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The simple argument for keeping nuclear power plants open

We need more carbon-free power, not less.

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About a year ago, the utility giant Exelon announced that it would [close down the Three Mile Island nuclear plant](#) in 2019. Last week, FirstEnergy followed suit, [announcing](#) that it would close three nuclear power plants of its own — Beaver Valley, Davis-Besse, and Perry — by 2021.

All four of these plants, located in Ohio and Pennsylvania, operate within the PJM Interconnection, a mid-Atlantic energy market that covers around 65 million people.

Here is a visual representation of how much zero-carbon energy will be lost to the PJM grid if all four of these nuclear plants close on schedule, courtesy of the consultancy [GPG](#).

Together, the four nuclear plants produced 40 terawatt-hours of energy in 2017 — more energy than was produced by PJM's *entire fleet of wind and solar plants* (30 TWh).

Here's my question: Why aren't climate hawks freaking out about this?

If climate change is indeed an existential threat, isn't the loss of 40 TWh a year of carbon-free energy a four-alarm emergency? Yet no one seems to be treating it that way (except the [owners of the plants in question](#)). With a few exceptions, environmental groups are silent on the closures, or even [support accelerating them](#). That is nuts.

Environmentalists have a long, strange, and vexed relationship with nuclear power, a great historical accretion that, in your author's humble opinion, makes it difficult for them to see this issue clearly. Part of the problem is that the question of what to do with existing nuclear plants gets tangled up in all sorts of peripheral arguments, many of which involve strong tribal loyalties. (If you want to see what I'm talking about, try going on Twitter and expressing a strong opinion about nuclear power.)

So I'm going to try to untangle things a bit, by showing what this argument is *not* about.

It's not about Trump's stupid attempts to bail out "baseload" power plants

Coal and nuclear ("baseload") power plants are getting the shit kicked out of them in energy markets. Coal plants are [retiring faster than ever](#), despite President Trump's bluster, and nuclear plants are going down with them, largely for the same reasons. It's [difficult for big, slow, always-on power plants to compete](#) on a grid being flooded with cheap, nimble natural gas and renewables. (For a deep dive into what's affecting the profitability of PJM's nuclear fleet, see [this paper](#) from Jesse Jenkins. Spoiler: It's mostly natural gas.)

There is, of course, an obvious justification for efforts to save nuclear plants: They offer carbon-free energy in a time when it is desperately needed. But in Ohio and Pennsylvania, there is no policy mechanism to compensate the plants for that value. New York figured out a way to do it with [zero-carbon energy credits](#) (ZECs), but PJM's plants are not similarly blessed.

Since there's no prospect of saving nuclear plants for the right reason, their owners, and PJM, are pressing to save them for the wrong reasons. The Trump administration and the generation companies are now advancing the argument that "baseload" plants (a [silly and outmoded term](#)) are needed for grid resilience and should be compensated for *that*.

So much resilience. [Wikipedia](#)

In response to the [Energy Department's loony coal bailout proposal](#), PJM responded with a [slightly less loony plan](#) that would still have had the effect of bailing out coal and nuclear. It is now [pleading with FERC](#) to bend power market rules to favor those sources.

It's an unfortunate situation because the resilience argument is [bogus](#). Electricity experts have been [widely critical](#) of PJM's plan. But it's all nuclear has to work with. The industry sees no choice but to [hitch its wagon to coal](#) and support coal's rent-seeking.

I happen to think that's a deal with the devil that will not work out in the long run, for reasons well articulated by energy analysts Varun Sivaram and Madison Freeman in this [Foreign Affairs op-ed](#). Coal is heading toward a deserved and unavoidable sunset, and by making "coal and nuclear" a single entity, the nuclear industry risks getting stuck on the same trajectory.

Nonetheless, the key point here is that the merits of these resilience arguments (insofar as there are any merits, which is not far) are distinct from the merits of keeping nuclear plants open. What matters most about nuclear is the carbon-free energy; that should be the focus.

It's not about new nuclear

The question of what to do with existing nuclear power plants is also distinct from the question of whether to build any new ones.

One of the most contentious arguments within the climate community is over the role of nuclear power in decarbonization over the coming century. There are people who believe that nuclear is the only realistic answer and people who believe that nuclear is a flailing mess that will play little role in the coming energy transition. The tribal intensity on both sides often makes productive discussion difficult. My own hopes for nuclear going forward are quite low. The latest generation of plants is a mess (almost universally [off schedule and over budget](#), if they get [finished at all](#)), and the existing industry is a swamp of [incompetence and corruption](#). The profusion of renewable energy, distributed energy, and natural gas is changing the grid and the electric sector so quickly that gigantic, long-term investments like nuclear plants are getting almost impossible to make.

To get to zero emissions, natural gas must be phased out over time, but I have more faith in batteries, smart grids, EVs, and other grid-edge innovations to close that gap than I do in nuclear coming back to life. Maybe the industry will come through with the long-rumored [small, modular, meltdown-proof nuclear generators](#) that consume spent nuclear waste. I hope so! We should research the hell out of those, though it doesn't seem wise to bank on them.

A “power reactor building” from the SMR startup [NuScale](#).
[NuScale](#)

Again, though, my point is that your position on these matters, whether you are “pro” or “anti” future nuclear, is immaterial to the issue at hand. It has nothing to do with the question of what to do with existing nuclear power plants.

You do not have to like nuclear power, or ever want to build another nuclear power plant, to believe that existing sources of carbon-free power should be kept running as long as practicably possible. You only have to like carbon-free power or dislike climate change.

It's not about nuclear versus renewables

Some environmentalists seem determined to establish a zero-sum conflict between renewables and nuclear power — not only new nuclear but existing nuclear. They [say](#) it can be replaced with efficiency and renewable energy, which are safer.

Problem is, we've seen several nuclear plants shut down in recent years and now have a pretty good idea what replaces them. It's [mostly natural gas](#) and some coal. This is from a [2016 analysis](#) by the EIA:

Today, variable sources like wind and solar are not a one-to-one replacement for firm capacity like nuclear. They might be someday soon, with help from batteries, but in the short term, the time horizon of these nuclear retirements, they are not. That means more natural gas.

A PJM spokesperson [told E&E reporter Sam Mintz](#), “in the short term, on a day-to-day basis, under the current economics and likely future conditions, the [retired nuclear] energy would be replaced by natural-gas-fired generation.”

For practical purposes, the choice is not existing nuclear versus renewables; it's existing nuclear versus natural gas. And as a fossil fuel, natural gas creates more greenhouse gases — an easy choice for climate hawks.

PJM still has plenty of coal plants running. (“PJM’s [installed capacity in 2016](#) consisted of 33 percent coal, 33 percent natural gas, 18 percent nuclear, and 6 percent renewables, including hydro.”) If renewables should be replacing anything, it's them first. And then natural gas.

And only when the very last fossil fuel power plant is closed will it make sense for climate hawks to debate the wisdom of replacing existing nuclear with renewables.

It's just about math

When an operating nuclear plant shuts down, a big chunk of carbon-free energy is lost. A *big* chunk. There's just no way to spin that as a good thing. The five nuclear plants shut down between 2013 and 2016 alone produced as much electricity as [all US solar put together](#). Carbon-wise, that means the next doubling of US solar will mostly be spent trying to make up for nuclear losses.

[According to the EIA](#), in 2017, nuclear energy provided 805 TWh of US power, around 20 percent of the total. Renewables, excluding

hydropower, provided 387 TWh, or 9.6 percent. Like it or not, we currently get twice as much carbon-free power from nuclear as we do from renewables.

Some 15 to 20 nuclear plants are [at risk of closing](#) in just the next five to 10 years. EIA's reference case shows nuclear capacity experiencing a [net decline of about 20 GW](#) through 2050, with potentially much larger losses.

[EIA](#)

That means by 2050, something like 160 TWh a year of renewable energy will go to replacing the carbon-free energy lost from retired nuclear — instead of going to, say, reducing the consumption of fossil fuels.

Even in the very best-case scenario, if the 40 TWh a year that PJM loses with its four latest nuclear retirements is replaced entirely by renewable energy (which, to be clear, won't happen), that's 40 TWh of carbon-free energy that won't be added to the total. It's just catch-up, as though PJM had made no progress on carbon in the last 20 years.

No matter what it's replaced with, the loss of carbon-free energy is a tragedy, a [blow to climate change efforts](#) when there is [no time to lose](#).

An enormous amount of such energy is about to be lost in the mid-Atlantic and, in coming years, across the US power fleet. The question of how some of it might be saved is [complicated](#), and finance and safety decisions will ultimately be made on a plant-by-plant basis.

But saving it, or at least as much of it as possible, seems like an obvious and urgent priority for [anyone who values decarbonization](#).