Dealing With Electric Grid Disruption

Post by “Julia” of May 11, 2024 at 12:31 PM

> Quote from Martin
>
> Nuclear power stations cannot black-start.

This is misleading in two ways: Firstly, nuclear plants will separate themselves from a failing grid, and keep themselves running; and example of this is the Northeastern 2003 blackout. Secondly, even if the plant would shut itself down, it could easily be jump started using any other plant.

> Quote from Martin
>
> nuclear power is a dead end

Actually, many states and companies are investing in new generation models (molten salt, dual fluid, small modular reactors, ...). Most states who can afford it are building or least planning new reactors to replace old ones. As a result, the number of decommissioned and newly built nuclear power plants was roughly stable over the past two decades. If it were so obviously a dead end, it would be unlikely to persist like that.

> Quote from Martin
>
> unreliable under unusual conditions

Every power plant is unreliable under unusual conditions: Draught, no water in the dam. No sun, no solar power. To little wind, no wind power. Too much wind, no wind power. Water levels too low to cool nuclear plant, no nuclear power.

Now, let's talk about usual conditions: Harvesting weather cannot supply enough power to *reliably* satisfy demand; the increase in redispatch events shows this nicely. On top, it is a very expensive endeavour, unless unusual geography can be used (Hoover dam, Swiss hydropower network) or unusual weather can be used (solar plants in deserts). On the other hand, nuclear power is cheap (just look at the merit order), reliable, and easily regulated to match demand (minimal redispatches).

> Quote from Martin
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> E.g. in the summer of 2022, more than half of the French nuclear power plants were temporarily off the grid, and France had to buy considerable amounts of electricity from

> Germany

Let's reframe this: Even with a heat-wave, a drought, scheduled shutdowns and unscheduled shutdowns – even with, at it's worst, less than half the plants left operational, France only needed a little help from their friends to get by just fine. Such an excellent illustration of the immense reserves in capacity those nuclear plants have!

The power France bought from Germany cannot have been more than the capacity of the transnational lines, which is 5 GW. Meanwhile, France has 24 nuclear plants, and the three largest can produce more than 5GW – *each*. Germany is relying on imports since shutting down their plants, and *relying* on exports because weather-harvesting plants are too unpredictable. That's right: Germany routinely *pays* its neighbours to take surplus power because its grid would otherwise melt (too much power), and then *pays its neighbours again* to get power, because the grid would otherwise freeze (too little power).

Keep in mind that a grid must be in balance during every single second of the year, during every supply-demand situation. This either implies controlling demand (rolling blackouts, prohibiting certain applications such as heat pumps or charging stations, limiting construction, shutting off industry), or it implies controllable supply. The weather is not controllable, and therefore doesn't offer controllable supply. Hydrogen is hugely inefficient, and pumped hydro is realistically at maximum capacity. I support using existing surfaces for solar panels, and using windy, sparsely inhabited areas for wind (if the soil erosion, dead birds/insects and microplastics they cause aren't a worry). I do mind placing gigantic wind turbines in windless nature preserves. I'd rather have a small and quiet nuclear power plant.

> Quote from Martin
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> provided predominantly by gas power stations

I don't mind gas power stations. They're an excellent addition to a smart mix of power sources. At the same time, I do mind needlessly shipping LNG across the globe, because it is very wasteful and regasification is often very damaging to the environment.

I don't think we'll find agreement on the topic itself; so I suggest we agree on “Time will tell, and until then, let's agree to disagree.” I will read your reply, but I won't reply in-turn to keep in line with the “no contemporary politics” rule; I feel like I've already overstepped the mark on that.