition than just solving an energy supply crisis," says Amy Myers Jaffe, the managing director of the Climate Policy Lab at Tufts and a research professor at The Fletcher School. She's the author of *Energy's Digital Future*, a book released earlier this year about the promises and challenges of a post-oil era.

Tufts Now spoke with Jaffe to understand how the transition to cleaner energy could help stabilize energy prices and prevent shortages in the future—and what hurdles we still have to clear to make that possible.

Tufts Now: We're seeing energy shortages and rising costs around the world. Can you explain how we got here?

Amy Myers Jaffe: It's important to understand what a huge shock the economic setback of COVID in 2020 was in all kinds of ways that affect energy, whether that's [energy investment](#), energy choices, or energy habits. We've had an event that has no historical precedent when it comes to energy.

And that event takes place within the context of normal cyclicalities in traditional industries like oil and gas—typically when prices are falling and supply is abundant, companies stop investing. And when demand rises with economic growth, and we have higher energy prices and shortages, that signals companies that they need to invest more. We're used to the up and down in oil and gasoline prices—as Americans, it

seems like we've seen that story a million times. Those of us who watch the energy markets have also seen a lot of up and down in [natural gas](#) and very recently, in Texas, even some shocking up and down in electricity prices.

In 2020, the pandemic shut down huge swaths of the global economy. Energy investment and production had to be sharply curtailed because we basically had no place to put the fossil fuels. We didn't need them. No one was flying anywhere. No one was driving anywhere. There were places where people weren't manufacturing anything. All of that caused this huge shock to the energy system.

And now—as we had a recovery in the United States, and we were having some more movement in Europe, and some economic activity and growth in Asia—all of that cut in investment in oil and gas from 2020 is making potential fuel shortages worse in 2021, and presumably into 2022.

Is the transition to renewable energy sources like solar and wind exacerbating the current energy crisis?

In the [political arena](#), a lot of people would like to tell the average layperson that this is all the fault of renewable energy because it's not produced in a constant way—the sun isn't shining at night, sometimes you have periods of time, like this summer in the U.K., where the wind is not blowing.

But really, had we not had any renewables, we would still be in the same place when it comes to the 2020 shock and after-effect. In fact, we would probably be in a worse place.

It's very easy to blame renewables, and while there were some

disruptions to wind power in Europe this summer and unexpected limitations to hydro power in China this year, that doesn't account in large measure for the market power of OPEC, or the sustained leverage Russia has on natural gas in Europe, or the boom-and-bust oil and gas investment cycle, or how we're using energy differently because of COVID.

Can transitioning to renewable energy sources help us avoid similar situations in the future?

As we shift to renewable energy, eventually it will weaken the oil and gas boom-and-bust cycle and maybe even make it disappear over time, because fossil fuels will be a much smaller piece of the global economy. But for now we need to develop the right regulations and combinations of technologies to build resilience in our energy distribution system.

For example, the state of Vermont relies on almost 100% renewable energy. But that doesn't mean the state is entirely powered by renewable energy made in Vermont. Vermont is importing hydroelectric power from Canada, and that helps balance any intermittency that they might experience from the concerted effort they've made to shift to renewables. If you can trade electricity across state and country borders, you can solve temporary problems caused by weather or other events. Texas learned the hard way last winter that going it alone can be problematic when the unexpected happens.

The other thing is that as we integrate more electricity storage—whether that's batteries, or hydrogen systems, or backup generation—it's going to become easier to balance changes in supply when we have weather-related surprises.

In Australia, they have put in a set of battery systems, aggregated in a

highly usable way, in the western part of the country that has gone a long way to eliminating historical brownouts. They've come up with these really great renewable energy solutions to solve the problem that it is not commercially viable to build a giant natural gas pipeline from the eastern part of the country.

So we know what can work. It's just a question of building the right infrastructure and having the right software solutions.

You talk about this in your book, *Energy's Digital Future*. What do countries need to do to facilitate these solutions?

I have a chapter in my book called "Alexa: Beam Me Up Clean Energy." It's about how, with all these devices and machines that talk to each other, we could use those technologies to burn less energy without changing our quality of life. Goods could be 3D printed locally on-demand, our smart devices could turn off machines we're not using, and our homes and vehicles could feed excess energy back to local utilities to balance the grid.

But that is only going to work if we have the regulatory framework to make those technologies work for us instead of against us.

If I am going to give my electricity company the right to turn off all my non-essential appliances, because I indicated on my smart application that I'm in my office, I have to be confident that that information is going to be held privately. We need protections for my energy usage data and also I need to know that my home energy supply cannot be hacked and cut off via the internet.

You're imagining a world where we'd have this

technology to help us use less energy, as well as getting more energy from renewable sources. It seems like an overwhelming task. What makes you optimistic that we can do it?

COVID was a terrible shock, but it was also an opportunity. All around the world, we were forced out of our usual practices. And the question now is, what are we going to go back to? Could we look at lifestyles that take into account climate change, and optimize our activity to lower the amount of waste, and the amount of energy we use, and the amount of things we buy?

In the context of global climate negotiations, it seems very overwhelming to think about how you would go about doing that. But when I think about new digital technologies like automation, artificial intelligence and the internet of things, and how to use them for both convenience and the environment, then it becomes a little bit easier.

We have much more cost-effective renewables than we had in the '80s and '90s. We have put the time and effort into developing these digital and other kinds of solutions that make deploying renewables easier and more reliable. We have come a really long way.

There is this sense of urgency that we haven't come far enough, fast enough. But we're in a better position to move fast today than we've ever been. And that's really what we need to focus on, and think about how to enable that last, big push to net zero [energy](#).

Provided by Tufts University

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