Renewable Energy Perspectives

A brief exploration of electricity demand and generation in the Trump era

Since taking office for a second time in January 2025, Donald Trump has issued a dizzying number of executive orders. These orders pertain to a wide range of topics including social issues, healthcare, foreign policy, government administration, energy, and the environment. Although executive orders do not necessarily have the force of federal regulations, they serve as indicators of administration intent and can have immediate practical consequences.

So, a president who has previously referred to climate change as a "hoax" has signed orders to support domestic production of fossil fuels, halt leasing for wind projects, and impound Inflation Reduction Act funding (i.e., significant renewable energy incentives). If we place these actions within our current reality of a visibly changing climate, complemented by nations (particularly wealthy ones) that consistently fail to meet climate targets, what comes to mind? Perhaps flavors of anxiety, despair, or frustration?

Before getting carried away by a doom spiral fed by headlines and vague conjectures of what current politics mean for the global environment, it may be helpful to look at some data. Here, we'll look at electricity demand and generation using data compiled by the energy think tank, Ember. This exploration will allow us to gain some global perspective and a view of US electricity generation in the context of the Trump presidency. But first, a caveat: global energy flows are complicated—we'll be taking a bird's eye view at electricity, which is just one piece of the puzzle.

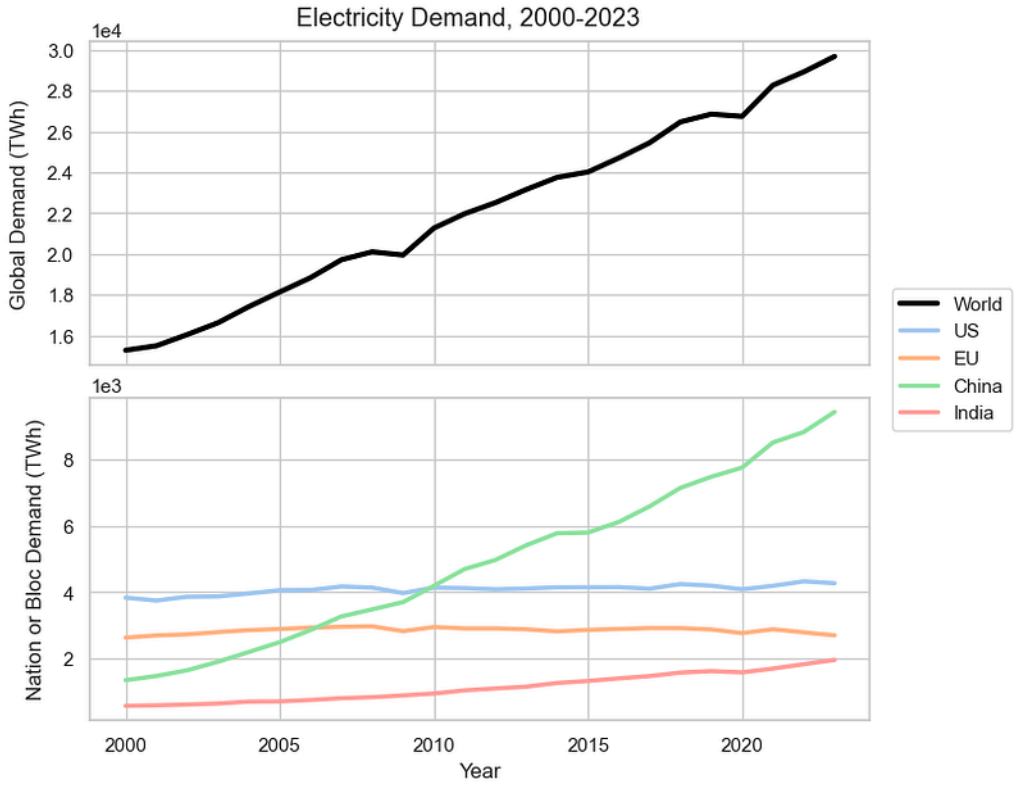

Figure 1. Electricity demand in TWh over time. World demand is plotted separately due to scale.

As shown in Figure 1, global electricity demand (measured in terawatt-hours [TWh]) has steadily increased from the year 2000 to 2023, nearly doubling over that time period. United States (US) demand increased very slightly over this time period, but it generally looks similar to the rather constant demand of the European Union (EU). In contrast, rapidly developing markets like China and India show clearly increasing demand. We can see that the electricity demand in advanced economies is more or less constant, whereas emerging markets show increasing demand as their populations grow, citizens accumulate wealth, and industries are developed.

So, US demand is not growing rapidly, but Figure 1 above suggests that current US demand is already relatively large. Let's take a different view of recent electricity demand to get a better picture of the seemingly high US demand.

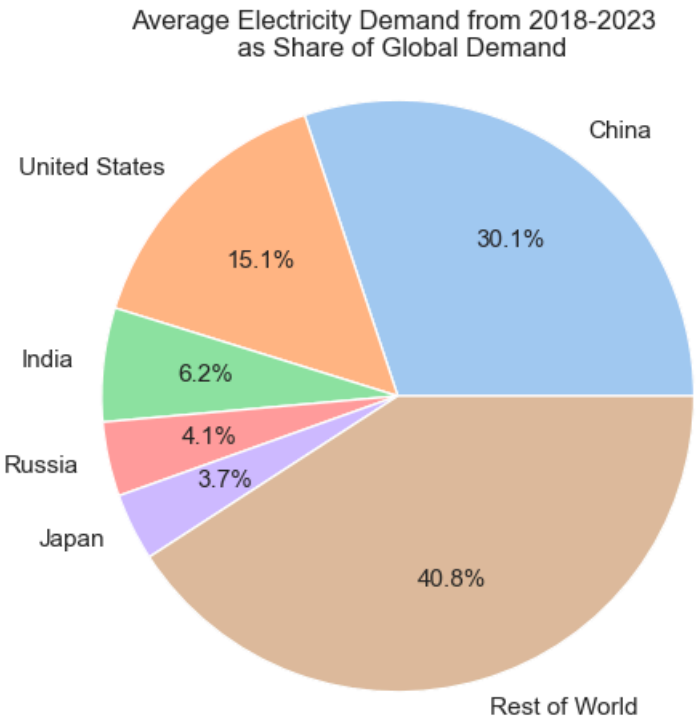

Figure 2. Proportions of recent global electricity demand calculated as average demand over the 2018–2023 time period.

According to Figure 2, the average electricity demand from the United States was only surpassed by that from China in recent years. India, Russia, and Japan round out the top five in demand, accounting for nearly 60% of total global demand. Note that there is a strong element of sheer population size driving these rankings. Analyses will often look at per capita metrics to adjust for population, but in our case, we are more interested in the bulk nation-level standings. How electricity is generated to meet the demands of these nations has broader implications for global emissions, air pollution, and the pace of the worldwide transition to less carbon-intensive fuels. Thus, it's worth taking a deeper dive into how electricity demand is being met globally and in the US.

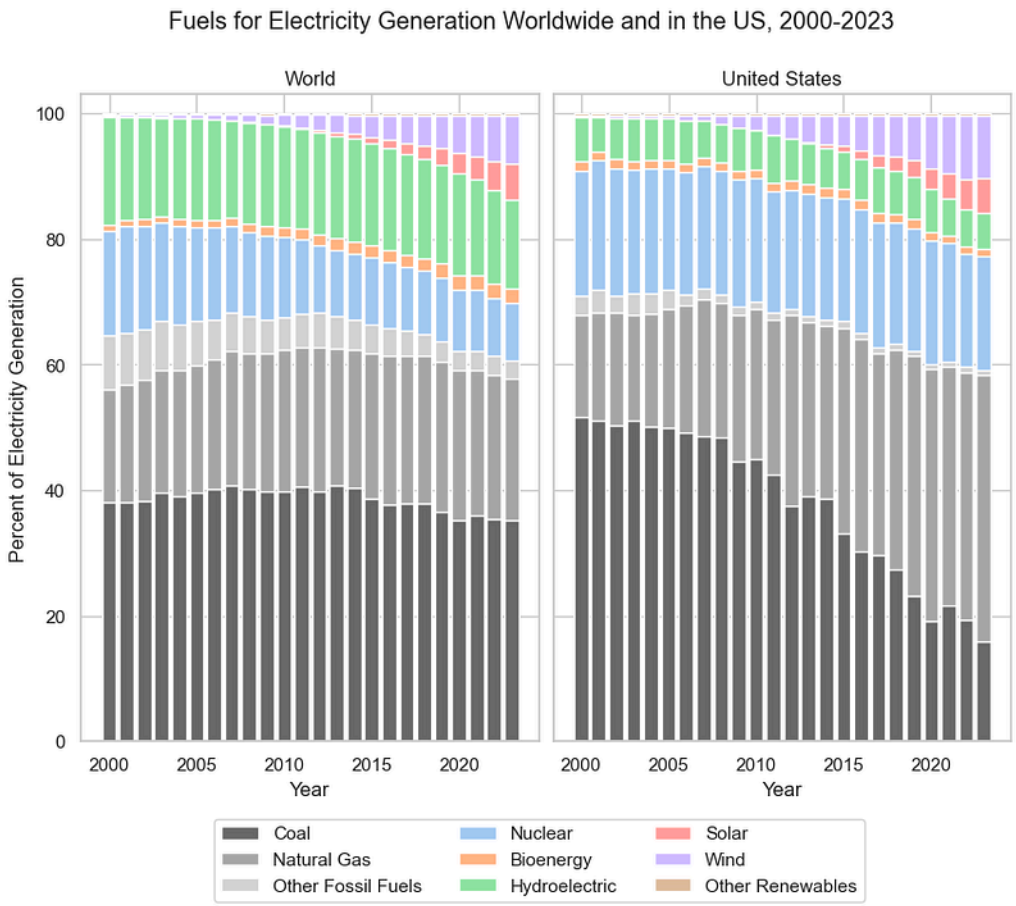

Figure 3. Contributions of various fuels to yearly electricity generation from 2000–2023.

Since the industrial revolution, our dominant fuel sources have been fossil fuels (coal, oil, and natural gas). Coal in particular has been a significant piece of the electricity puzzle, as Figure 3 shows starting in the year 2000. Notably, hydroelectric and nuclear also provide substantial amounts of electricity over the entire time period shown. Both of these sources have the important property of constant reliability, unlike solar and wind, which are more intermittently available. Wind began really gaining traction worldwide in the early 2000s, while solar started to become more widely adopted later in the 2010s. Advances in efficiency and battery storage coupled with falling production costs have helped to drive expansion.

Figure 3 suggests that both wind and solar have continued to grow quickly since 2015. Trump's first term took place from 2017–2021. Early in this term, Trump released the "America First Energy Plan" with the aim of expanding domestic fossil fuel production and undoing Obama-era climate policies. He issued an executive order in 2017 to weaken or undo many of the actions the federal government had previously taken

to address climate change. Certainly, Trump was not generally supportive of renewable energy production. Interestingly, however, the archived Trump Administration Energy & Environment web page boasts about both increased US fossil fuel production *and* record high renewable energy production and consumption.

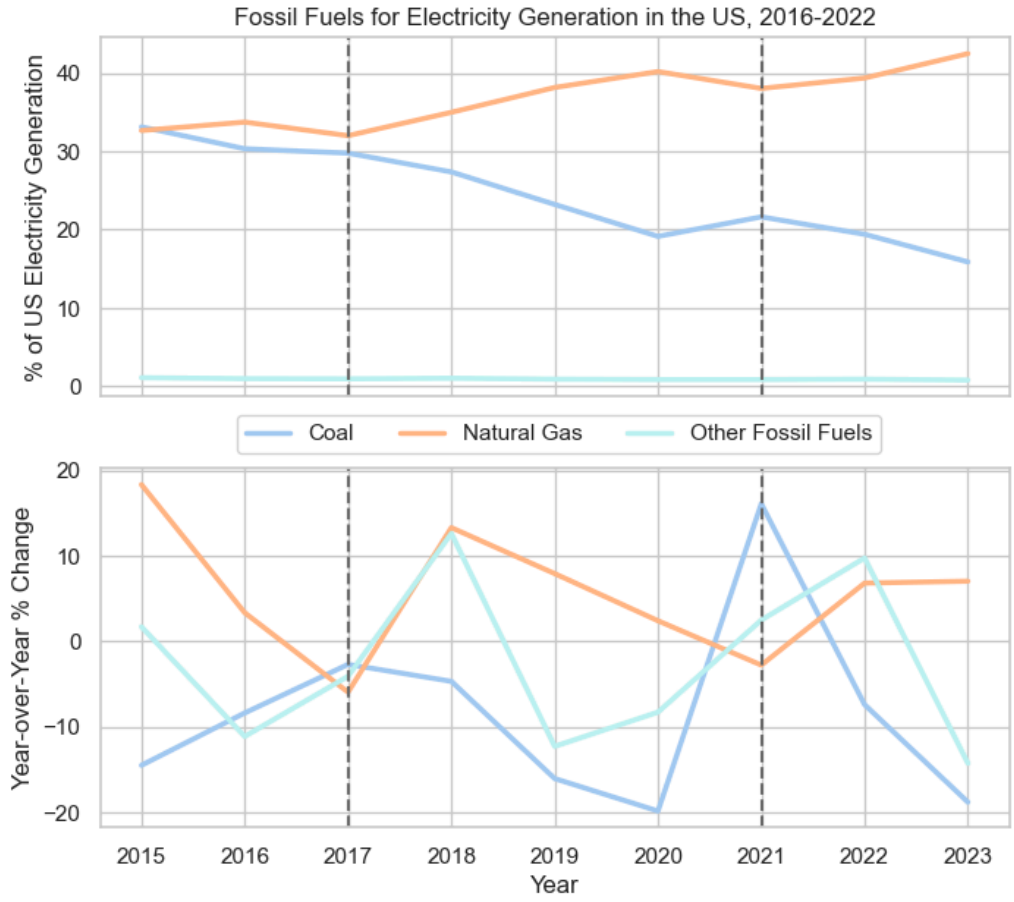

Figure 4. Fossil fuel percent contribution to US electricity generation and year-over-year percent change from 2015–2023. Vertical dashed lines demarcate the time period corresponding to Trump's first term. Additional years on either side are included for context.

Despite Trump's pro-coal rhetoric, coal's contribution to the US electricity generation portfolio mostly decreased during his presidency. As seen in Figure 3, this decline began in the early 2000s. Natural gas, on the other hand, has been on the rise. The top panel of Figure 4 shows that natural gas' share of US electricity generation increased from 2017–2021, albeit at a slower rate from 2018 onward, according to the bottom panel. Other fossil fuels account for next to none of US electricity generation. Overall, Figure 4 does not show the explosion of fossil fuels we might have predicted from Trump's rhetoric and policies.

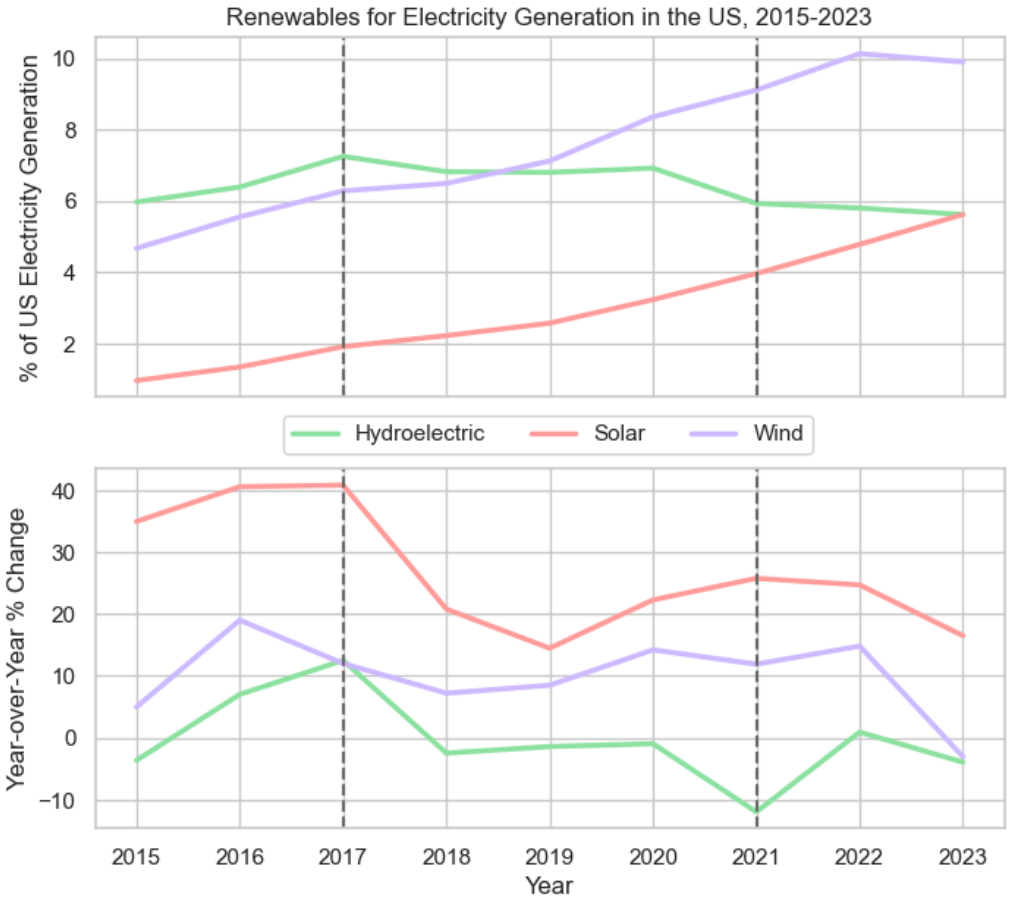

Figure 5. Renewable fuel contributions to US electricity generation. Bioenergy and the catchall "other renewables" category were excluded because they account for a small share of US electricity generation and stayed relatively constant over this time period. Nuclear was also excluded since though it is a low-carbon fuel, it is not renewable.

Hydroelectric generation appears to have declined slightly from 2017–2021. Bigger picture though, hydroelectric generation is roughly constant; the amount generated between 2000–2023 wobbles around about 260 TWh. In contrast, solar and wind show clear growth during Trump's first term. The year-over-year changes for both fell early on, but then rebounded during the second half of this time period. Of course, there are many factors contributing to the rise and fall of electricity sources. Still, the growth in solar and wind demonstrates that Trump's policies and rhetoric were not damaging enough to reverse the rise of these renewables. Perhaps their growth was slowed compared to what might have taken place under a more climate-friendly president, but that's a "what if" rabbit hole.

No one knows what will happen over the next four years. Since the US accounts for a sizeable chunk of the world's electricity demand and

generation, maybe we can hope that renewables will continue to surge toward a lower carbon future.

Data Source: Ember, Yearly Electricity Data. https://ember-energy.org/data/yearly-electricity-data/