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Data Centers Drive Buildout of Gas Power Plants and Pipelines in the Southeast

Ratepayers at Risk of Subsidizing Unneeded Electric Infrastructure for Data Centers

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Contents

Figures and Tables

Key Findings

Southeast utilities and gas pipeline developers are planning a major infrastructure buildout, in large part due to data center demand.

Utilities and pipeline developers appear poised to overbuild gas infrastructure in the Southeast.

Southeast consumers are subsidizing the growth of the data center industry and the major tech companies behind it.

Data center growth forecasts are incompatible with necessary action on climate change.

Executive Summary

Southeast utilities and pipeline companies are planning a major buildout of natural gas infrastructure (pipelines and power plants) over the next 15 years. This report focuses on the states of Virginia, North Carolina, South Carolina and Georgia. Utilities in these states plan to build more than 20,000 megawatts (MW) of natural gas power plants by 2040.

Meanwhile, pipeline operators are currently proposing or constructing more than 3,300 million cubic feet (MMcf)/day of new pipeline capacity through these states. More than 75% of this capacity is destined for electric utilities. More pipeline capacity will be needed if the Southeast utilities' natural gas power plant plans come to fruition over the coming decades.

The main driver of this dash to build new gas infrastructure is data centers. The Southeast utilities profiled in this report are forecasting a level of load growth unprecedented in the last two decades in large part attributable to projections of rapid data center expansion. IEEFA finds that:

- Major utilities in Virginia, North Carolina, South Carolina and Georgia are collectively forecasting the addition of 32,600 MW of electrical load over the next 15 years.
- The major driver of this load growth—particularly in Virginia, South Carolina and Georgia—is data centers. In these three states, data centers are responsible for 65% to more than 85% of projected load growth.
- There is a significant risk of Southeast utilities overbuilding power plants and pipelines in response to projected data center energy demand. Utilities already are financially incentivized to overbuild infrastructure. This risk is exacerbated by the uncertainty over whether data center demand will materialize at the levels forecasted, in part due to the questions around the financial viability of artificial intelligence (AI).
- Ratepayers are subsidizing the cost of electrical infrastructure being built to serve data centers, and this subsidization will worsen if infrastructure is overbuilt.
- The focus on building out electrical infrastructure, including gas infrastructure, to serve data centers is slowing the energy transition.

I. Southeast Utilities and Gas Pipeline Developers Are Planning a Major Infrastructure Buildout

Electric utilities in the Southeast are planning a major buildout of gas power plant capacity through 2040. The following table shows the more than 20,000 MW of gas power plant capacity proposed by the largest electric utilities in the states of Georgia, South Carolina, North Carolina and Virginia. The table is based on integrated resource plans submitted to state regulators, although each individual plant will require regulatory commission approval to proceed.

Table 1: Planned Gas Power Plants Through 2040 by Major Utilities in Georgia, South Carolina, North Carolina and Virginia[1]

State	Utility	Date Online	Capacity, MW	Technology[2]	Power Plant (if Specified)
GA	Georgia Power	2026-2027	1400	CT	Yates
SC	Santee Cooper/Dominion South Carolina Joint Venture		1360	CC	Canadys
SC	Santee Cooper	2031	894	CT	
SC	Santee Cooper	2028	255	CC and CT mix	Rainey upgrades
SC	Dominion South Carolina	2029	402	CT	
SC	Duke Carolinas	2031	1360	CC	
NC	Duke Carolinas	2029-2030	2720	CC	Roxboro
NC	Duke Carolinas	2032-2033	2720	CC	
NC	Duke Carolinas	2029	850	CT	Marshall
NC	Duke Carolinas	2030	850	CT	

[1] Santee Cooper. Integrated Resource Plan 2024 Update. September 2024. Also see: Dominion Energy South Carolina. Integrated Resource Plan 2024 Update. March 2024; Duke Energy Carolinas. Supplemental Planning Analysis. January 2024; Georgia Power. 2023 Integrated Resource Plan Update. October 2023; and Dominion Virginia. 2024 Integrated Resource Plan. October 2024.
[2] CT stands for "combustion turbine," which are typically used as peaker plants, running less than 15% of the time. CC stands for "combined cycle," typically operated as baseload plants. "ST" refers to "steam turbine," which are typically coal plants that have been converted to burn natural gas; since they are less efficient than combined cycle plants, they are typically operated less.

NC	Duke Carolinas	2031	425	CT	
NC	Duke Carolinas	2035	849	ST	Cliffside Unit 6 (Conversion)
VA	Dominion Virginia	2031	944	CT	Chesterfield
VA	Dominion Virginia	2032	818	CT	
VA	Dominion Virginia	2033	818	CT	
VA	Dominion Virginia	2034	818	CT	
VA	Dominion Virginia	2035	1268	CC	
VA	Dominion Virginia	2036	1268	CC	

Source: Utility Resource Plans

The level of gas buildout in these states could be even higher before 2040. Although Georgia Power does not have specific gas plants listed in the above table other than Plant Yates, it has issued an all-source RFP for up to 8,500 MW of new capacity which could include new gas resources. The company expects to sign contracts in September 2025 for this new capacity,[3] so Table 1 likely understates Georgia Power's gas buildout.

Table 1 also does not consider electric cooperatives; Northern Virginia Electric Cooperative (NOVEC) is particularly significant because it is forecasting a more than six-fold increase in its peak load solely from data centers. NOVEC purchases more than 90% of its power via bilateral contracts or from the PJM wholesale market, which is why it is not included in the table. Still, its explosive demand growth forecast will increase pressure to construct new generation, including gas plants, elsewhere in PJM.[4] Oglethorpe Power Company, which provides the majority of power for 38 of the 41 electric cooperatives in Georgia, is planning to add 1,400 to 1,700 MW of new natural gas capacity by 2029.[5]

[3] Georgia Power Company. All-Source Capacity Request for Proposals Draft. February 26, 2024.
[4] PJM has expressed an urgent need to attract new generation, driven in part by the proliferation of data centers. See: PJM. Letter from PJM Board of Managers. December 9, 2024, regarding "enhancements to the interconnection process and adjustments to the capacity market."
[5] Oglethorpe Power Corporation. Form 10-Q. September 30, 2024.

This report also does not include Alabama and Tennessee because neither the Tennessee Valley Authority (TVA) nor Alabama Power provides sufficient detail on its load forecast to understand the drivers of their plans for increased gas generation. However, these plans are significant. The baseline scenario of the TVA's draft integrated resource plan (IRP) included the addition (net of retirements) of 600 MW of combined cycle capacity and 4,400 MW of combustion turbine capacity by 2040.[6] And Alabama Power's most recent 2022 IRP included more than 4,800 MW of new natural gas capacity through 2039.[7]

Serving proposed new gas plants would also require a buildout of gas pipeline infrastructure, as detailed in Table 2. The majority of the proposed gas plants listed in Table 1 are not sufficiently far into the planning stages to have gas supplies associated with them; this implies that more gas pipelines will be proposed over the coming decade to supply these plants, if utilities move forward with their plans to build them. Table 2 provides more details on the gas pipelines currently proposed or under construction in Georgia, North Carolina, South Carolina and Virginia. According to IEEFA's analysis, more than 75% of the capacity of these pipelines has been contracted to electric utilities to serve new gas power plants proposed for the region (the remainder has been contracted to gas distribution utilities).[8]

[6] Tennessee Valley Authority. Draft Integrated Resource Plan 2025. September 2024.
[7] Alabama Power. 2022 Integrated Resource Plan Summary Report. 2022.
[8] This analysis excludes the MVP Expansion and South System Expansion 4. MVP Expansion is not far enough in its planning process to have announced shippers. South System Expansion 4 has published its shippers (which include Dominion South Carolina, Oglethorpe Power in Georgia, and the Southern Company), but will not make public the amount of capacity contracted to each shipper until April 2025 (Kinder Morgan. South System Expansion 4 Project: Resource Report 1. FERC Docket PF25-1, December 2024, pp. 1-2). IEEFA assumes that the T-15 Reliability Project will have a capacity of at least 400 million cubic feet/day to supply the Roxboro gas plant that it is being constructed to serve.

Table 2: Pipelines Proposed/Under Construction in Georgia, North Carolina, South Carolina and Virginia As of December 2024

Project Name	Pipeline Operator	Status	Planned In-service	Start state	End state	Capacity (MMcf/d)	Description
Alabama Georgia Connector Project	Williams / Transco	Approved	2025	AL	GA	64	Modifications to 5 existing compressor stations
Commonwealth Energy Connector Project	Williams / Transco	Under construction	2025	VA	VA	105	6.35 miles of pipeline and modifications to a compressor station
South System Expansion 4	Kinder Morgan	Proposed	2029	MS	GA	1,200	279 miles of pipeline and modifications to 13 compressor stations; capacity contracted to Dominion South Carolina, Oglethorpe Power (GA), Southern Company, and gas utilities.

Southeast Supply Enhancement Project	Williams / Transco	Pre-applied	2027	VA	AL	1,600	55 miles of pipeline and modifications to 4 compressor stations; capacity mainly contracted to Duke and Southern Company
Virginia Reliability Project	TC Energy / Columbia Gas Transmission	Approved	2025	VA	VA	100	Replacement of 49 miles of pipe and modifications to 2 compressor stations
T-15 Reliability	Williams / Transco	Applied		NC	NC	unknown	45 miles of pipeline; to serve Roxboro Plant
MVP Expansion	MVP LLC	Proposed		WV	VA	500	Expansions to compressor stations
MVP Southgate	MVP LLC	Applied	2028	VA	NC	550	31 miles of pipeline; capacity contracted to Duke and Public Service Company of NC

Source: EIA pipeline database, FERC, project developer websites

II. Southeast Utilities Have Been Rapidly Revising Upwards Their Forecasts of Electricity Demand Over the Past Two Years, in Large Part Due to Demand From Data Centers

How are utilities justifying this major buildout in gas infrastructure?

In part, the new gas plants are being proposed to replace retiring coal power plants. The utilities listed in Table 1 are planning the retirement of more than 15,500 MW of power generation, mainly coal, by 2040.[9]

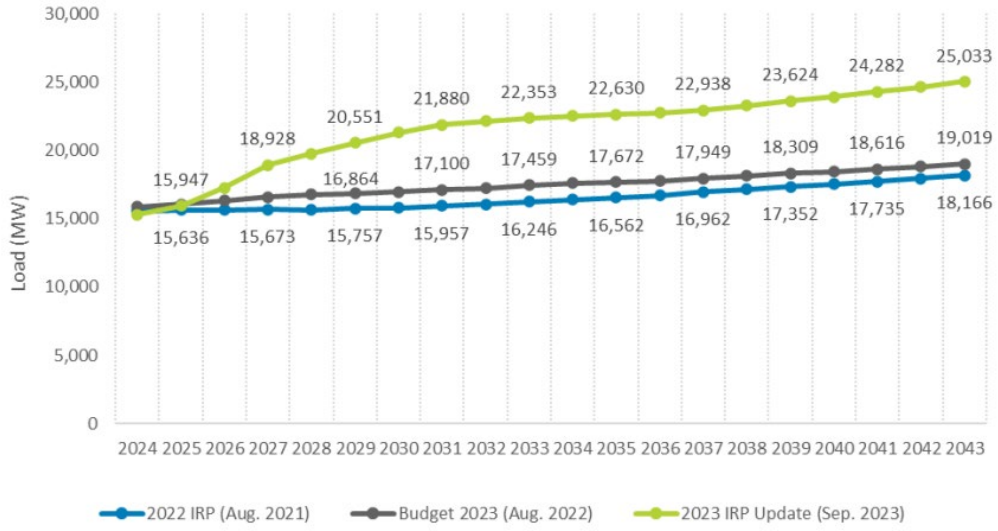
However, the driving factor behind the proposed buildout in gas infrastructure is not retirements, but rather these utilities' projections of rapidly rising electricity demand. Collectively the five southern utilities shown in Table 1 are planning for 32,600 MW of demand growth by 2040.[10,11]

These utilities have dramatically ramped up their load forecasts within the last 12-18 months, citing unexpected projected growth in large commercial and industrial loads:

- **Georgia Power:** Georgia Power produced a September 2023 load forecast that is markedly higher than its previous load forecast from August 2022. The following graph from Georgia Power's Fall 2023 IRP Update shows a difference of 5,000 MW of new load added by the mid-2030s, relative to the 2022 load forecast released 13 months earlier. In the year since the forecast was published, Georgia Power has reported that an additional 4,400 MW of projects "committed to service from Georgia Power" have materialized for the mid-2030s that were not included in the Fall 2023 IRP Update.[12] In other words, Georgia Power's load forecast for the mid-2030s has increased by 9,400 MW from the 2022 forecast. Overall, the utility is planning for the addition of more than 11,400 MW to its current load by the mid-2030s, an increase of more than 70% relative to the current load.

[9] See references in footnote 2. It is also likely that utilities will start to walk back some of these retirement plans, as Georgia Power has done between its 2022 IRP and 2023 IRP Update, which considers extending the life of Scherer Unit 3 and Gaston 1-4.
[10] See footnote 2.
[11] In addition to natural gas, these utilities are also planning significant increases in renewable energy, storage and, in some cases, nuclear energy.
[12] Georgia Power. Quarterly Large Load Economic Development Report. November 18, 2024.

Figure 1: Georgia Power IRP Load Forecasts[13]

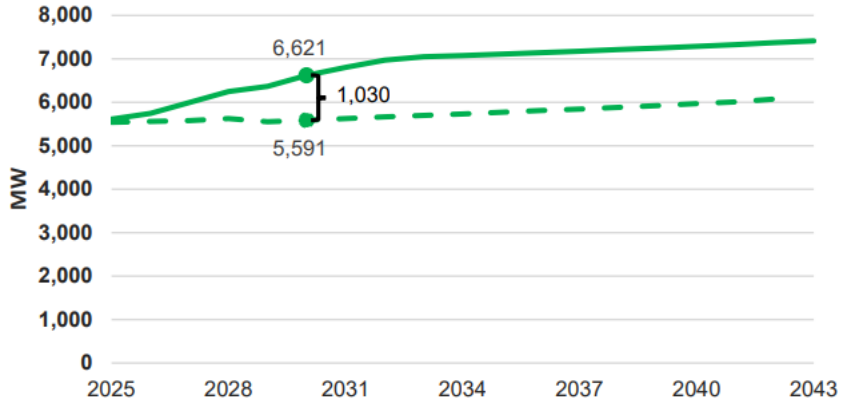


Source: Georgia Power 2023 Integrated Resource Plan Update

- Georgia Power has stated in the press that 80% of its projected increase in demand is due to data centers.[14]

- **Santee Cooper:** The South Carolina public utility published an IRP update in September 2024, significantly raising its load forecast from its 2023 IRP. As indicated below, the 2024 forecast projects an additional load of more than 1,000 MW by 2030 than its 2023 forecast. Overall, Santee Cooper is planning a 30% increase in load by 2040.[15]

Figure 2: Santee Cooper IRP Load Forecasts



Source: Santee Cooper Integrated Resource Plan 2024 Update

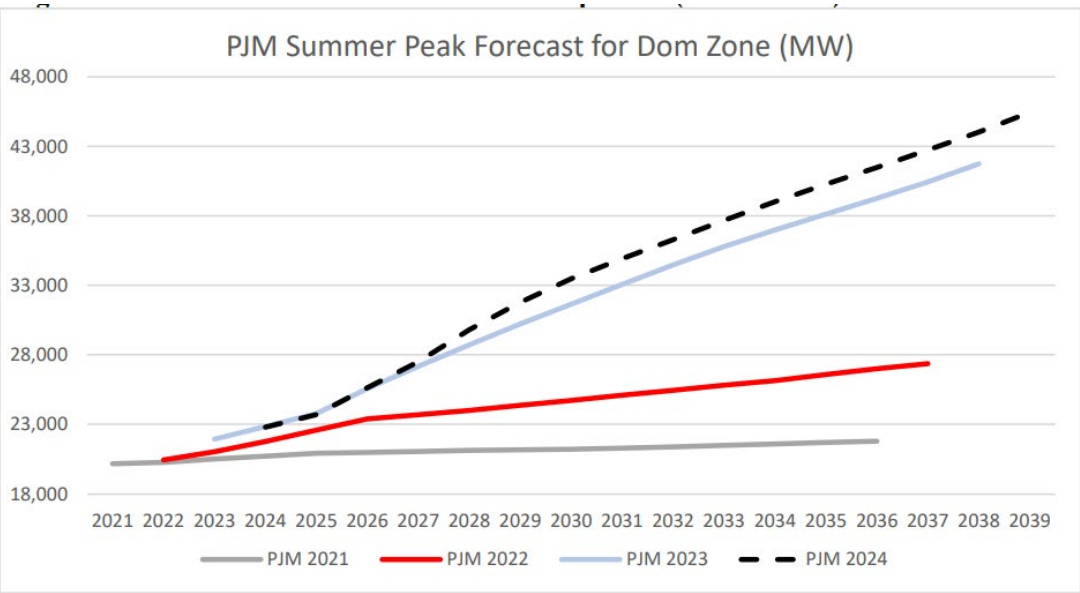
[13] Georgia Power. 2023 Integrated Resource Plan Update. October 2023, p. 10.
[14] Data Center Dynamics. Georgia Power increases power capacity by 1.4 GW with fossil fuels to meet data center demand. April 17, 2024.
[15] Santee Cooper. Integrated Resource Plan 2024 Update. September 2024, p. 24.

- Reportedly the CEOs of South Carolina's three largest utilities (Santee Cooper, Dominion Energy South Carolina, and Duke Energy Carolinas) told the state senate that 65-70% of the projected increase in load in the state will be from data centers.[16]

- **Dominion Energy South Carolina (DESC):** In March 2024, DESC released an IRP update that includes two new large customers with a combined demand of 256 MW that will be online by 2032 and had not been included in previous load forecasts. The two customers represent a 4.8% increase in DESC's demand.[17] Overall, DESC is planning for a 20% increase in load by 2040.[18]

- **Dominion Virginia Electric and Power (Dominion Virginia):** Dominion Virginia relies on the PJM load forecast for PJM's Dominion Zone, which increased dramatically from 2022 to 2023, and then increased again from 2023 to 2024, as shown in the following figure.[19]

Figure 3. PJM Dominion Zone load forecasts

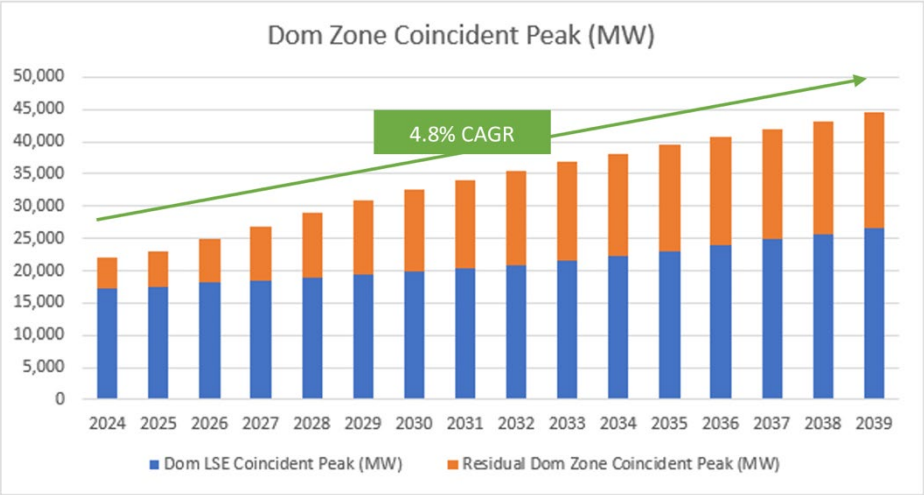


Source: Dominion Virginia. 2024 Integrated Resource Plan

PJM's Dominion Zone comprises an area larger than the service territory of Dominion Virginia. The following graph breaks down the 2024 PJM Dominion Zone forecast into the load served by Dominion Virginia (blue bars) vs. other electric utilities in the zone (orange bars). Dominion Virginia is planning for a 46% increase in peak load by 2039.

[16] South Carolina Daily Gazette. Commentary: Protect SC consumers from data center costs. September 12, 2024.
[17] Dominion Energy South Carolina. Integrated Resource Plan 2024 Update. March 2024, p. 1.
[18] Ibid., p. 52.
[19] Dominion Virginia. 2024 Integrated Resource Plan. October 2024, p. 10.

Figure 4: A Breakdown of the 2024 PJM Dominion Zone Load Forecast. Blue Bars Show Load Projected Served by Dominion Virginia Power; Orange Bars Show Projected Load Served by Other Utilities.[20]



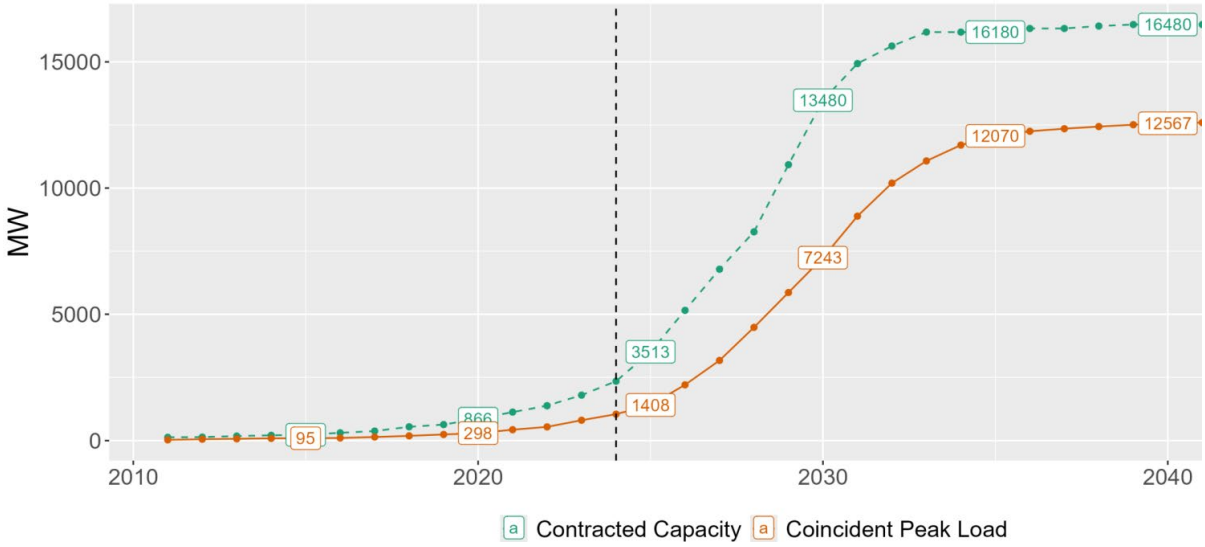
Source: Dominion Virginia. 2024 Integrated Resource Plan

Dominion Virginia produced an alternative forecast of a scenario with no data center demand growth, in which total demand grows by only 1,255 MW by 2039, instead of the 9,270 MW forecasted in Dominion's baseline forecast. Comparing these two forecasts, it is evident that data centers are responsible for 86% of Dominion Virginia's forecasted load growth.[21]

The growth shown by the orange bars in Figure 4 above is also almost exclusively due to data center demand growth, particularly in NOVEC's service territory. NOVEC is a load-serving entity that buys its power primarily from the PJM market, so it is not in the business of building new gas plants to serve its rapidly growing demand. However, the load growth in NOVEC's service territory is putting increasing pressure on the rest of PJM to meet the cooperative's need for power. Figure 5 shows NOVEC's August 2024 data center load growth forecast. NOVEC's overall peak demand in 2024 was 2,076 MW; this forecast would have NOVEC's peak demand increasing by more than a factor of 6 due to data center demand alone by 2040.[22]

[20] Ibid., p. 9.
[21] Dominion Virginia Electric and Power Company. SCC Directed 2024 IRP Supplement, State Corporation Commission Docket No. PUR-2024-00184. November 15, 2024.
[22] PJM Load Analysis Subcommittee. NOVEC Data Center Load Forecast. October 25, 2024.

Figure 5: Northern Virginia Electric Cooperative (NOVEC)'s Data Center Load Forecast, As Submitted to PJM Interconnection



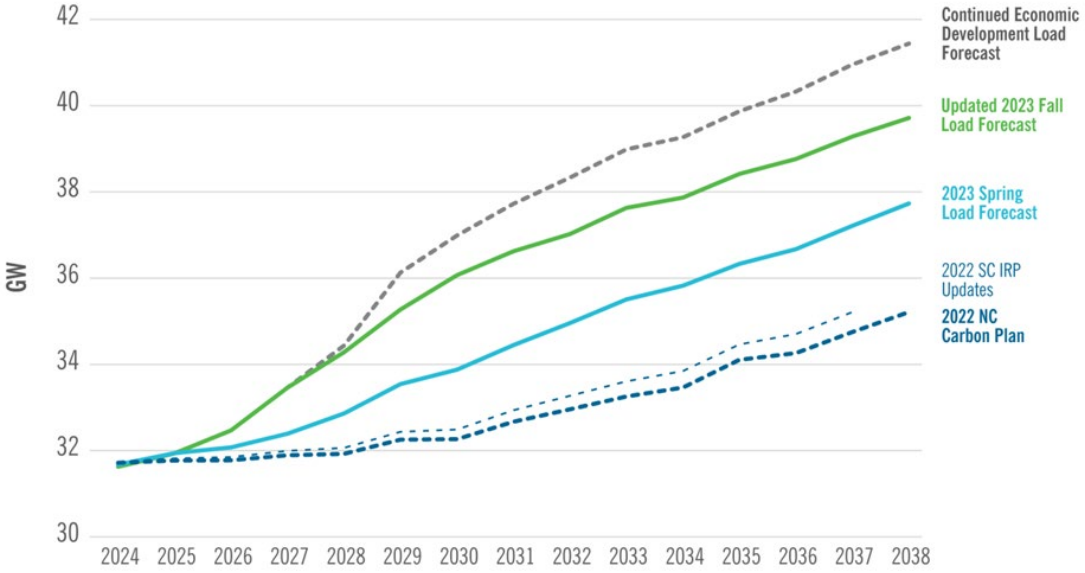
Source: NOVEC Data Center Load Forecast

As Figure 4 indicates, the PJM Dominion Zone in Virginia overall is looking at a doubling of load by 2040, the largest percentage increase of any state considered in this report, with more than 85% driven by data center growth.[23]

Duke Energy Carolinas the public utility, which operates in both South and North Carolina, published a supplemental planning analysis in 2024 with the following graph. The green line shows the most recent load forecast (dated fall 2023), with the grey dashed line above it showing a high load scenario. The blue line is the spring 2023 load forecast. The fall 2023 forecast is more than 2,000 MW higher by 2030 than the spring 2023 forecast.

[23] IEEFA calculation based on the data center-only load increases for Dominion Virginia Power and NOVEC.

Figure 6: Duke Carolinas IRP Load Forecasts



Source: Duke Energy Corporation Carolina's Resource Plan

In contrast to the other utilities noted here, Duke did not attribute the increase in load growth primarily to data centers. The utility also cited manufacturing and the electric transportation industry. Duke has stated that it projects data centers to account for 25% of additional energy demand by 2028.[24]

In short, the gas plant and pipeline infrastructure buildout described here is largely attributable to rapid projected increases in demand that are largely attributable to data centers.[25]

The load growth that these utilities are forecasting is part of a national trend of rapidly escalating demand forecasts, driven in large part by data centers. National forecasts vary widely. The range is captured by a December 2024 Lawrence Berkeley National Laboratory study that predicted 2028 data center demand between 74 and 132 gigawatts (GW), or 6.7% to 12% of total U.S. electricity consumption (up from 4.4% of U.S. consumption in 2023).[26] This is consistent with a December 2024 Grid Strategies study noting that utilities are projecting more than 90 GW of new data center demand by 2029. In total, the Grid Strategies report found that utilities are planning for almost 16% of load growth in the United States by 2029 – a sharp contrast to the past two decades, when load grew at less than 1% annually. [27]

[24] Reuters. Duke Energy seeks take-or-pay power contracts for data centers. May 7, 2024.
[25] Based on the above information, IEEFA estimates that for Dominion Energy South Carolina, Santee Cooper, Duke Energy Carolinas, Georgia Power and Dominion Virginia combined, about two-thirds of their forecasted load growth is due to data centers.
[26] Shehabi et al. 2024 United States Center Energy Usage Report. Lawrence Berkeley National Laboratory, December 2024.
[27] Grid Strategies. Strategic Industries Surging: Driving US Power Demand. December 2024.

Although cloud computing has been growing steadily over the past 15 years, data center power demand has only begun to take off in the last few years. This is in large part due to the fact that cloud computing is more efficient than individual corporations maintaining their own smaller data centers. Data center energy consumption stayed relatively constant because the overall expansion in data centers was offset by the efficiency gains of corporate data centers transitioning to off-site, "hyperscalar" facilities, as well as other efficiency gains. Since 2020, data center demand has started to increase, driven by new demands such as virtual meetings (which sharply increased during the COVID-19 pandemic) and AI, as well as diminishing returns from the elimination of smaller data center facilities.[28]

The emergence of "artificial intelligence" large language models over the past two years has driven even more dramatic projections for data center growth. AI applications are extremely energy-intensive both for training the models (feeding them enormous amounts of data to "learn") and when the models are then used. A single ChatGPT query, for example, uses about 10 times the energy of a traditional Google search.

In the following section, we discuss whether Southeast utilities are at risk of overbuilding gas infrastructure in response to this forecasted growth in data center demand, and whether the data center demand growth forecasts are overstated. In both cases, the answer appears to be yes.

III. Utilities and Pipeline Developers Appear Poised to Overbuild Gas Infrastructure in the Southeast

Utilities and pipeline developers appear poised to overbuild gas infrastructure in the Southeast for two reasons: first, because utilities appear to be overestimating the number of data centers that will actually locate in their individual service territories and, second, because the forecasted demand from AI is unlikely to fully materialize, due to fundamental weaknesses in the business model.

It is important to emphasize at the outset that many utilities in the Southeast have strong incentives to overbuild infrastructure. Regulated vertically integrated utilities, including Alabama Power, Georgia Power, Duke and Dominion, earn a rate of return that is recovered from customer rates and is based on their total rate base, i.e. the total value of their infrastructure. In other words, these utilities earn a profit on all the infrastructure they build, as long as it receives regulatory approval. And all utilities, including publicly or cooperatively owned utilities, have a strong social incentive to err on the side of building too much generation to serve new load rather than too little, which could lead to service disruptions.

[28] Electric Power Research Institute. Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption, May 2024, p. 4. Also see: Goldman Sachs. Gen AI: Too Much Spend, Too Little Benefit. June 25, 2024.

A. Utilities Appear To Be Overstating Load Growth From Data Centers

There is always uncertainty regarding whether an announced load will materialize, and how utilities treat that uncertainty is very important. Georgia Power in particular appears to have an overly generous load forecasting methodology that has been criticized even by Microsoft, a major data center developer.[29] Georgia Power's methodology assigns a percentage probability to each potential new load project materializing at a certain level of load and then runs thousands of possible load forecast simulations. It bases its planning on the 95th percentile load forecast, i.e., that for which 95% of the simulated outcomes are at or below that level.[30] Santee Cooper, in contrast, takes a similar approach but chooses the median simulation result (50th percentile) as the basis for its load forecast.[31]

Comparing the utilities' data center load growth forecasts to the state-by-state projections of the Electric Power Research Institute (EPRI) suggests a pattern of utilities overstating future load growth. EPRI put out a study in May 2024 with different scenarios of data center electricity demand, state-by-state, based on an analysis of data center industry trends.[32] The following table summarizes EPRI's forecasts of increased data center load from 2023 to 2030 for several Southeastern states:

Table 3: Increase in Data Center Demand (MW) From 2023 to 2030 in Select Southeastern States.[33]

	Moderate scenario	High scenario	Higher scenario
Virginia	2,097	4,888	8,528
North Carolina	166	386	673
South Carolina	125	292	510
Georgia	383	892	1556

Source: Electric Power Research Institute

[29] Microsoft Corporation. Microsoft Comments on Georgia Power's 2023 Integrated Resource Plan Update. April 1, 2024.
[30] Georgia Power. 2023 IRP Update Technical Appendix "Load and Energy Forecast. October 2023.
[31] Santee Cooper. Integrated Resource Plan 2024 Update. September 2024, p. 26.
[32] Electric Power Research Institute. Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption. May 2024.
[33] Electric Power Research Institute. Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption. May 2024. EPRI's energy projections (MWh) were converted to capacity (MW) using an assumed data center load factor of 75%.

Dominion's forecast of data center growth from 2023 to 2030 is 3,263 MW[34], and Northern Virginia Electric Cooperative's is 5,835 MW, for a total of 9,098 MW, or 7% higher than the upper-end EPRI forecast. (This does not include other electric cooperatives in Virginia, some that are planning for much smaller amounts of data center capacity).

The forecasts from the utilities in Georgia, North Carolina and South Carolina are an even worse match with EPRI's forecasts, suggesting that the utilities may be either overstating demand or overstating the share of demand growth from data centers:

- As indicated in Figure 1 above, Georgia Power predicts demand growth of approximately 5,400 MW from 2023 to 2030. Since that estimate was published, Georgia Power states that it has received an additional 2,200 MW in commitments from large-load customers for the winter of 2028/2029. If 80% of Georgia Power's load growth is attributable to data centers, as the company has stated, the company's forecasts represent more than 6,000 MW of new data center demand by 2030, well above the EPRI projection, without including the data center load projected by Oglethorpe Power.

- Santee Cooper is projecting demand growth of more than 1,000 MW by 2030, and Dominion Energy South Carolina is projecting an additional 440 MW. If 65% (or 936 MW) is from data centers, that also exceeds the EPRI highest scenario for South Carolina.

- Finally, Duke Carolinas projects demand growth of more than 4 GW by 2030. Even if only 25% is attributable to data centers, that still implies more than 1 GW of data center demand growth, again well above the EPRI highest scenario.

These comparisons with the EPRI forecast suggest that Southeast utilities may well be planning for more data center load growth than is likely to materialize. This finding is also reflected in a December 2024 Grid Strategies report that notes that the utility industry nationally is planning for more than 90 GW of data center demand growth by 2029; tech industry analysts are projecting closer to 65 GW.[35]

[34] Dominion Virginia. 2024 Integrated Resource Plan. October 2024.
[35] Grid Strategies. Strategic Industries Surging: Driving US Power Demand. December 2024, p. 3.

B. AI Business Case

A separate question is whether the data center industry itself is likely to need as much electricity as envisioned, a debate that revolves in part around the future development and growth of AI. Assumptions around the growth of AI vary substantially. Goldman Sachs, for example, predicts that AI will grow to account for 19% of total data center energy usage in 2028; the Boston Consulting Group assumes that AI will account for 32% of data center energy usage that year.[36] McKinsey's midrange forecast is that AI will account for 40% of total data center energy demand by 2030, which would imply that 70% of the growth in data center energy usage over the remainder of the decade will be due to AI.[37]

While forecasts for AI-driven data center demand vary widely, there is reason to believe that AI is less financially viable than commonly portrayed, casting doubt particularly on the upper end of demand forecasts.

The financial risks of AI have to do with its energy intensiveness—specifically, that the energy and infrastructure costs of training and running AI models may be more than what customers are willing to pay, i.e., that the technology may ultimately prove to be unprofitable.

The business model for AI essentially rests on licensing models directly to clients (who then build their own specialized chatbots or other applications directly from the model) or selling subscriptions to AI-based software to clients. The question is whether customers are willing to pay the full cost of developing and running the models.

So far, the dominant AI companies have been operating at a substantial loss. OpenAI and Anthropic are the most significant privately held companies whose business model is purely AI, i.e., developing models and applications and licensing them. (Tech giants like Google, Meta and others have also developed their own AI models, but there is not sufficient transparency to tease out the financials of those models from the rest of those companies' operations).

OpenAI, the developer of ChatGPT, provided financial information to investors that was reported in The New York Times in September 2024 and provides a revealing window into OpenAI's business.[38]

At that time, OpenAI projected 2024 revenue of $3.7 billion, about two-thirds of which was to come from 10 million users who would pay $20/month individual subscriptions for ChatGPT ($2.4 billion in total). With The Times reporting that 350 million people use ChatGPT monthly, less than 3% were converting to paid subscribers; the other 97% of users were imposing costs on OpenAI without generating any revenue. OpenAI projected that ChatGPT would generate $2.7 billion in revenue, a

[36] Goldman Sachs. AI is poised to drive 160% increase in data center power demand. May 14, 2024. Also see: Boston Consulting Group. US Data Center Power Outlook. July 2024.
[37] McKinsey & Company. AI power: Expanding data center capacity to meet growing demand. October 29, 2024.
[38] New York Times. OpenAI Is Growing Fast and Burning Through Piles of Money. September 27, 2024. Also see: Ed Zitron. OpenAI is a Bad Business. October 2, 2024.

total which also includes “enterprise” and “teams” subscriptions. OpenAI projected generating an additional $1 billion (arriving at the $3.7 billion total) by licensing its models to developers. In October 2024, OpenAI announced that it had 3 million developers building applications with its models.[39] OpenAI projected that it would more than triple its revenue, to $11.6 billion, in 2025.[40]

The flip side is that OpenAI projected a net loss of $5 billion in 2024 (i.e., operating costs of $8.7 billion). Its net loss would be even greater if it did not have a special deal with Microsoft, in which Microsoft sells cloud computing credits to OpenAI at a substantial discount.[41] If OpenAI were paying the full cost of its cloud computing services, IEEFA estimates that it would have faced a net loss of about $12 billion in 2024.[42]

In December 2024, OpenAI added a $200/month “pro” subscription to ChatGPT.[43] In January 2025, CEO Sam Altman announced that this business segment was losing money,[44] with the average subscriber is costing the company more than $200/month.

According to The New York Times, “The fund-raising material also signaled that OpenAI would need to continue raising money over the next year because its expenses grew in tandem with the number of people using its products.”[45] This was confirmed in January 2025 when OpenAI announced, “We once again need to raise more capital than we’d imagined.”[46]

OpenAI has announced a target of 1 billion users in 2025 (in part due to a partnership with Apple to integrate OpenAI into its phones) but has not publicly stated how many of these users it expects will generate revenue.[47,48]

As of September 2024, OpenAI’s projected costs were more than double its projected revenue for 2024. Given that OpenAI is under constant competitive pressure to churn out new models that are just as energy-intensive (if not more energy-intensive) to train as the previous versions, it is difficult to see how OpenAI will get its costs under control without dramatically increasing the cost of its products and/or eliminating the free version of ChatGPT (which it has not signaled any intention of doing). The New York Times reported that OpenAI was planning to raise the monthly subscription fee for the paid version of ChatGPT from $20/month to $22/month by the end of 2024 and to

[39] TechCrunch. OpenAI’s DevDay brings Realtime API and other treats for AI app developers. October 1, 2024.
[40] New York Times. OpenAI Is Growing Fast and Burning Through Piles of Money. September 27, 2024.
[41] Ed Zitron. The Subprime AI Crisis. September 16, 2024.
[42] This calculation is based on reports that OpenAI was projecting to spent $4 billion on cloud computing with Microsoft and that Microsoft is charging OpenAI about $1.30 per server per hour. (See: Data Center Dynamics. OpenAI training and inference costs could reach $7bn for 2024, AI startup set to lose $5bn – report. July 24, 2024. For the same servers, Microsoft normally charges $3.4 to $4 per server per hour. See: Digital Ocean. The Ultimate Guide to Cloud GPU Providers. Last visited January 10, 2025. This suggests that if Microsoft charged OpenAI the actual cost of running its models, the cost would rise from $4 billion to closer to $11 billion, and OpenAI have faced a net loss of $12 billion instead of $5 billion.
[43] OpenAI. Introducing ChatGPT Pro. December 5, 2024.
[44] Sam Altman. Twitter. January 5, 2025.
[45] New York Times. OpenAI Is Growing Fast and Burning Through Piles of Money. September 27, 2024.
[46] OpenAI. Why OpenAI’s structure must evolve to advance our mission. December 27, 2024.
[47] Financial Times. OpenAI targets 1bn users in next phase of growth. November 30, 2024.
[48] Importantly, Apple is not providing any revenue to OpenAI, solely exposure to its customer base. (See: PYMNTS. Apple Paying OpenAI With Distribution Not Cash. June 13, 2024).

$44/month over the next five years.[49] Yet as of January 2025, OpenAI has not yet implemented the increase to $22/month that it promised investors.

To achieve its revenue target of $11.6 billion in 2025, OpenAI would have to either (a) triple its paid subscribers and triple its revenues from licensing its model, or (b) if it fails to triple one of those segments, increase the other even more dramatically. As noted above, OpenAI does plan to approximately triple its user base in 2025, which may result in tripling its paid subscribers (although not necessarily if OpenAI also raises subscription costs). But OpenAI's costs will also rise proportionately to service the rapid growth of non-paying users.

Additionally, OpenAI faces competition from other AI models that makes it much more difficult for the company to raise fees. A recent news report asserts that OpenAI has dramatically slashed fees for licensing its models to developers over the last two years precisely because of competition.[50] In other words, competitive pressures between AI companies in an attempt to capture market share are, at least for the moment, preventing any of them from raising prices to cover costs. If one company ends up with the dominant model after this price war, it may then be able to raise its costs—although it is unclear if the market will support the true costs of running AI models.

Less-detailed financial information has been published for Anthropic (developer of the Claude model), but the little information available suggests its scenario may be worse. According to an April 2024 New York Times report, Anthropic is earning about $150 to $200 million in annual revenue and spending $2 billion.[51]

While much bigger and diversified tech companies like Microsoft, Google, Meta and Apple can develop generative AI models without suffering overall financial losses, the experiences of OpenAI and Anthropic suggest that this technology costs more than it can be reasonably expected to generate in revenue. At some point, even these tech giants may back away from a product that is losing money. The question is when?

[49] New York Times. OpenAI Is Growing Fast and Burning Through Piles of Money. September 27, 2024.
[50] TechCrunch. OpenAI's DevDay brings Realtime API and other treats for AI app developers. October 1, 2024.
[51] New York Times. AI Start-Ups Face a Rough Financial Reality Check. April 29, 2024.

IV. Southeast Consumers Are Subsidizing the Growth of the Data Center Industry and the Major Tech Companies Behind It

Southeast electric utility customers are and likely will continue subsidizing data centers and their owners, who in many cases are multi-billion-dollar tech companies: (1) by subsidizing the infrastructure needed to serve data centers, and (2) by shouldering the cost of infrastructure built to serve data center load that does not materialize. This is on top of any direct subsidies in the form of special electric rates or state-based tax incentives.[52]

First, non-data center customers are paying some of the cost of infrastructure that would not otherwise be needed if not for the rapid growth in data centers. Under traditional ratemaking, data centers are treated just like any other large commercial and industrial customer, and the infrastructure needed to serve them (whether new power plants, pipelines, or transmission) is rolled into the electric utility's overall rate base. This model made sense in the context in which it was developed, namely a utility experiencing overall economic growth in its service territory that needs to build infrastructure shared across multiple customers. However, some utilities now find themselves building infrastructure that simply would not be needed if not for data centers, yet the regulatory structure has all customers paying for them.

One clear example of this phenomenon is in Virginia, where Dominion Virginia Power recently produced a report to the State Corporation Commission detailing the transmission infrastructure that it plans to construct through 2031 and classifying some of these projects as "data center driven projects," i.e., transmission lines whose need is determined solely by data centers. Dominion identified $2.4 billion worth of such projects. Under PJM's transmission cost allocation, the $2.4 billion tab will be paid for by utility ratepayers across the PJM footprint.[53] The Virginia Joint Legislative Audit and Review Committee found, "A typical residential customer of Dominion Energy could experience generation- and transmission-related costs increasing by an estimated $14 to $37 monthly in constant (or real) dollars by 2040 (independent of inflation)" due to growing data center load.[54]

Another example is a recent news report from Maryland on the Quantum Loophole data center campus. The Maryland Public Service Commission approved a transmission project from Potomac

[52] In 2024, legislation was defeated in Georgia that would have put a two-year moratorium on tax breaks for data centers. See: Georgia Recorder. Governor vetoes pausing data center tax breaks, homestead exemption bump and higher ed assistance. May 8, 2024. Also, legislation was defeated in South Carolina to end special rate subsidies for data centers. See: South Carolina Daily Gazette. Data centers gobble up energy. Should SC block them from getting special deals? April 15, 2024. In Virginia, the sales and use tax exemption for data centers cost the state almost $1 billion in fiscal year 2023 alone. See: Virginia Joint Legislative Audit and Review Committee. Data Centers in Virginia. December 2024, p. viii).

[53] PJM allocates costs for larger transmission projects based on a formula that is 50% allocated to all utilities based on their contribution to PJM's total load and 50% allocated to those zones of PJM expected to benefit most from the project. For smaller projects, the cost is allocated to the PJM zone where the benefits will be received, in this case the PJM Dominion Zone. (See 187 FERC ¶ 61,012).

[54] Virginia Joint Legislative Audit and Review Committee. Data Centers in Virginia. December 2024, p. v.

Edison to provide power to the site. Even though the project is solely to benefit the data center, the data center is paying less than 10% of the cost of the $33 million project. The rest of the cost will be borne by ratepayers.[55]

It is quite possible that some utilities will end up building infrastructure for data center load that does not materialize, and the costs will be passed on to customers unless the utility has adopted a policy that would shift the risk back to data center developers. This risk is exacerbated by the sheer size of data centers; as AEP Ohio notes, "historically AEP Ohio's largest customers have been large industrial facilities whose peak power demand was in the range of a few hundred MW. Now AEP Ohio has had multiple customers express interest in building data centers that plan to reach loads of 1,000 MW or more."[56] Clearly planning for a large load that does not materialize has more significant consequences than planning for a smaller load.

In addition to the reasons discussed in Section 3, another reason data center load may not materialize as planned is precisely the mismatch in timing in procuring the necessary electricity resources to support data center growth in certain jurisdictions. The lead time to build new generation and transmission is often more than five years (and conceivably longer if community opposition results in delays to energy infrastructure projects).[57] Such delays could result in developers deciding to pull out of a data center project.

The Virginia Legislature recently raised the concern that Virginia may not have the power infrastructure to serve data centers on the timeframe that the data center industry is demanding: "PJM's goal is to have $3.5 billion in Virginia transmission projects that were proposed in December 2023 for Virginia, mostly to serve data center demand, to be in service by June 2027. This 3.5-year timeline is possibly unrealistic considering that major new transmission projects often take five to seven years to complete."[58] While Virginia is facing the most rapid increase in forecasted data center demand by 2040, Georgia is not far behind and may face a similar situation.

[55] Data Center Dynamics. Quantum Loophole substation gains approval for connection to Doubs substation. August 6, 2024.
[56] Ohio Power. Direct Testimony of Kamran Ali. May 13, 2024.
[57] Virginia Joint Legislative Audit and Review Committee. Data Centers in Virginia. December 2024, p. 33.
[58] Ibid.

A few utilities have started to put forward proposals that would put more of the financial risk on the data centers. The most notable proposals come from two AEP subsidiaries, AEP Ohio and Indiana Michigan Power Company:

- AEP Ohio recently advanced a settlement in a case before the Ohio Public Utilities Commission that would create a new tariff for data center loads greater than 25 MW. The settlement would require the data centers to sign a contract for eight to 12 years of service and pay demand charges equivalent to at least 85% of their rated capacity, even if they actually consume less. AEP argues that its Ohio service territory is already constrained in terms of transmission capacity, and the utility will need to build new high-voltage transmission (765 kV) for new data center loads. AEP Ohio's peak demand is currently 4,000 MW and the utility has pre-existing contracts with data centers that will increase demand by 5,000 MW by 2030. AEP Ohio has had a moratorium in place on signing additional agreements with data centers since March 2023, pending PUC approval of their proposed tariff. AEP Ohio's recent settlement was reached with Public Utility Commission staff, industrial energy users, and the consumer advocate (not with any of the tech or data center companies participating in the case); a hearing was held before the Public Utility Commission in December 2024.[59]

- Indiana Michigan Power Company has recently reached a settlement to modify its industrial load tariff, with the modifications applying to facilities greater than 70 MW (or 150 MW for a company with multiple facilities). This tariff would require a 12-year commitment to demand charges equivalent to at least 80% of the capacity of the facility. The facility would pay a fee to cancel its contract or reduce its demand by more than 20%.[60] While the tariff would not be specific to data centers, the impetus is clearly requests for data center interconnection. Indiana Michigan currently has a peak demand of 2,800 MW and notes that it has received requests from data centers that would increase it by 250%, to more than 7,000 MW by 2030.[61]

Additionally, Duke Energy is reportedly seeking to sign "minimum take" contracts with data centers and other loads larger than 100 MW. Such contracts would guarantee that the data centers will pay for a certain amount of power, regardless of whether they use it, to protect other ratepayers. To IEEFA's knowledge, no further detail is publicly available on whether any such arrangements have been signed.[62]

Another business model that creates a potentially different set of risks to consumers is the trend of co-location, in which a data center locates directly next to a generating facility (new or existing) and contracts with that generating facility to provide its power. In Texas, for example, the chair of the Public Utilities Commission has signaled that data centers should look at building their own power plants.[63] Several high-profile announcements of data centers contracting with nuclear power plants

[59] Ohio Power., Direct Testimony of Kamran Ali. Also see: Ohio Public Utilities Commission Case No. 24-0508-EL-ATA. Joint Stipulation and Recommendation. October 23, 2024.
[60] Indiana Utility Regulatory Commission. Unopposed Settlement Agreement and Unopposed Motion for Acceptance of Out of Time Filing. November 22, 2024.
[61] Indiana Michigan Power. Direct Testimony of Andrew J. Williamson. Indiana Utility Regulatory Commission. July 19, 2024.
[62] Data Center Dynamics. Duke Energy to include take-or-pay provisions in US data center agreements. November 9, 2024.
[63] Data Center Knowledge. Texas Regulator Wants Data Centers to Build Power Plants. October 4, 2024.

also fall into this category of co-location. However, if the data center is contracting with an existing generator that currently supplies power to the regional grid, it is taking that generator's capacity off the grid, which could lead to problems for utilities in serving existing load.[64] And most co-located data center proposals still involve connection to the grid, raising questions about how to fairly allocate grid costs to data centers. The Federal Energy Regulatory Commission has an open docket to consider the issues raised by data center co-location.[65]

V. Data Center Growth Forecasts Are Incompatible With Necessary Action on Climate Change. Questions Need To Be Asked About Priorities for Development of New Electricity Infrastructure

The surge in gas infrastructure that utilities and pipeline developers are proposing and justifying based on data center load growth is misaligned with the action that needs to be taken on climate change. North Carolina and Virginia have legislatively-mandated climate targets.[66] The scientific community has warned that limiting warming to the target of 1.5 C would require eliminating carbon emissions globally within 12 years—completely incompatible with the expansion of gas-fired power generation described in this report.[67] Former Google CEO Eric Schmidt admitted as much recently, saying, "We're not going to hit the climate goals, anyway."[68]

Data centers are increasingly relying on public subsidies to pay for their rapidly growing electrical infrastructure needs. Investments in electrical infrastructure to serve new data center load could crowd out the investments that many jurisdictions have articulated as priorities for addressing climate change, such as electrification of transportation and heating, as well as decarbonization of existing electricity demand. As an economic development strategy, data centers provide far fewer jobs per megawatt of electricity required than other industrial and manufacturing uses.[69]

To meet the electricity needs of data centers in Virginia by 2040, for example, would require building out new solar, wind, natural gas and storage facilities at a rate that would "greatly outpace what has been accomplished historically," according to the Virginia Joint Legislative Audit and Review

[64] IEEE Spectrum. Amazon Vies for Nuclear-Powered Data Center. August 12, 2024.
[65] FERC Docket No. AD24-11.
[66] North Carolina's law (Law 2021-165) requires electric utilities to be carbon neutral by 2050; Virginia's Clean Economy Act of 2020 requires Appalachian Power to be 100% renewable energy by 2050 and Dominion Virginia by 2045.
[67] Nature. Is it too late to keep global warming below 1.5oC? The challenge in 7 charts. November 21, 2023.
[68] Benzinga. Former Google CEO Eric Schmidt Says 'We Are Never Going To Meet Our Climate Goals' - Pushes For AI And Data Centers To Solve The Crisis. October 10, 2024.
[69] According to AEP Ohio, non-data center commercial and industrial customers average 25 jobs per MW of power demand, whereas data centers average less than 1 job per MW. See: Ohio Power. Direct Testimony of Lisa Kelso. May 13, 2024. Mid-Atlantic grid manager PJM Interconnection has also noted that data centers "have a load impact that is disproportionate with their economic impact. Data centers generally require minimum staffing and thus would not have a significant impact on economic variables but do have a considerable impact on energy demand." See: PJM Interconnection. 2023 Regional Transmission Expansion Plan. March 7, 2024, p. 46.

Commission. This new infrastructure would do nothing to decarbonize Virginia's existing energy demand—and, indeed, would actively move in the opposite direction. And it would raise electric rates for the average residential customers by $170 to $440 per year.

Despite the public subsidy, there has been no public conversation about the societal value of data center energy usage. Indeed, there has been no transparency in how this electricity is being used: how much is going towards training ever-larger large language models vs. consumer applications (search engines, cloud storage, AI-generated images) vs. industrial applications and other uses (including potentially dangerous and unregulated uses like generative biology.[70]) In many cases, consumers have been given no choice in interacting with much more data-intensive services, such as AI applications that are embedded in search engines or applications.

Modeling efforts published prior to the increase in data center demand already showed the need for year-over-year additions of renewable energy capacity at historically unprecedented levels and mobilization of capital for energy supply infrastructure at unprecedented rates to meet the 2050 net-zero target for addressing climate change.[71] That modeling made no provision for a massive increase in data center energy demand, regardless of how it would be powered. By adding to our energy demand so massively, data centers are making those already "unprecedented" numbers even larger and more difficult to achieve. The net-zero energy transition is already behind schedule,[72] and is at great risk of being crowded out entirely by the decision to prioritize building out infrastructure, including fossil fuel infrastructure, for prospective data center demand.

Conclusion

Utilities in the Southeast are planning a major buildout of gas infrastructure over the next fifteen years, for which the primary driver is increasing energy demand from data centers. Collectively, utilities in Virginia, North Carolina, South Carolina and Georgia plan to add more than 20,000 MW of gas-fired power plants, an amount of capacity approximately equivalent to the total current generation capacity of Dominion Virginia Power.[73] The Southeast utilities are effectively planning to build an entire new, large electric utility over the next 15 years, entirely powered by gas.

IEEFA finds that there is a serious risk of overbuilding electrical infrastructure to meet data center demand. This is due both to financial incentives for utility companies to overbuild infrastructure in general, as well as risks specific to data centers that demand—particularly demand associated with AI— will not materialize at the levels projected. In the absence of proactive decisions by utilities or

[70] African Centre for Biodiversity. Black Box Biotech: Integration of Artificial Intelligence with Synthetic Biology. September 2024.
[71] E. Larson et al. Net-Zero America: Potential Pathways, Infrastructure, and Impacts, Final Report Summary. October 29, 2021.
[72] As evidenced by the secondary rationale for the Southeast utilities' gas expansion, namely replacing retiring coal plants with natural gas capacity rather than renewable energy.
[73] Dominion Virginia. 2024 Integrated Resource Plan. October 2024, p. 5.

regulators, electric ratepayers will subsidize the building of new infrastructure that would not be needed in the absence of data centers and will be on the hook for overbuilt infrastructure.

In short, utilities in the Southeast are planning for a level of load growth that is unprecedented in recent decades, and they are planning a major investment in gas infrastructure to meet that load growth. This is incompatible with the rapid transition to clean energy required to meet the climate target of net zero by 2050. If infrastructure to meet prospective data center demand is built out to the extent utilities have planned, it will prevent the energy transition from occurring in time to mitigate the worst effects of climate change.

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