

## How to Keep the Lights On

### Nine principles for electrical grid reliability

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A reliable electrical grid is essential to all aspects of daily life. Power keeps the lights on, appliances running, and keeps our homes warm on cold days and cool on hot ones. Americans have rightfully come to expect reliable electricity and the grid has made this possible. Yet some legislators are valuing other goals above maintaining reliability. Predictably, reliability has begun to suffer.

Legislators at all levels of government should respect the nine principles for electrical grid soundness identified in this paper. In so doing, they will be helping to ensure the long-term efficacy of all parts of the American Bulk Power System.<sup>1</sup> This system is comprised of the three separate interconnections in the US: the Western, Eastern, and Texas interconnections.<sup>2</sup>

Avoiding blackouts and other reliability issues should be the highest priority of lawmakers when it comes to electricity because the human cost of blackouts is incredibly high. Electricity is needed for almost every facet of our lives. Indeed, modern life would not be possible without it. Policymakers should be cognizant of the fact that the stakes are high.

#### 1. Reliability should be the primary concern of electricity policy, with cost as a close second.

Reliability can be a matter of life and death and should be treated as such. Blackouts have a range of consequences, from late starts at work and food in the fridge at one end of the spectrum and deaths from cold or heat at the other end. The Texas blackout in 2021 resulted in 246 deaths. The majority of those froze to death for lack of power.<sup>3</sup> Power outages<sup>4</sup> cost billions of dollars annually. The Department of Energy (DOE) estimating the yearly cost at \$150 billion.<sup>5</sup>

Prices should be the second most important concern. Higher prices make it more difficult for people to keep their homes warm and cool, and price increases hit the elderly and poor the hardest. A 2024 study published in the Proceedings of the National Academy of Sciences found that, “the elderly, especially the low-income elderly, have



a higher total energy cost burden rate.”<sup>6</sup> Electricity prices are a major piece of the overall energy price pie, and constraining these costs should be an important aim for policymakers.

<sup>1</sup> “U.S. Grid Regions,” Environmental Protection Agency, accessed April 12, 2024, <https://www.epa.gov/green-power-markets/us-grid-regions>.

<sup>2</sup> Within these larger interconnections, a variety of grid operators manage smaller regions, with the exception of the Texas Interconnection which covers most of the state and is managed entirely by the Electric Reliability Council of Texas (ERCOT).

<sup>3</sup> Jaclyn Diaz, “Texas officials put the final death toll from last year’s winter storm at 246,” NPR, January 3, 2022, <https://www.npr.org/2022/01/03/1069974416/texas-winter-storm-final-death-toll>.

<sup>4</sup> Blackouts are longer and more widespread power outages, so this definition includes more than just major blackouts.

<sup>5</sup> “Department of Energy Report Explores U.S. Advanced Small Modular Reactors to Boost Grid Resiliency,” Department of Energy, accessed April 3, 2024, <https://www.energy.gov/ne/articles/department-energy-report-explores-us-advanced-small-modular-reactors-boost-grid>.

<sup>6</sup> Peipei Tian, Kuishuang Feng, et al. “Higher total energy costs strain the elderly, especially low-income, across 31 developed countries,” Proceedings of the National Academy of Sciences (January 2024), <https://www.pnas.org/doi/10.1073/pnas.2306771121#data-availability>.

## 2. Backup generation should be properly valued.

Currently, the power plants that are able to ramp up and down quickly to match demand, known as “peaker plants,” are utilized to fill the gaps when intermittent wind and solar inevitably (and suddenly) go offline. These plants are primarily natural gas plants. Peaker plants provide an essential function to the grid by meeting demand when other facilities are unable. As wind and solar penetration grows, the need for this backup power increases and peaker plants must ramp up and down more frequently to compensate for the weaknesses of intermittent sources. Peaker plants that provide required back-up electricity generation are invaluable, yet existing policy fails to acknowledge the benefit that these facilities provide to the grid.

Some state policies are actually trying to get rid of these plants. For example, the state of New York finalized a rule that sought the closure of 1,500 MW of natural gas peaker plant capacity by 2025 in order to reduce nitrogen oxide emissions,<sup>7</sup> a deadline that the state is now struggling to comply with.<sup>8</sup> The rule failed to take into account the essential role that these facilities play. The state government was forced to backtrack to maintain reliability.

## 3. Lawmakers should reject energy subsidies and certainly not pick winners and losers.

Energy subsidies are ubiquitous and incredibly damaging to grid reliability. The most subsidized sources tend to be those that are more, rather than less, demanding on the grid: intermittent wind and solar. In 2022, wind and solar received more than \$15.5 billion in federal government subsidies.<sup>9</sup> Other sources received a fraction of these subsidies, with \$873 million going to coal, \$2.3 billion going to natural gas and petroleum liquids, and \$390 million going to nuclear.<sup>10</sup> The disparity is actually far worse when taking into consideration the money going to sources as measured in terms of electricity generation. Wind and solar together produced less than 15 percent of US electricity in 2022 despite consuming the lion’s share

of the subsidies.<sup>11</sup> This huge disparity undermines energy markets in general and electricity markets in particular.

The main wind and solar subsidies are the Production Tax Credit (PTC)<sup>12</sup> and Investment Tax Credit (ITC).<sup>13</sup> The Inflation Reduction Act (IRA) extended both of these tax credits. The PTC is a tax credit for companies that produce wind or solar for every kilowatt-hour that they produce, while the ITC is a tax credit for a percentage of the cost of wind and solar projects.

Wind and solar receive so much in terms of subsidies and credits that the total amount is sometimes greater than the costs to operate these facilities.<sup>14</sup> This creates a skewed set of incentives around price for wind and solar producers compared to other energy sources and makes it difficult for more reliable sources to compete on price. When price signals no longer function properly, it is hard for the owners of other types of electricity generation to make investment decisions that will provide the necessary capacity down the line.<sup>15</sup>

## 4. Government should not dictate the electricity mix.

This principle is slightly, but meaningfully distinct from the problem with subsidies. Subsidies distort the market, but other prescriptive policies go a step further to require specific grid composition.

State renewable portfolio standards require a certain percentage of the power on the grid to come from specific renewable sources within specified time periods. Those sources are outlined in each state law. These policies do not set out to improve the grid or ensure reliability.

This is exactly the wrong way to organize the grid. Which sources are used by a given utility should be determined by economic viability and reliability of power provided, not to comply with an artificial requirement set by a government to achieve objectives that have little to nothing to do with meeting the needs of electricity users.

<sup>7</sup> Energy by 5, “NY’s Peaking Plant Problem,” Energy by 5, November 28, 2023, <https://www.energyby5.com/new-york-peaker-rule-reliability#:~:text=Combustion%20turbines%20known%20as%20%E2%80%9Cpeakers,comply%20with%20the%20emissions%20requirements>.

<sup>8</sup> New York Independent System Operator, “NYISO Identifies Solution to Solve New York City Reliability Need” press release, November 20, 2023, <https://www.nyiso.com/-/press-release-%7C-nyiso-identifies-solution-to-solve-new-york-city-reliability-need#:~:text=The%20DEC's%20peaker%20rule%20allows,the%20reliability%20need%20is%20expected>.

<sup>9</sup> Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy in Fiscal Years 2016–2022*, August 2023 <https://www.eia.gov/analysis/requests/subsidy/pdf/subsidy.pdf>.

<sup>10</sup> Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy in Fiscal Years 2016–2022*, August 2023 <https://www.eia.gov/analysis/requests/subsidy/pdf/subsidy.pdf>.

<sup>11</sup> “Electricity explained,” Energy Information Administration, accessed April 20, 2024, <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php#:~:text=In%202022%2C%20about%2060%25%20of,was%20from%20renewable%20energy%20sources>.

<sup>12</sup> “Production Tax Credit and Investment Tax Credit for Wind Energy,” Department of Energy Office of Energy Efficiency and Renewable Energy, accessed April 19, 2024, <https://windexchange.energy.gov/projects/tax-credits>.

<sup>13</sup> “Federal Solar Tax Credits for Businesses,” Department of Energy Office of Energy Efficiency & Renewable Energy, accessed April 19, 2024, [https://www.energy.gov/eere/solar/federal-solar-tax-credits-businesses#:~:text=The%20production%20tax%20credit%20\(PTC,is%20adjusted%20annually%20for%20inflation](https://www.energy.gov/eere/solar/federal-solar-tax-credits-businesses#:~:text=The%20production%20tax%20credit%20(PTC,is%20adjusted%20annually%20for%20inflation).

<sup>14</sup> Frank Huntowski, Aaron Patterson, and Michael Schnitzer, *Negative Electricity Prices and the Production Tax Credit* (The Northbridge Group) [https://www.edleaver.com/Archives/2013/06/pdf/NegativeElectricityPricesAndPTC\\_exelon.pdf](https://www.edleaver.com/Archives/2013/06/pdf/NegativeElectricityPricesAndPTC_exelon.pdf).

<sup>15</sup> Raymond L. Gifford and Matthew S. Larson, “FERC’s Christie raises issues that need raising about the RTO state of mind,” Utility Dive, September 13, 2023, <https://www.utilitydive.com/news/electricity-market-constructs-rto-iso-ferc-christie/692882/>.

The goal of many of the policies that endanger reliability is ostensibly a reduction in greenhouse gas emissions. According to a 2022 report by the Heritage Foundation, “Eliminating all U.S. emissions would reduce global temperatures by less than 0.2 degrees Celsius by 2100—wrecking the economy for a negligible climate benefit.”<sup>16</sup>

These policies place undue burdens on reliability for little to no actual benefit. Policies that prize emissions reductions over other, more immediate issues do not properly recognize that it is generally all pain and no gain. They do not consider the tradeoffs that include impacts on the poor and elderly, the threat of blackouts, and making everyday life more expensive.<sup>17</sup>

## 5. Government policy should not impede the movement of fuels needed for electricity production.

Natural gas is needed for baseload power and to consistently ramp up and down plants to accommodate intermittent sources. It is important that policymakers limit the barriers to the movement of natural gas, both through pipelines, and when it is moved by ship as Liquefied Natural Gas (LNG) so that it is reliably available, especially in the winter months.

There are two issues of particular concern. First, permitting new pipeline capacity is essential to maintaining the just-in-time supply of natural gas to power plants, especially in the winter when there are also home heating demands on the same supply of gas. Home heating receives priority over power plants for gas supplies, so ensuring there is adequate supply of natural gas for all uses is crucial to maintaining the output of natural gas-fired power plants.

Second, the Jones Act imposes limitations on natural gas supplies for power plants due to shipping restrictions. This law limits the movement of goods between US ports to those that are compliant with its US -owned, -built, -crewed, and -registered requirements. There are no Jones act compliant LNG tankers, so the Jones Act is incredibly

onerous for LNG, essentially preventing the movement of LNG between US ports.<sup>18</sup>

Reforming pipeline permitting and the Jones act to allow freer movement of natural gas supplies would ease these limitations and help make gas supplies more reliable thereby helping the grid.

## 6. Agencies should consider the threats their rules pose to reliability.

Rulemakings like the Environmental Protection Agency’s (EPA) new power plant rule would have serious implications for grid reliability. The power plant rule would force the bulk of coal and natural gas fired power plants off the grid by the 2030s if certain requirements are not met.<sup>19</sup> In this and other energy rulemakings, agencies are not taking these threats seriously and are oftentimes not accurately factoring them in during the rulemaking process.<sup>20</sup>

In comments submitted on the proposed rule, a group of regional transmission organizations (RTOs) said that, “...proceeding with these requirements could place the reliability of the electric grid in jeopardy. In short, hope is not an acceptable strategy.” This statement shows how seriously they are taking the threat posed by this rule that would endanger reliability. Although this comes from comments on the proposed rule, the final rule has many of the same problems.

Despite some concerns expressed for reliability throughout the rulemaking process, the cost of blackouts is not properly considered in the final rule. After the final rule was issued, Jim Matteson, the CEO of the National Rural Electric Cooperative Association, warned, “The path outlined by the EPA is unlawful, unrealistic and unachievable,” and went on to point out that it “undermines electric reliability and poses grave consequences for an already stressed electric grid.”<sup>21</sup> This rule is a prime example of the grave issues that that administrative agencies can create for reliability.

<sup>16</sup> Kevin Dayaratna, Katie Tubb and David Kreutzer, “The Unsustainable Costs of President Biden’s Climate Agenda”, The Heritage Foundation, June 16, 2022, <https://www.heritage.org/energy-economics/report/the-unsustainable-costs-president-bidens-climate-agenda>.

<sup>17</sup> Alexander Stevens, “States With Aggressive Renewable Portfolio Standards Will Continue to Face Rising Prices and Reliability Problems”, The Institute for Energy Research, August 25, 2023, <https://www.instituteforenergyresearch.org/renewable/states-with-aggressive-renewable-portfolio-standards-will-continue-to-face-rising-prices-and-reliability-problems/>.

<sup>18</sup> Paige Lambermont, “New LNG Ruling Makes Jones Act Even More Unreasonable,” Catalyst, January 3, 2024, <https://catalyst.independent.org/2024/01/03/lng-ruling-jones-act/>.

<sup>19</sup> Marlo Lewis, Jr., “EPA’s new powerplant rule is the Clean Power Plan on steroids,” OpenMarket (blog), Competitive Enterprise Institute, April, 26, 2024, <https://cei.org/blog/epas-new-powerplant-rule-is-the-clean-power-plan-on-steroids/>.

<sup>20</sup> Paige Lambermont, “The Problem With the Power Plant Rule,” Catalyst, September 26, 2023, <https://catalyst.independent.org/2023/09/26/power-plant-rule-problem/>.

<sup>21</sup> Molly Christian, “‘Unlawful, Unrealistic, Unachievable’: EPA Releases ‘Barrage’ of Power Plant Rules,” NRECA, April 26, 2024, <https://www.electric.coop/unlawful-unrealistic-unachievable-epa-releases-barrage-of-power-plant-rules#:~:text=%E2%80%9CThe%20path%20outlined%20by%20the,an%20already%20stressed%20electric%20grid.%E2%80%9D>.

## 7. Reliable baseload generation should not be forced off the grid.

Some rulemakings, including the EPA power plant rule, directly or indirectly force reliable generation off the grid in the name of reducing emissions. This is a nonsensical approach to grid reliability.<sup>22</sup>

Baseload capacity consists of reliable power plants with consistent and predictable output that operate nearly continuously to supply the minimum requirements of the grid. Other facilities come on and offline as demand changes, or as their own intermittency plays out, but baseload quietly produces in the background as these changes take place. These facilities consist of nuclear, coal, hydropower dams, and combined cycle gas plants (when they are not cycled up and down to meet demand).<sup>23</sup>

Existing reliable capacity is essential to overall reliability, and early closures of any kind can make it harder for utilities to consistently meet demand. This is similarly true for politically driven premature closures of nuclear power plants. The closure of the Indian Point Nuclear Power plant in New York several years ago is a prime example of this phenomenon.<sup>24</sup> Nuclear closures take thousands of megawatts of reliable baseload generation off the grid permanently. Nuclear plants can operate safely for up to 80 years. Keeping a plant with such a long operating life online is generally far more affordable than replacing its output with something new.

In addition to cost savings, there are also reliability benefits to keeping reliable thermal units online. These are units that use heat energy to generate electricity and generally have a predictable output. Keeping them on the grid for as long as reasonably possible is highly beneficial to overall reliability.

## 8. Transmission investments should not be used to cover for flawed policies that hurt reliability.

Policymakers are now seeking to cover reliability failures through investment in transmission, rather than making individual grids more reliable. Recently, some legislators introduced the Big Wires Act in the House and Senate that would encourage or mandate the buildout of additional transmission infrastructure.<sup>25</sup> One of the bill sponsors, Sen. Gary Peters (D-MI) said that, “BIG WIRES will help get clean, reliable energy from where it is produced to where it is used by people, but above all else, it is an American energy security and independence bill.”<sup>26</sup> The issue with the focus on the addition of “clean” power here is that the clean power in question is often intermittent wind and solar.

Specifically, the legislation would require all FERC transmission planning regions to be able to transfer at least 30 percent of their peak load to adjacent regions. The problem with this type of policy is that it externalizes the costs of poor planning to neighbors and reduces incentives to create reliable production.

## 9. Policymakers should critically address the causes of blackouts.

Recurring blackouts, especially in places like Texas and California, have been national headline news in recent years. Policymakers should be providing oversight and examining the root causes of these incidences. But in the immediate aftermath of blackouts, the narrative is heavy on pointing fingers, and light on offering real solutions. Often, lawmakers do not properly identify real problems. After the news cycle blows over, little or nothing is done to address the problems that led to the situation in the first place. The grid that was under strain remains vulnerable to the next weather event or demand spike.

This is an imprudent way to address these types of issues that are often the result of bad policy choices. Legislators should address reliability issues for any grid that is struggling to meet demand. They should be even more concerned in situations like what was seen in the 2021 Texas blackout where thousands were without power, and hundreds of deaths occurred.<sup>27</sup>

<sup>22</sup> “Final Rule - National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review” Environmental Protection Agency, accessed April 28 2024, <https://www.epa.gov/stationary-sources-air-pollution/final-rule-national-emission-standards-hazardous-air-pollutants-0>.

<sup>23</sup> “Glossary,” Energy Information Administration, accessed April 28<sup>th</sup>, 2024, <https://www.eia.gov/tools/glossary/?id=B>.

<sup>24</sup> Paige Lambermont, “New York Was Wrong to Close the Indian Point Plant,” Catalyst, June 20, 2022, <https://catalyst.independent.org/2022/06/20/new-york-indian-point/>.

<sup>25</sup> Office of Representative Scott Peters, “Rep. Peters, Sen. Hickenlooper Introduce BIG WIRES Act to Reform Permitting, Lower Energy Costs,” press release, September 15, 2023, <https://scottpeters.house.gov/2023/9/rep-peters-sen-hickenlooper-introduce-big-wires-act-to-reform-permitting-lower-energy-costs>.

<sup>26</sup> Office of Senator John Hickenlooper, “Hickenlooper, Peters Introduce BIG WIRES Act to Reform Permitting, Lower Energy Costs,” press release, September 15, 2023, [https://www.hickenlooper.senate.gov/press\\_releases/hickenlooper-peters-introduce-big-wires-act-to-reform-permitting-lower-energy-costs/](https://www.hickenlooper.senate.gov/press_releases/hickenlooper-peters-introduce-big-wires-act-to-reform-permitting-lower-energy-costs/).

<sup>27</sup> Office of Senator John Hickenlooper, “Hickenlooper-Peters BIG WIRES Act Would Speed Permitting Reform, Simplify Grid Upgrades,” press release, May 25, 2023, [https://www.hickenlooper.senate.gov/press\\_releases/hickenlooper-peters-big-wires-act-would-speed-permitting-reform-simplify-grid-upgrades/](https://www.hickenlooper.senate.gov/press_releases/hickenlooper-peters-big-wires-act-would-speed-permitting-reform-simplify-grid-upgrades/).



## Conclusion

Grid reliability or unreliability comes down in most cases to the political decisions that affect how the grid is structured, and what resources it uses. Legislators and regulators should keep their outsized impact in mind and prioritize reliability and cost. Reliable electricity is something that Americans have rightfully come to expect as an essential part of their everyday lives. Anything that endangers reliability is unacceptable.

The decades of reliability that the American Bulk Power System has experienced is due to an overwhelming presence of reliable thermal generators on the grid. They provide the necessary reliability and predictability to keep the grid running smoothly. Policies that undermine reliability ignore the work that goes in to keeping the grid reliable, and assume reliability as a default state.

Some policymakers may want to meddle in energy markets. The consequences of such actions can be disastrous and should be avoided. They ignore reliability at the peril of their constituents and of all Americans.

## About the author

Paige Lambermont is a research fellow in the Center for Energy and Environment at the Competitive Enterprise Institute where her writing focuses on electrical grid and nuclear power policy. She is also a Catalyst policy fellow at the Independent Institute, a fellow at Roots of Progress, and a visiting fellow at the Independent Women's Forum. She has a Bachelor's degree in political science from American University, and a Master's degree in public administration from the University of Idaho.

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