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After 45 Hours With No Electricity, Some Top Takeaways From The Texas Blackouts

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Energy

I write about energy, power, innovation, and politics.

The Texas Blackouts are a stark reminder that the electric grid is our biggest, most important, and ...

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The autopsy of last week's near-collapse of the Texas electric grid will be gruesome. The Texas Blackouts were the result of several complex and interrelated factors. The final cost of the blackouts will be measured in tens

of billions of dollars and the blizzard of finger-pointing, litigation, and bankruptcies will last for years to come.

I was among the millions of Texans hit by the blackouts. My wife, Lorin, and I spent 45 cold hours, along with our dog, Peaka, sitting as close to our fireplace as we could without singeing ourselves. In many ways, we were lucky. We had a natural gas connection (thank God!) so we had hot food, hot coffee, and hot water. We also had plenty of firewood. Thousands of Austinites lost both water and electricity service. A friend of mine who lives on a small ranch on the outskirts of Austin told me his water system froze, which meant he and his family didn't have water in their home for six days. During the blizzard, we did regular checks on our faucets to make sure the water was dripping and our pipes hadn't burst. We also cut firewood and shoveled snow. When the power came back on, we were so happy we jumped out of bed and danced around the house.

It has been one week since we got juice again. Over the past seven days, I've been reading the myriad articles and tweets about the blackouts, what caused them, and who, or what, should bear the blame. I will be writing a lot more about the blackouts in the weeks ahead, but in the meantime, here are my top takeaways from the iceberg that nearly sank the Texas economy.

The first and most important point is this: **We ignore the fragility of the electric grid at our peril.** The Texas Blackouts are a stark reminder that the electric grid is our biggest, most important, and most complex network. Its strategic importance to our society cannot be overstated. The electric grid is the mother network, the network upon which all of our most-critical networks depend. We must pay more attention to its resilience and reliability.

As I wrote in my latest book, *A Question of Power: Electricity and the Wealth of Nations*, "We take electricity for granted. But nearly everything we touch – almost everything we read, eat, or wear – has in one way or another, been electrified. Electricity is the world's most important and

fastest-growing form of energy. It's also the most difficult to supply and do so reliably." I continued, "Electricity is the fuel of the 21st century. Electricity makes modern life possible. And yet, some 3 billion people around the world are still stuck in the dark. Their opportunities, their potential to develop lives beyond the back-breaking work of subsistence farming and day labor, their possibilities for economic and social development, depend on increasing their access to reliable electricity."

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The reason for the blackouts is simple: grid mismanagement. Last Wednesday, on the latest episode of the Power Hungry Podcast, I asked Meredith Angwin, the author of a terrific new book, *Shorting the Grid: The Hidden Fragility of Our Electric Grid*, a simple question: What happened? She quickly replied: "Grid mismanagement…The rules that set up the grid do not care about reliability."

Other prominent analysts are also pointing at the structure of the Texas grid, which is overseen by the Electric Reliability Council of Texas. On February 18, a writer with the *nom du plume* Policy Engineer published a long post on the website of Judith Curry, one of America's highest-profile climate scientists. (Curry was on the Power Hungry Podcast last October.) In the post, Policy Engineer explained that Texas's energy-only market doesn't compensate electricity producers for providing capacity, that is, the ability to provide power at any given moment. "Texas has stacked the deck to make wind and solar more competitive than they could be in a system that better recognizes the value of dependable resources which can supply capacity benefits. An energy-only market helps accomplish the goal of making wind

and solar more competitive. Except capacity value is a real value. Ignoring that, as Texas did, comes with real perils."

On February 19, Larry Kellerman, a managing director of I Squared Capital, and Robert McCullough of McCullough Research, published a report which said, "the origins of this disaster included the lowest reserve margins in North America, ignoring basic maxims of preparing for bad winter weather, and a market design that rewards shortages (rather than the resolution of shortages) at the cost of consumers."

Given the structure of the Texas electricity market, there's no surprise that the system failed. As Angwin told me on Sunday, the Texas system "rewards crisis. The grid becomes more profitable when it is in crisis. So power producers have a perverse incentive to facilitate a shortage so they can make more money."

Texas narrowly averted a total grid meltdown and the societal mayhem that would have followed. During the height of the electricity crisis on the night of the 14th as demand was soaring and generation was falling, the Texas grid came close to total blackout. ERCOT's president and CEO, Bill Magness, said the grid was "second and minutes" away from collapse due to a drop in frequency, which is a measure of energy flow. Electric grids operate on narrow tolerances of voltage, which is akin to water pressure in a pipeline. The grid must be continually tuned so that electricity production and electricity usage match. Doing so helps ensure that voltage on the grid stays at near-constant levels. If voltage fluctuates too much, it causes swings in frequency, and blackouts can occur. In the US, the grid operates at 60 cycles per second, or 60 Hertz. During the crisis, that frequency dropped to 59.93. Yesterday, a former ERCOT engineer told me that frequency dropped as low as 59.3. As Bloomberg reported, "below 59 and the state's electrical system would face cascading blackouts that would take weeks or months to restore."

Such a shutdown would have put huge numbers of people — thousands, maybe tens of thousands — at immediate risk of freezing to death. Sensitive infrastructure, like water treatment plants, would have frozen. Nursing homes, hospitals, police stations, fire stations, and other critical operations would have been plunged into darkness at the same time that temperatures were plunging, snow was falling, and roads were impassable. That's just plain scary.

It was crazy cold for a long time. Even mentioning this sounds like a job for Captain Obvious, but it was so cold it made the mercury shiver. In Austin, the temperature was below freezing for 144 consecutive hours, a new record. We've lived in Austin for 35 years and have never experienced anything like it. At our house in central Austin, we had about seven inches of snow. The reason I mention this is simple: this may be the new normal. If climate change means that we are going to have more extreme weather events, including spells of very hot and/or very cold weather, and those events happen more often, then we must assume this will happen again, maybe next year.

Our solar panels were worthless for nearly a week. Solar energy is like motherhood and apple pie. Everyone likes it. But when panels are covered with snow, as ours were for most of six days, their output is zero. We paid a hefty sum to install our 8.5-kilowatt system and we got equally hefty subsidies – from the federal government and Austin Energy — for doing so. But I am not planning to buy a battery system to back up our solar system for the next blizzard. Instead, like a lot of other people, I'm thinking about buying a gasoline-fired generator.

Electrifying everything is a recipe for disaster. As I wrote on this site last week, this blizzard shows that attempting to "electrifying everything" will reduce our society's resilience and lead to what could be a catastrophic failure. In the simplest terms, attempting to electrify everything requires putting all of our energy eggs in a single basket, and that basket —

the electric grid — has repeatedly demonstrated how fragile it can be. During a time when we should be laser-focused on increasing our society's resilience to external shocks, like terrorist attacks, extreme weather events, and pandemics, the claims that we should concentrate all of our energy supplies — *and therefore all of our energy-related risk* — on a single grid is not just wrongheaded, it is deeply dangerous.

In a blizzard, nuclear reactors are really handy. For decades, anti-nuclear activists have thrown out the tired trope that nuclear reactors are "an expensive way to boil water." But here's the reality, during a blizzard, and periods of prolonged sub-freezing weather, our society needs lots of boiling water and steam to drive electricity generators. Why? Because those are the times when other forms of generation, including renewables, natural gas, and coal, all have trouble producing power. Indeed, that fact can be vividly seen during the depths of the electricity crisis in Texas. On February 16th, Wade Schauer, the research director, North America power and renewables at the consultancy, Wood Mackenzie, published a chart on Twitter which showed that even at its lowest output, the state's nuclear plants were still producing at about 73% of their rated capacity. By contrast, solar's lowest output was 0%, wind's was 2%, hydro's was 18%, natural gas's was 53%, and coal's was 56%.

Finally, of course, wind energy deserves blame. The oldest maxim in politics is: follow the money. Over the past two decades, the overwhelming majority of electricity-related spending in Texas went to wind and solar. The companies that installed all those wind turbines and solar panels collected enormous sums for doing so. In 2019, Bill Peacock of the Texas Public Policy Foundation estimated the "total cost to taxpayers and consumers of subsidies going to renewable energy operators in Texas from 2006 to 2029 to be $36 billion." For comparison, the final cost of the South Texas Project, the twin reactor nuclear plant in Bay City was about $12.5 billion.

To be sure, the spin – and there was an avalanche of it — in the immediate wake of the blackouts, in big media outlets and on Twitter, was that wind was not to blame because it was "expected to make up only a fraction" of what the state needed during the winter. But all these excuses underscore the essence of the problem: if wind and solar can provide so little power during times of peak demand, and particularly during moments when the grid is on the verge of collapse, why are we spending so much money on it?

There's more, a lot more, to write about the Texas Blackouts. In my next columns, I will be looking at several issues including deregulation, resilience, and natural gas.

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