



# MEETING GROWING ELECTRICITY DEMAND WITHOUT GAS

A Brief for Utility Regulators

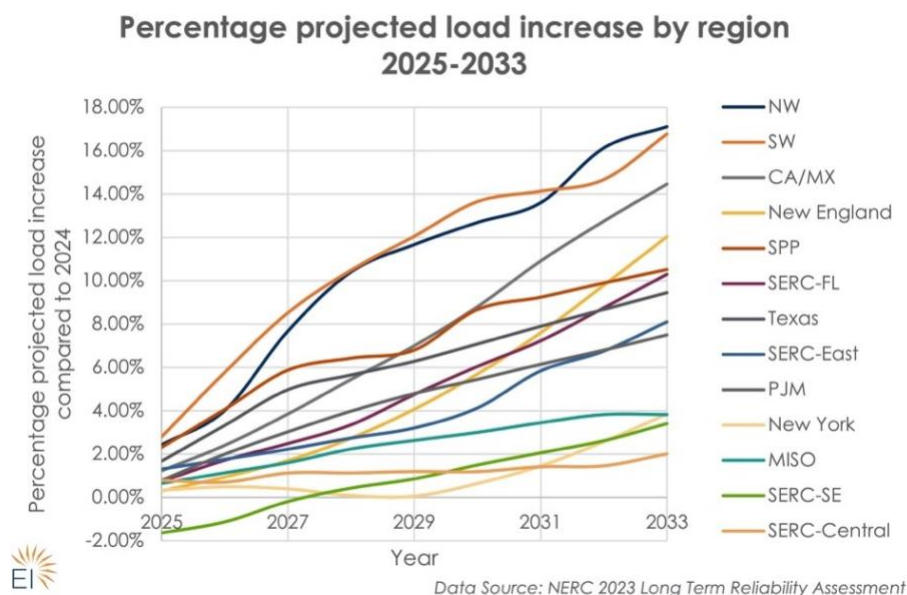
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After 15 years of stagnation, new electricity demands from factories, data centers, and electric vehicles are pushing the utility industry to grow again. To serve rising electricity demand and meet the challenge of cleaning up our economy, utilities have a broad range of options to consider. In several “hotspots” for demand growth, an increasing number of utilities are turning to gas plants as the default solution to unexpected growth. But new gas plants come with considerable risks—to resilience, fuel market stability, human health, future carbon regulation, utility net-zero goals, and state policy goals. In this brief, we review viable near-term solutions to meet the demand growth challenge without making risky investments in fossil fuel infrastructure. We discuss utility roles and regulatory responses in implementing modern solutions to meet growing demand and conclude by laying out questions regulators should ask to investigate alternatives to near-term expansions of gas capacity.

## HOW BIG IS THE PROBLEM, NOW AND IN THE FUTURE?

In December 2023, the power sector consulting firm Grid Strategies published a report called “The Era of Flat Power Demand is Over,” which pointed out that United States grid planners—utilities and regional transmission operators (RTOs)—had nearly doubled growth projections in their five-year demand forecasts.<sup>1</sup> So far, this new demand growth has appeared mostly in hot spots with diverse drivers: new manufacturing in Georgia and Arizona, new data centers in North Carolina and Virginia, crypto-mining and liquefied natural gas export terminals in Texas, electric vehicles in California, etc.

On a regional and national scale, it is becoming clear that for various reasons, demand growth is here to stay. The North American Reliability Corporation aggregates utility demand



forecasts into its long-term reliability assessment and found that utilities are projecting demand to grow 2-15 percent over the next 10 years. However, this forecast, which was published in December, may not reflect the latest uptick in demand from utilities. The exact pace of the growth in the near term remains uncertain, particularly with the addition of factories and data centers. Therefore, short-term investments by utilities should prioritize low-regrets, flexible options that avoid locking in expensive and potentially stranded assets. However, many utilities are moving instead to invest in new gas-fired power generation.

For example, Georgia Power's 2023 Integrated Resource Plan (IRP) update projects that peak winter demand will grow 37 percent by 2031 and calls for 1,400 megawatts (MW) of new gas by winter of 2026-2027.<sup>2</sup> Duke Energy's draft IRP from fall 2023 includes 1,700 MW of new demand growth since its spring IRP, and calls for an additional 2,700 MW of new combined cycle gas plants, raising its total to 8,900 MW of additional planned new gas by 2035. This move toward new gas is not ubiquitous, however, and the regions with the largest projected growth by

## EPA'S POWER PLANT RULES & RELIABILITY

In May 2023, the U.S. Environmental Protection Agency (EPA) issued draft rules limiting CO<sub>2</sub> emissions from power plants, including new gas plants. These rules would require gas plants running more than 20 percent of the year to install CO<sub>2</sub> capture or burn clean hydrogen but would only require efficiency standards for new low-capacity-factor plants.

Grid operators and utilities have pushed the EPA to relax these regulations, citing reliability concerns around load growth's collision with limitations on gas and faster coal retirements. Energy Innovation's previous analysis found utilities can maintain reliability under these standards using existing technology. The alternatives explored in this brief show utilities have a range of options to bolster resource adequacy in the near term, while they invest in new supply to comply with the EPA's proposed rule over the coming decade.

See generally O'Boyle et al., "Maintaining a Reliable Grid Under EPA's Proposed 111 Rules Restricting Power Plant Emissions" (Energy Innovation, November 2023), <https://energyinnovation.org/wp-content/uploads/2023/11/Maintaining-a-Reliable-Grid-Under-EPAs-Proposed-111-Rules.pdf>.

percentage—the Northwest, the Southwest, and California—are notably not moving to add gas to their resource plans.

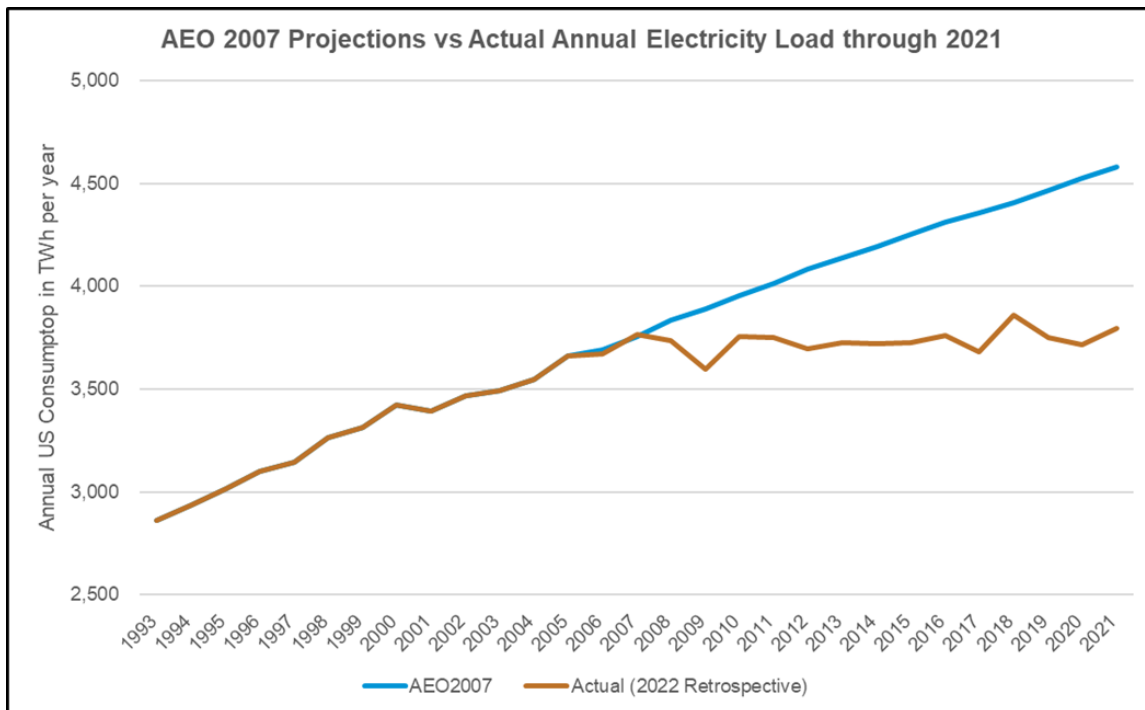
It is important for policymakers, especially the public utility commissioners who will need to approve these additions, to remain skeptical of plans to add new gas. New gas plants represent large investments that utilities will be locked into for decades to come. This means that as the clean electricity transition accelerates, these plants could become stranded assets, with costs ultimately falling to electricity customers. Here, regulators can learn from historical mistakes—in the early 2000s, another data center boom drove up future electricity demand projections, and a wave of new coal plants was planned. That electricity demand ultimately failed to appear, largely due to measures like energy efficiency, and some coal plants that did come online—like Comanche in Colorado, which required more than \$1 billion in investment—are planning early retirement.<sup>3</sup> Today, demand growth is not a mirage, but a panicked rush toward new gas capacity is not the appropriate response to the challenge—better near- and long-term solutions exist and should be deployed first. Luckily, solutions exist for policymakers, consumers, industries, and utilities to meet this challenge.

## MEETING THE CHALLENGE

We recommend centering two solutions to demand growth beyond gas plant additions or fossil retirement delays: (1) prioritize resource efficiency and (2) elevate short turnaround resource and market solutions to bolster resource adequacy.

### RESOURCE EFFICIENCY

Efficiency was a primary cause of flat demand after 2008 and could be a major factor in mitigating the pressure that new demand growth puts on the electrical grid. In 2007, the Energy Information Administration (EIA) predicted steady 1.5 percent annual electricity demand growth—a 21 percent increase over 15 years. The growth pause of these last 15 years, a whopping 785 terawatt-hours (TWh) of “missing” demand, wasn’t an accident. Energy efficiency was the largest contributor to avoiding this projected growth in the power sector and was brought about by three major factors: utility efficiency programs, federal and local building codes and appliance standards, and voluntary industry efforts.



Source: EIA Annual Electricity Outlook, 2007

According to the American Council for an Energy-Efficient Economy (ACEEE), between 2006 and 2021 **utility efficiency programs** decreased annual demand for electricity by roughly 220 TWh per year, accounting for almost one-third of projected demand growth. Unfortunately, since 2019 annual spending on the programs has declined.<sup>4</sup> And while 15 states are leveraging utility efficiency programs to reduce annual energy consumption 1-2 percent, leading to high marks on the 2022 ACEEE State Efficiency Scorecard, utility programs in the demand growth and gas proposal hotspots of North Carolina, South Carolina, Georgia, Virginia, and Tennessee have room for improvement, saving only 0.64 percent, 0.36 percent, 0.20 percent, 0.15 percent, and 0.01 percent, respectively.<sup>5</sup> Thankfully, utility efficiency programs are now common, and these states have diverse models to emulate right away to fit their specific economic circumstances.

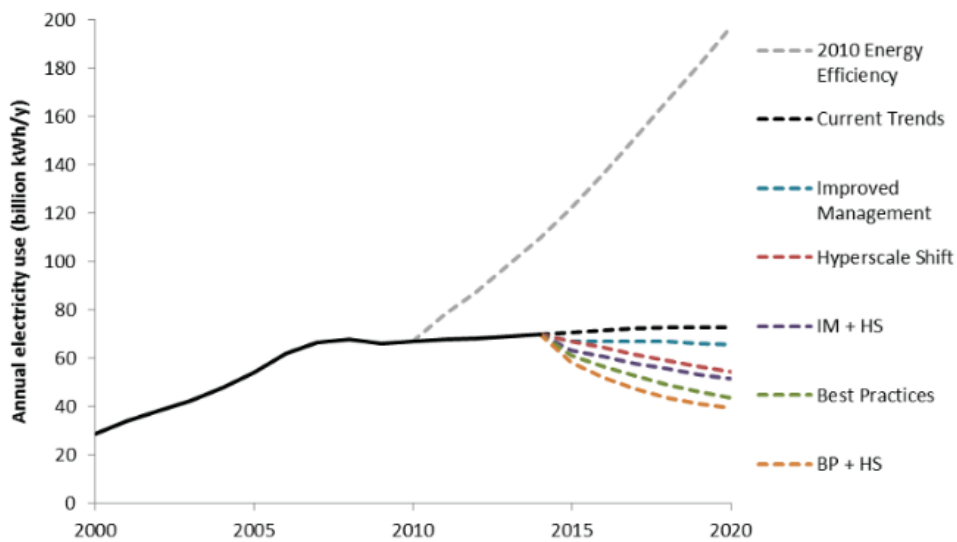
**Standards** also played a big role in the demand pause. In December 2009, the Edison Foundation published a report titled “Assessment of Electricity Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes (2010 - 2020),”<sup>6</sup> which looked at the impacts of federal legislation<sup>7</sup> as well as state implementation of model building codes.<sup>8</sup> The report estimated that implementing codes and standards would reduce annual electricity demand from 2010 to 2020 by 104-293 TWh relative to the EIA Annual Energy Outlook baseline forecast. A 2017 report from ACEEE partially validated this projection, finding that federal appliance standards alone reduced electricity use by 21 percent in 2015.<sup>9</sup> ACEEE research projects that there’s room for continued improvement, as the U.S.

Department of Energy can reduce peak demand 90 gigawatts (GW) by 2050 by updating those standards.<sup>10</sup>

**Voluntary industry efforts** motivated by sustainability goals and economics are the third opportunity to slow demand growth, giving utilities and regulators reason to be skeptical that manufacturing and data center demand growth will be as high as projected, or that new facilities will be willing to invest in utilities that plan to add polluting energy sources. Data centers are prime examples of how voluntary efforts can lead to less demand growth than anticipated. A 2007 EIA study projected that data center use would double in a decade, extrapolating current practices to future demands for data processing.<sup>11</sup> In reality, demand remained flat over that time, and a subsequent 2016 Lawrence Berkeley National Lab report demonstrated how energy efficiency gains blunted the growth of data center electricity demand from 2009 to 2016.<sup>12</sup> While the data and power demands driven by the current artificial intelligence boom may be different in kind and degree than those from data centers in the 2010s, industry incentives remain to find innovative ways to reduce energy consumption associated with these behemoth processing centers.

**Figure 3 – Data center energy use plateaued from 2009-2015 due to efficiency gains<sup>13</sup>**

The resulting electricity demand, shown in Figure ES-1, indicates that more than 600 additional billion kWh would have been required across the decade.



**Figure ES-1 Projected Data Center Total Electricity Use**

Meanwhile, large customers are opposing utility plans to add gas to meet their energy demands. Google and Microsoft have goals to meet their own energy demand with carbon-free energy matched “24/7” to their power demand, by 2030. Other tech giants

have similar carbon-free goals on similar timelines. The Clean Energy Buyers Association offered the following testimony to the Georgia Public Utilities Commission in response to Georgia Power's request to add more gas capacity: "Georgia Power's proposals to add more fossil fuel resources into its resource mix in this docket send the wrong message to the business community and large customers evaluating Georgia as a place to do business." Whether data centers are willing to hold utilities truly accountable for their demands remains to be seen, but they can be partners in seeking alternative solutions.

## TECHNOLOGY AND MARKET SOLUTIONS TO BOLSTER RESOURCE ADEQUACY

Proposing new gas plants to serve growing demand does not occur in isolation; it is a decision that implicitly rejects alternatives as either infeasible, expensive, or unconsidered. Adding clean energy to keep up with demand and falling costs has been hard, especially with recent inflation,<sup>14</sup> supply chain snags, and growing efforts to adopt local regulations that outlaw wind and solar.<sup>15</sup> New transmission infrastructure faces similar barriers. But gas is not the only or best answer in the near term. Utilities and their regulators should examine a wider portfolio of solutions that are lower risk and more compatible with utility and state climate goals and customer preferences.

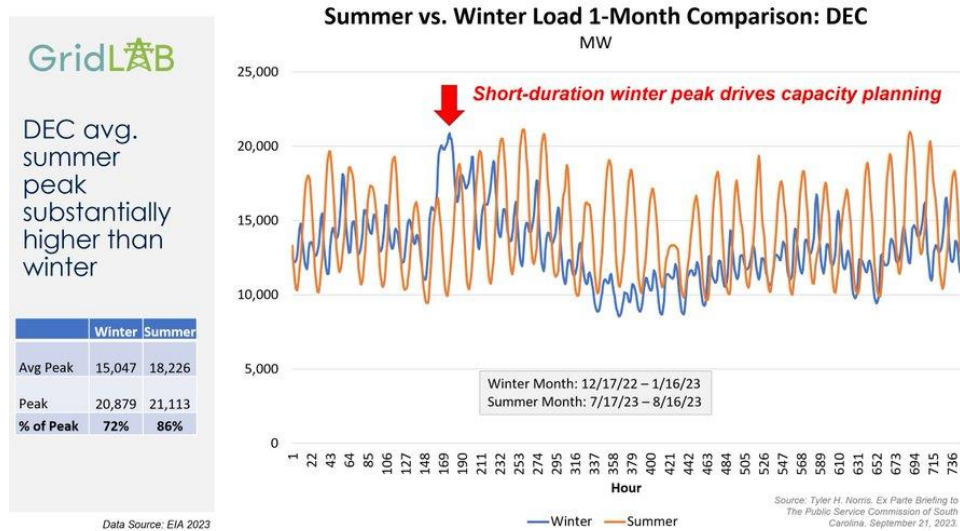
Solutions that have the potential to bolster resource adequacy in the short-term fall into five buckets:

1. **Build renewables and storage where you can.** Even though interconnection queues are clogged, there remain plenty of places to connect renewables to the grid that reuse existing interconnection infrastructure, starting with the sites of retiring coal plants. While regions implement Federal Energy Regulatory Commission reforms like Order 2023, utilities and RTOs can take a proactive approach to identify and prioritize reuse of these sites. RMI research indicates there are 250 GW of clean energy projects that could leverage existing or retiring fossil interconnection rights to connect to the grid, with the greatest opportunities in the Southeast.<sup>16</sup> Projects under development can also add storage to bolster peak reliability value, as demonstrated in a recent contract for solar-plus-storage that quadrupled the storage amount in response to growing demand.<sup>17</sup> After a brief inflationary period, battery storage costs fell in 2023 to all-time lows.<sup>18</sup>
2. **Generate closer to demand.** Distributed solar photovoltaics reduced U.S. demand by 62 TWh per year from 2014 to 2022,<sup>19</sup> but deployment is uneven across states and regions. Reducing obstacles and increasing support for these resources, including with storage, could take a bite out of demand growth and peak growth. Additionally, large customer requests to interconnect should be paired with opportunities for these customers to add resources onsite and offer demand flexibility to offset the need for additional peak capacity, if possible. The

same goes for existing customers. For example, a steel mill in Pueblo, Colorado structured a deal for 300 megawatts of solar partnership with Xcel Energy. The project broke ground in 2022 and will create what the mill CEO billed “the most green steel facility in North America, and maybe the world.”<sup>20</sup>

3. **Work with big customers to flex demand.** While large new customers add to demand throughout the year, the push for new gas capacity, especially so-called “peaker” units, is often responding to the relatively few hours per year when the grid is stressed. For example, in South Carolina, projections for short-duration winter shortfalls in capacity are driving calls for new gas.<sup>21</sup> These short-duration peaks are well suited to demand response—an event during which a customer voluntarily reduces consumption, mirroring the impact of turning up power production. Google, one of the large drivers of new data demand, said in 2023 that it “developed and piloted a new way to reduce [its] data centers’ electricity consumption when there is high stress on the local power grid, by shifting some non-urgent compute tasks to other times and locations, without impacting . . . Google services.”<sup>22</sup> This included applications in Oregon, Nebraska, and the Southeast. Demand response is a big opportunity for utilities to work with large energy users to see whether innovative demand management practices can avoid the need for some or all new peak gas capacity, which would better align with corporate goals.

**Figure 4 – short peaks drive winter capacity shortfalls in the Southeast.<sup>23</sup>**



4. **Improve use of existing power infrastructure.** Expanding transmission capacity is another way to expedite more low-cost resources and to access resources from neighboring utilities or regions. While new transmission can



take 5-15 years to develop, grid-enhancing technologies like dynamic line rating, power flow controllers, and storage devices can be installed in a matter of months at a fraction of the incremental cost. Reconductoring existing lines with advanced conductors can nearly double transmission capacity and come online in one to three years.<sup>24</sup> Each is widely commercialized. Utilities can leverage these technologies to open the market for additional resources in the near term while new transmission projects develop apace.

5. **Strengthen regional and interregional coordination on resource adequacy.** When one utility falls short on capacity, it can lean on neighbors that may have some spare capacity, but only if arrangements exist for that real-time access. This efficiency is one major benefit of a regional market. While regions with an RTO are already coordinating on regional resource adequacy, non-RTO regions like the Southeast and West (where demand growth is also highest) still have big opportunities for more efficient use of capacity across the region. In this regard, the Western Resource Adequacy Program is a promising initiative, as are efforts to expand real-time markets in the West. The Southwestern Energy Exchange Market, by contrast, has yet to yield meaningful results, including failing to facilitate adequate regional transactions during Winter Storm Elliott.<sup>25</sup> Research from Energy Innovation and Vibrant Clean Energy found that sharing capacity between non-RTO states in the Southeast would yield more than \$10 billion in cost savings annually, revealing a region replete with spare capacity if utilities can figure out how to share it.

Demand growth isn't going anywhere. These near-term solutions can also scale with growing demand, and over a longer time span, additional solutions come into play. These include a continuous focus on deep efficiency, continued growth in cost-effective renewables and storage, cost-effective investment in high-voltage regional and interregional transmission, and support for emerging clean "firm" technologies like geothermal, long-duration storage, advanced nuclear, industrial thermal batteries, and future technologies.

## THE ROLE OF UTILITIES AND REGULATORS

Utilities and their regulators will play an important role in managing demand growth and accurately assessing demand projections. Utilities, especially vertically integrated for-profit entities, use capital expenditures within their monopoly business as their primary growth engine.<sup>26</sup> Engineers, who heavily influence planning decisions, also tend to adopt understandingly conservative, proven approaches to managing reliability. In addition, utilities may not have a profit incentive for solutions like distributed energy resources (including demand response and energy efficiency) that show up as reduced demand for their product. In some states, the electric utility is also the gas utility and can benefit from rate-basing new gas infrastructure. These

circumstances create incentives that can skew utility decisions toward well-worn solutions like gas plants and typically disincentivize regional coordination.

The combination of these incentives is apparent in Duke Energy's North Carolina IRP process. Duke has placed limits on the deployment of solar and storage resources in its modeling, effectively barring from regulator and consumer consideration these potentially cost-effective alternatives that might challenge engineers and planners to expand their solution set beyond what seems feasible today.<sup>27</sup> Meanwhile, Texas will add 6.4 GW to its grid in 2024, alone.<sup>28</sup> Ultimately, policymakers need to demand more from their utilities and be skeptical of the "usual suspect" solutions.

Here are some **key questions** policymakers should be asking of utilities proposing new gas plants:

- What is the potential for resource efficiency to meet some of this reliability and energy challenge? Could the utility demonstrate a strong effort on this front before spending money on gas assets that may become stranded, and that come with their own fuel price, supply chain, and reliability risks?
- In what ways can large new customers become partners in clean energy procurement and demand flexibility, obviating the need for new gas capacity? Have you brought these customers to the table to assess their willingness and ability to help?
- In what ways are existing transmission limitations binding your consideration of new technologies, especially non-fossil technologies and reliance on neighboring utilities for resource adequacy? Could grid-enhancing technologies, storage technologies, and reconductoring enable faster deployment of cleaner, more cost-effective alternatives to gas?
- Could distributed energy resources help cost-effectively reduce net energy demand and add flexibility to the system via storage and demand flexibility? Have you asked similar questions for some of your large new and existing customers, and assessed the costs and benefits of larger customer-sited resources?
- How can you leverage existing interconnection rights to boost capacity quickly, whether at existing power plants or retiring sites?
- What are your long-term plans to obviate the need to rely on gas and meet your own voluntary climate goals and, as applicable, state clean energy and electrification goals?
- How can we align regulatory incentives to reward you for investing in these short- and long-term solutions while still protecting customers from excessive investments?

## CONCLUSION

The uptick in electricity demand growth is a litmus test for whether the utility industry is ready to eschew legacy solutions in favor of cost-effective clean energy technologies that entail new approaches. Utility consumers and affected communities cannot afford for utilities to fail. And while each state and utility are unique, common solutions are readily available to all who face these challenges. Regulators should not fall for the fallacy that one needs to match every big new demand with a bespoke new generation resource. Policymakers must take an active and skeptical approach to harness the consumer and environmental benefits of clean energy and customer participation, or risk saddling customers with gas assets that will be around for a generation.

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<sup>1</sup> John D Wilson and Zach Zimmerman, “The Era of Flat Power Demand Is Over” (Grid Strategies, December 2023), <https://gridstrategiesllc.com/wp-content/uploads/2023/12/National-Load-Growth-Report-2023.pdf>.

<sup>2</sup> Georgia Power, “2023 Integrated Resource Plan Update,” October 2023, <https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/2023-irp-update-main-document.pdf>.

<sup>3</sup> Miguel Ortarola and Sam Brasch, “Xcel Has Reached a Deal to Close Its Controversial Coal-Fired Power Plant in Pueblo, Cutting Emissions,” *Colorado Public Radio*, November 24, 2021, <https://www.cpr.org/2021/11/24/xcel-reaches-deal-close-controversial-coal-fired-plant-pueblo-cutting-emissions/>.

<sup>4</sup> Sagarika Subramanian et al., “2022 State Energy Efficiency Scorecard” (American Council for an Energy Efficient Economy, December 2022), at p. 30 <https://www.aceee.org/sites/default/files/pdfs/u2206.pdf>.

<sup>5</sup> Subramanian et al. at p. 34.

<sup>6</sup> Ingrid Rohmund et al., “Assessment of Electricity Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes (2010 - 2020)” (The Edison Foundation & The Institute for Electric Efficiency, December 2009), [https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEE\\_RohmundApplianceStandardsEfficiencyCodes1209.pdf](https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEE_RohmundApplianceStandardsEfficiencyCodes1209.pdf).

<sup>7</sup>The Energy Policy Act of 2005 (EPACT 2005) and the Energy Independence and Security Act of 2007 (EISA 2007).

<sup>8</sup> IECC 2009 or ASHRAE 90.1 2007

<sup>9</sup> Andrew deLaksi and Joanna Mauer, “Energy-Saving States of America: How Every State Benefits from National Appliance Standards” (Appliance Standards Awareness Project & American Council for an Energy Efficient Economy, February 2017).

<sup>10</sup> Mauer, Joanna, and Andrew deLaski. “Fact Sheet: Biden’s Energy Department Could Slash Carbon Pollution, Energy Costs with Efficiency Standards.” American Council for an Energy-Efficient Economy, November 2020. <https://www.aceee.org/research-report/a2001>.

<sup>11</sup> “EPA Report to Congress on Server and Data Center Energy Efficiency” (Environmental Protection Agency, 2007), [https://www.energystar.gov/ia/partners/prod\\_development/downloads/EPA\\_Report\\_Exec\\_Summary\\_Final.pdf](https://www.energystar.gov/ia/partners/prod_development/downloads/EPA_Report_Exec_Summary_Final.pdf).

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<sup>12</sup> Arman Shehabi et al., “United States Data Center Energy Usage Report” (Lawrence Berkeley National Laboratory, June 1, 2016), <https://doi.org/10.2172/1372902>.

<sup>13</sup> Shehabi et al., Figure ES-1.

<sup>14</sup> Mike O’Boyle, Rachel Goldstein, and Solomon, “Tools for Energy Regulators to Manage Power Sector Inflation” (Energy Innovation, October 2023), <https://energyinnovation.org/wp-content/uploads/2023/10/Tools-for-Energy-Regulators-to-Manage-Power-Sector-Inflation-FINAL.pdf>.

<sup>15</sup> Elizabeth Weise and Suhail Bhat, “Across America, Clean Energy Plants Are Being Banned Faster than They’re Being Built,” *USA Today*, accessed March 27, 2024, <https://www.usatoday.com/story/news/investigations/2024/02/04/us-counties-ban-renewable-energy-plants/71841063007/>.

<sup>16</sup> Katie Siegner and Alex Engel, “Clean Repowering: A Near-Term, IRA-Powered Energy Transition Accelerant” (RMI, January 16, 2024), <https://rmi.org/clean-repowering-a-near-term-ira-powered-energy-transition-accelerant/>.

<sup>17</sup> Spector, “Utah Developer Quadruples Battery Storage to Meet New Electricity...,” *Canary Media*, March 18, 2024, <https://www.canarymedia.com/articles/batteries/utah-developer-quadruples-battery-storage-to-meet-new-electricity-demand>.

<sup>18</sup> “Lithium-Ion Battery Pack Prices Hit Record Low of \$139/kWh,” *BloombergNEF* (blog), November 26, 2023, <https://about.bnef.com/blog/lithium-ion-battery-pack-prices-hit-record-low-of-139-kwh/>.

<sup>19</sup> According to EIA data.

<sup>20</sup> “World’s Largest Solar-Powered Steel Mill Breaks Ground in Colorado,” *Construction Dive*, March 2, 2022, <https://www.constructiondive.com/news/worlds-largest-solar-powered-steel-mill-breaks-ground-in-colorado/619381/>.

<sup>21</sup> Tyler H Norris, “Status Update on Variable Renewable Electricity and Resource Adequacy: Ex Parte Briefing to The Public Service Commission of South Carolina” (Public Service Commission of South Carolina, September 21, 2023), <https://dms.psc.sc.gov/Attachments/Matter/ca573211-bb5f-4117-ac93-84f2c80e1619>.

<sup>22</sup> Varun Mehra and Raiden Hasegawa, “Using Demand Response to Reduce Data Center Power Consumption,” *Google Cloud* (blog), October 3, 2023, <https://cloud.google.com/blog/products/infrastructure/using-demand-response-to-reduce-data-center-power-consumption>.

<sup>23</sup> Norris, “Status Update on Variable Renewable Electricity and Resource Adequacy: Ex Parte Briefing to The Public Service Commission of South Carolina.”

<sup>24</sup> Chojkiewicz, Emilia, Umed Paliwal, Nikit Abhyankar, Casey Baker, Duncan Callaway, and Amol Phadke. “Accelerating Transmission Expansion by Using Advanced Conductors in Existing Right-of-Way.” Energy Institute at Haas, UC Berkeley, February 2024. <https://haas.berkeley.edu/wp-content/uploads/WP343.pdf>.

<sup>25</sup> Simon Mahan, “SEEM’s First Year: Broken Promises, Disappointing Results,” *Southern Renewable Energy Association* (blog), accessed March 27, 2024, <http://www.southernrenewable.org/2/post/2023/11/seems-first-year-broken-promises-disappointing-results.html>.

<sup>26</sup> Steve Kihm et al., “Moving Toward Value in Utility Compensation” (Western Grid Group, June 2015), <https://www.westerngrid.net/wp-content/uploads/2015/06/CostValue-Part1-Revenue.pdf>.

<sup>27</sup> “Carolinas Resource Plan, Supplemental Planning Analysis” (North Carolina Public Utilities Commission: Duke Energy, January 31, 2024), <https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=bfb12788-90ea-4352-97d6-3f3a7134b5ad>.

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<sup>28</sup> “Solar and Battery Storage to Make up 81% of New U.S. Electric-Generating Capacity in 2024 - U.S. Energy Information Administration (EIA),” Today in Energy, accessed March 27, 2024, <https://www.eia.gov/todayinenergy/detail.php?id=61424>.