Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, Pennsylvania 17120

June 6, 2025

*Submitted Electronically*

Re: *En Banc Hearing* Concerning Interconnection and Tariffs for Large Load Customers
Docket No. M-2025-3054271

Dear Commissioners,

The Sierra Club, on behalf of its nearly 620,000 members nationwide and in particular its nearly 25,000 members in Pennsylvania, submits the following comments concerning Interconnection and Tariffs for Large Load Customers, Docket No. M-2025-3054271. The explosive growth of data centers are rapidly increasing estimates of future electricity demand across the country, very much including in Pennsylvania. Without careful planning, this expansion risks burdening ratepayers, straining local grids, and worsening pollution in our communities. Accordingly, we greatly appreciate that the Commission is taking steps to grapple with these issues, and likewise appreciate the opportunity to comment in this proceeding.

<u>Background</u>

Planned new hyperscale data centers are among the largest consumers of electricity, with individual facilities requiring hundreds of megawatts—the equivalent of hundreds of thousands of homes. Their tendency to cluster compounds their impact, often creating a significant strain on local energy systems in a short time. As utilities invest in securing power and infrastructure to serve this new load, residential and other existing customers are increasingly placed at risk of bearing the costs of this data center boom:

> The sudden surge in electricity use by data centers—warehouses filled with power-hungry computer chips—is shifting utilities' attention away from societal needs and to the wishes of a few energy-intensive consumers. Utilities' narrow focus on expanding to serve a handful of Big Tech companies, and to a lesser extent cryptocurrency speculators, breaks the mold of traditional utility rates that are premised on spreading the costs of beneficial system expansion to all ratepayers. The very same rate structures that have socialized the costs of

> reliable power delivery are now forcing the public to pay for infrastructure designed to supply a handful of exceedingly wealthy corporations.[1]

Proposed new hyperscale data centers also inject enormous uncertainty into utility planning. Not only may a new data center be "shopping" around by lodging grid connection requests in multiple locations, how long any new demand due to a data center may be on-system is similarly unpredictable.[2] Traditional utility customers, including residential customers, may thus be left on the hook for costly system upgrades and generation acquired to serve expanded demand from data centers that might, after operating just a short while, exit the market (or migrate to new locations).

Sierra Club is concerned about what a dramatic near-term increase in data-center driven electricity demand might mean for Pennsylvania electricity customers–especially residential customers–and on the general impact on public health and the environment that might occur as a result of increased pollution from combustion electricity generation. As such, we are providing our recent report, "Demanding Better: How Tech Companies Can Drive the Clean Energy Transition" (included hereto as Exhibit 1), which outlines a series of recommendations as to what state utility regulators can do to protect residential customers, as well as technology companies, utilities, lawmakers, and energy advocates. Recommendations for state utility regulators like the Commission include requiring transparency about electric load projections, requiring utilities to conduct rigorous system planning modeling of a clean and affordable pathway to meet load growth, and ensuring large electricity users pay their fair share of transmission and system costs.

Comments

A. Topline Recommendations

To protect ratepayers, the Sierra Club recommends the following:

**Tariffs before infrastructure: the Commission should require that Pennsylvania EDCs seek and obtain approval for tariffs for new large load customers on the front end.** EDCs should not be securing generation or investing in distribution infrastructure to serve new large load customers without an approved tariff in place that makes clear how the costs of this new generation will be allocated between existing ratepayers and the new large load customer. The alternative is major investment in resources on the basis of undifferentiated "load growth"

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[1] E. Martin & A. Peskoe, Environmental & Energy Law Program, Harvard Law School, "Extracting Profits from the Public: How Utility Ratepayers Are Paying for Big Tech's Power," (March 5, 2025) at 1, *at* https://eelp.law.harvard.edu/wp-content/uploads/2025/03/Harvard-ELI-Extracting-Profits-from-the-Public.pdf.

[2] *See, e.g.*, A. Carelton, *Pennsylvania Capital-Star*, "Fracking-powered crypto mine in Pennslyvania shuts down without word to regulators," (May 1, 2025), *at* https://penncapital-star.com/energy-environment/fracking-powered-crypto-mine-in-pennsylvania-shuts-down-without-word-to-regulators/.

without guarantees that those rate-based costs will fall primarily on the large load customers that cause the additional cost.

This process is meant to reduce the risk of excess infrastructure, or rushed infrastructure, on smaller-scale customers. The establishment of a tariff structure provides clarity on the responsibility of large load customers to the EDC, and protection for other ratepayers.

**Large load tariffs: the Commission should require EDCs to implement large-load tariffs with front-loaded costs or commitments.** Across the country, utilities are increasingly proposing to build (or actually building) large infrastructure, and securing new generation, to serve new large load customers, but the costs of those investments may be borne disproportionately by existing (i.e., residential) customers if those large loads do not materialize, or if unfair rate allocation principals are used. This problem can be addressed with a large-load tariff. Features of such a large-load tariff may include:

- Minimum contract terms and premature exit or termination fees to ensure that new large customers are committed to a long-term relationship with the utility that will help pay down the costs of new infrastructure;
- Minimum charge based on anticipated or previously billed use that ensures that infrastructure to serve high-use baseload customers are paid for, even if those customers temporarily shut down;
- A requirement for collateral, escrow, or demonstration of financial viability to ensure that anticipated customers are backed by real demand and are able to pay costs; and
- Incentives for demand management, renewable behind-the-meter generation, or utility use of behind-the-meter storage.

**24/7 Tariffs: the Commission should require that EDCs serving data centers offer rigorous clean energy transition tariffs for locally-deliverable, additional, and zero-emissions energy in all hours of the year.**

Many of the technology companies driving data center growth have sustainability and carbon reduction goals; to help ensure that EDCs are able to support those goals–and to decrease air, water, and other pollution impacts from increased electricity demand on Pennsylvania residents–a 24/7 carbon-free energy transition tariff should be offered to large load customers.[3]

[3] *See, e.g.*, Linvill, C., Enterline, S., Farnsworth, D., Kadoch, C., LeBel, M., & Seidman, N. L. (2024). *24/7 carbon-free electricity transition tariffs: A regulatory tool for accelerating decarbonization* [Technical paper], Regulatory Assistance Project, at 5 ("24/7 carbon-free electricity transition tariffs are different from the green tariffs that match annual consumption with annual renewable energy production. 24/7 transition tariffs seek to match a customer's hourly consumption with deliverable carbon-free electricity provision in each hour of the year. We refer to this concept as a "transition" tariff because it is designed to accelerate the transition of the electric grid to carbon-free sources. Complete hourly matching will require investments and changes in operating practices that address high-emitting hours and high-emitting locations on the grid, where generation still depends on fossil resources, and full decarbonization of the grid requires these investments and changes in operating practices. Annual-matching green tariffs do not induce these investments or change practices, but with the move toward more granular time matching, 24/7 transition tariffs can accelerate progress toward full decarbonization.")

Key considerations of such a tariff include whether the EDC is charged with identifying and procuring sufficient resources to meet the requirements of the tariff, or whether customers are able to identify resources that will work for their requirements (i.e. “bring your own capacity”), recognizing that more advanced customers may be able to identify resources, while smaller data center customers may need utilities to arrange all power supply contracts.

The most efficient way to implement this policy may be to require EDCs to create and implement a subscription-based green tariff, where specific customer classes can (or are required to) subscribe to the tariff, which is organized on their behalf by the EDC, as a class. In doing so, the EDC can pull together a portfolio that works for the entire class, rather than boutique options for individual customers.

It is important that such a tariff be structured so as to be *additive*. Numerous utilities around the country have “green tariffs” which vary in effectiveness from those that allow utilities to purchase unbundled RECs to those that provide rigorous local, incremental renewable energy for purchasers. It is critical that energy resources used to serve a green tariff in Pennsylvania are not simply diverted from other customers, leaving other customers with a fossil-heavy portfolio.

**The Commission should establish demand management and demand response incentives for traditional data centers.** A small amount of demand management or demand response at data centers could relieve congestion and utility strain, reduce capacity requirements, and allow new renewable energy to serve more requirements. Data centers generally use energy around the clock at a very high utilization, but with increasing AI loads, they may be able to shift demand geographically (i.e., to be processed elsewhere) or temporally (i.e., to be processed at a different time of day).

As an alternative to a demand management incentive, data centers could be called on to provide a minimum amount of demand response capability (through battery storage or reduced use) and charged higher rates otherwise. Such an incentive structure could be implemented through EDC rate structures.

**Utility growth transparency: the Commission should require EDCs to disclose large load customer trajectories.** Some of the most problematic outcomes from data center load growth happen when utilities fail to disclose the growth that they anticipate from data centers and other large load customers until it's too late, triggering a planning emergency. To circumvent this information imbalance, the Commission should require EDCs to disclose large load customer trajectories with the appropriate level of certainty, well before EDC rate cases involving costs incurred to meet that customer load.

**The Commission should regularly report to the legislature: periodic reports from the Commission to the legislature on large load customer trajectories, electric affordability, infrastructure requirements, and economic development/jobs from data center growth.** In almost every state, PUCs are grappling with the impacts of data center growth, with narratives from data centers, utilities, and ratepayer advocates arguing about the value of new load, economic incentives and jobs, infrastructure, and rates. This Commission will ultimately make decisions about rate structures and EDC requirements that seek to balance the public interest. Therefore, it is incumbent upon the Commission to report back to state representatives on the impacts of data centers and other large loads.

## B. Responses to Key Commission Questions

The Sierra Club appreciates that the Commission has identified specific questions to which it is seeking input. In addition to the recommendations above, the Sierra Club offers the following responses to Vice Chair Kimberley Barrow's questions for consumer advocates and public interest stakeholders.

***What safeguards do you believe are essential to prevent cost-shifting from speculative or short-lived data center investments onto existing ratepayers?***

It is important to ensure that new large load customers pay their fair share, and that prospective such customers approach interconnection with the same prudency and caution that EDCs and this Commission are required to exercise on behalf of customers generally. As discussed above, front-loading costs for large load customers helps ensure that costs incurred in serving those customers do not end up being born by existing customers if the data center or other new customer ends up being short-lived: they ensure that such customers have "skin in the game." Ways of structuring those costs include minimum contract or tariff terms and premature exit or termination fees, minimum charges based on anticipated or previously billed used, and/or a requirement for collateral, escrow, or demonstration of financial viability on the part of new large load customers. New data center customers should pay the full cost of infrastructure to serve them, including the cost of new transmission lines, distribution, substations, and other system upgrades they necessitate.

Additionally, since times of peak demand are what place the most stress on system resources, and are what drive overall system costs, incentives for demand management, renewable behind-the-meter generation, or utility use of behind-the-meter storage are also important safeguards to ensure that large load customers are minimizing overall impacts. In particular, storage requirements for large load customers could provide valuable benefits to the overall system even if the data center ends up being a short-lived investment.

***How can we ensure tariff structures are transparent enough to allow meaningful public input on what constitutes fair cost allocation, especially when commercial contracts are confidential?***

Precisely to avoid the thorny issue of confidential contracting and the tendency of such contracts to mask impacts from large load customers on existing–and in particular, residential–customers, special contracts with potential large load customers by EDCs should be avoided.  Instead, new data centers and other large load customers should be required to take service under tariffs that offer standard terms:

> Unlike a one-off special contract that provides each data center with unique terms and conditions, a tariff ensures that all data centers pay under the same terms and that the impact of new customers is addressed by considering the full picture of the utility's costs and revenue. This holistic and uniform approach ends the race-to-the-bottom competition that incentivizes utilities to attract customers by offering hidden discounts paid for by other ratepayers.[4]

Tariffs can also be revisited in future rate cases and other Commission proceedings, heightening the availability of information to the public and Commissioners and ensuring that there is public opportunity to evaluate and debate the impacts of the large load customers on existing customers.

Conclusion

Thank you again for this opportunity to comment.  The Sierra Club appreciates that the Commission is engaged in forward-looking policy assessment to help address the potentially large load growth and system needs posed by the rapid proliferation of data centers.  The Club likewise hopes that the Commission will engage with other policy dockets to consider the challenges and opportunities presented by other significant and growing sources of electricity demand, such as the rapidly progressing transition to electric vehicles and the shift towards electrification of buildings throughout the Commonwealth.

Sincerely,

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[4] E. Martin & A. Peskoe, at 23.

SIERRA CLUB

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# DEMANDING BETTER

*How growing demand for electricity can drive a cleaner grid*

Photo by Cavan Images/Alamy

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Photo by, Hugh Kenny. The Piedmont Environmental Council

# Policy Summary

Forecasts of rapid electric demand growth, driven by new data centers, electric vehicle and battery manufacturing, and electrified industries, have garnered dramatic headlines—and not without merit. Electric utilities across the country, from Virginia to Arizona, have quickly responded by proposing to expand gas-fired generation and retain existing coal-fired power plants, leaving policy makers deeply concerned that actual and projected progress towards ambitious climate targets is now at risk. Ironically, the largest drivers of demand are corporate customers with climate commitments, many of whom want to see a different pathway forward.

The pathway towards deep electrification and large-scale load growth, and reliance on a clean grid, has been charted for years; analysts have shown that we can grow demand, transition the US electric grid, and reduce customer bills while driving at pace to zero emissions. But creating a power sector that is 80 percent clean by 2030 (Sierra Club strategic goal alignment), or faster, will require coordination and sustained efforts from utilities, large customers, regulators, policy makers, and advocates. This is where energy customers can play a significant role, and turn this risk into an opportunity: an opportunity to advance new policies, grow new procurement strategies, and advocate for better utility practices. The time has come for large energy customers to step out of back rooms, and demand better.

This paper presents three three groups of recommendations for how new large loads can drive:

First, more sophisticated large load customers should pursue 24/7 carbon-free procurement through their own purchase agreements, new utility tariffs, or advanced trading schemes. Second, large buyers should engage in utility planning and rate proceedings to drive improved utility outcomes. Third, large buyers should help illustrate the value of rigorous clean energy standards to ensure that all customers benefit from a coordinated energy transition.

To achieve these outcomes, this paper presents emerging recommendations for large energy customers, regulators, policy makers, and advocates. Without these policies and practices, there is a real danger that utilities—both those that have already made headlines, and those that are quietly gearing up for new load—will revert to turnkey gas and existing coal plants, delaying (if not reversing) real grid and climate progress.

The recommendations here are derived from both Sierra Club and our partners extensive work before utility regulators and in utility proceedings, emerging practices piloted by leading energy buyers, and a review of extensive modeling efforts by energy system experts.

# The top recommendations emerging from this assessment include:

1. Large customers should assess their host utilities' decarbonization plans when siting;
2. Large customers should move past annual volumetric renewable purchases to pursue either 24/7 clean energy or other equally rigorous forms of clean energy and capacity procurement;
3. Large customers should actively engage in utility proceedings to demand a clean energy transition;
4. Large customers should advocate for fair market rules and robust transmission planning;
5. Regulators should require new large customers to be transparent about their load projections;
6. Utilities and large customers should work together to maximize demand management capabilities;
7. Large customers should transition to batteries as backup, not diesel or gas generation;
8. Regulators should require utilities to conduct rigorous system planning modeling of the clean and affordable pathway to meeting load growth—before it's an electricity emergency;
9. Policy makers and registries should work together to create a national system for tracking and verifying hourly emissions to facilitate time-based REC markets (T-EACs);
10. Large corporate buyers should consider partnering with utilities to permanently buy down emissions;
11. Regulators should ensure large buyers pay their fair share of transmission and system costs; and
12. Large buyers should partner with state policy makers to tighten mandatory renewable portfolio standards (RPS) and clean energy standards (CES), or better, develop a federal CES.

The US in the middle of a major transition in the electric sector away from high-emissions coal and gas plants to clean energy and storage. However, the pace of that transition could be at risk if utilities seek to meet new demands for electricity with fossil energy, rather than clean portfolios that meet customers' demands for both energy and capacity during every hour. The recommendations presented in this paper are designed to ensure that utilities, large customers, regulators, and stakeholders can collaborate to maintain momentum, guiding the way toward a decarbonized, reliable, and affordable electric grid.

# Introduction

In May of 2023, Dominion Energy—the public utility that provides electricity to Northern Virginia and the largest hub of data centers in the United States—filed with state utility regulators its proposed long-term plan for meeting customers' electricity needs. The plan contained a startling finding: it stated that unprecedented load growth, 10,000 MW over 15 years, driven by data centers, would necessitate the delay of the planned retirement of multiple coal plants,[1] and add up to 3,000 megawatts (MW) of new gas-fired power plants. [2] The plan took the utility drastically out of step with Virginia's climate goals, the over arching need to decarbonize the grid, and many of the data center companies' own climate commitments.

It quickly became evident that Dominion's plan was an industry bellwether. In October of the same year, Georgia Power filed an emergency resource plan that cited rapid load growth and a resulting 6,600 MW shortfall as the reason for extending the life of a coal plant in Mississippi [3] and adding 1,400 MW of new gas by 2026. [4] Similarly, utilities in the Carolinas, [5,6] Tennessee, [7] Wisconsin, [8] Nebraska, [9] and Arizona [1] have proposed plans to substantially increase gas-fired generation in response to rapidly increasing load forecasts due to data centers. One of the country's largest utilities, American Electric Power (AEP), which has a peak demand of 35,000 MW, has reported commitments for more than 15,000 MW of new load by 2030. This rapid and apparently unanticipated load growth stems not only from an explosion in data center construction—the banks of computers that run the internet and increasingly large-language models and artificial intelligence (AI)—but also from electrified industries, new manufacturing sectors like electric vehicles, and hydrogen hubs.

Electric utilities, apparently caught off-guard at this need to provide reliable electricity to a vastly expanded customer base, have defaulted to familiar but high-emissions choices: building turnkey gas power plants, [11] and delaying the retirement and replacement of aging coal plants. Unfortunately, these snap utility decisions have long-term consequences; gas plants built today may operate for decades to recover their construction costs. [12] Combined, delays in coal retirements and the massive build out of new gas plants pose a serious threat to achieving the carbon emissions reduction targets required to avert climate catastrophe. Ironically, many of the largest actors driving demand growth—including technology companies, industries returning to the United States, and clean energy manufacturing companies—have corporate commitments to procure clean energy that are at odds with the direction host utilities are taking to address their needs.

This rapid load growth raises new policy questions, such as:

- How should large customers with climate and renewable energy commitments ensure their demand does not rely on fossil generation?
- What best practices should guide the electric sector to ensure the load growth is met with clean energy rather than relying on a fossil-based electric grid?
- How should corporate customers, utilities, consumer advocates, and regulators ensure that load growth does not shift the costs for maintaining dirty, risky, and expensive fossil infrastructure to residential customers?

It also raises new critical venues for engagement: planning and rate cases as well as industrial tariff dockets before state public utility commissions are now key spaces in which these policy questions will be addressed.

To ensure load growth is met sustainably rather than locking in a climate catastrophe, the corporate adoption of best procurement practices and their engagement in regulatory spaces is critical. This paper is meant to serve as a high-level guide to evolving best practices for regulators, advocates, utilities, and large customers to respond to rising demand with true clean energy solutions. The time has come for large industrial customers to start **demanding better.**

# The Challenge Ahead: Meeting Both Demand and Climate Targets

### Load growth is real, but high uncertainty can drive suboptimal decisions

For the last two decades, electricity demand has remained largely unchanged despite increasing home sizes, commerce, and electric vehicle adoption. Increased electricity demand has primarily been offset by improvements in efficiency, resulting in stable net demand. However, energy and climate policy makers, researchers, and advocates have long known that deep decarbonization would ultimately result in substantial increases in electric demand. This is because achieving deep emissions reductions from buildings, transportation, and industry requires electrification, like heating buildings via heat pumps, running cars on batteries, and transitioning to electricity-based industrial processes where feasible.

In the last two years, the anticipated rise of demand has garnered attention as utilities grapple not only with electrification, but the rapid growth of AI data centers and novel manufacturing for commodities such as computing chips, solar cells, and batteries. This rapid growth has led some utilities to propose suboptimal near-term solutions, such as large new gas-fired power plants and extending the lives of outdated coal plants. [13]

Photo by, Hugh Kenny. The Piedmont Environmental Council

Utilities, which are state-sanctioned monopolies, have an "obligation to serve" customers—both new and old. In response, some utilities have proposed to build massive new infrastructure to meet new demands. But the extent to which load will grow, or even if customers will transpire, is highly uncertain.

Indeed, utilities—and the general public—simply have no concept of how big load growth for large customers might get, and what it portends for their own service territories. Today, those tracking the AI boom forecast growth anywhere from a near-term plateau [14] **to upwards of an enormous 8-9 percent of US electricity by 2030.** [15] A recent paper assessed an annual growth rate of data centers anywhere from 5-20 per year. [16] And individual utilities may only have limited insight into their own future. Some observers have hypothesized that large load customers may be shopping the same demand to multiple utilities, looking for the fastest interconnection process at the lowest cost, a practice which puts utilities at risk of overbuilding for loads that may not materialize. [17]

But the forecast uncertainty doesn't end with speculative bidding: a large portion of data centers are built by companies who specialize in hosting other companies, and may build facilities in anticipation of future AI demand. In addition, there is deep competitive pressure to improve the efficiency of data centers through improved chips, cooling, load management, and algorithm improvement, leaving substantial uncertainty even when new loads are decently characterized.[18]

Thus, utilities face a split incentive in deciding how to respond to uncertain load growth. Building a grid to meet the demand of speculative new customers risks leaving current customers with the burden of paying for excess infrastructure. Conversely, building for today's customers might leave utilities unprepared when new industries come knocking.

There are other factors that may guide a utility to overbuild in response to potential load growth. At one end, traditional ratemaking incentivizes capital investments by offering a healthy return to utility shareholders, and utilities may see new earnings opportunities with new loads. In addition, some utilities may perceive that new customers ease fixed costs borne by existing customers.

But new customers bring new costs as well. Utilities must make decisions to invest in capacity, as well as transmission and distribution infrastructure, and if customers fail to materialize then existing customers (or the utility) may be left holding the bag on excessive costs from overbuilding.

While perfect foresight is impossible, it is important to use best planning practices (discussed in Recommendation 8) to mitigate the risks of over- or under-building. Moreover, data center companies need to increase data transparency to facilitate better planning, both to ensure that utilities do not overbuild, and to align the timing of new expected resources with realistic expectations of new demand.

## Growing electricity and driving down emissions is feasible—and can be affordable

Transparent planning is critical for meeting load demands while reducing emissions and stabilizing costs for consumers. Given the projection that climate targets will require expansive electrification, policy makers, planners, and forward-thinking utilities have been anticipating a grid capable of handling electrical loads up to two to four times today's demands by 2050.[19] Forward-looking planners and policy makers have sought to meet the need for renewable interconnection, new transmission to connect clean energy, and leverage regional diversity to ensure renewable energy can meet demands around the clock. For example, the Midcontinent Independent System Operator (MISO), responsible for a reliable and efficient electricity market across 15 states, now plans transmission needs around a 2040 future with nearly twice today's installed capacity, largely from renewable resources [20]

Importantly, leading national studies have found that, with good planning and a concerted effort toward transmission expansion, we have the technology today to meet growing demand with clean energy and transition away from fossil fuels. For example:

- Berkeley's **2035 Report** charts a path to 90 percent clean energy within a decade and identifies a reliable, cost-effective portfolio of clean energy, storage, and transmission that meets a high electrification scenario (13 percent increase by 2035) with no new gas additions and all coal plants retired by 2035.[21] The report's authors used an industry-standard production cost model to stress test the portfolio under extreme weather conditions and found it would maintain, and even improve, grid reliability.
- Princeton's Net Zero America report assesses multiple electrification scenarios and charts pathways to a zero-emissions future, even with massive expansion in industrial and commercial demand (30 percent growth by 2035). It projects that gas consumption for power could be cut in half by 2035, and all coal could be retired by 2030. [22] The analysis conducts a high-resolution assessment of likely needs across multiple sectors and trade-offs between different policy choices.
- The National Renewable Energy Laboratory (NREL) Standard Scenarios assess that we can reduce electric sector emissions by 62 percent from 2020 levels by 2035 while maintaining an annual growth of electricity demand of nearly 3 percent per year to electrify industries, buildings, and vehicles.[23]

In each of these cases, the incremental cost (relative to a business-as-usual) of driving towards a sustainable climate through 2035 is nearly zero, but achieving these outcomes requires coordinated planning, and sustained investments in not only clean energy, but transmission and both short- and long-duration storage.

## Corporate procurement is growing rapidly, but can it mitigate emissions from load growth?

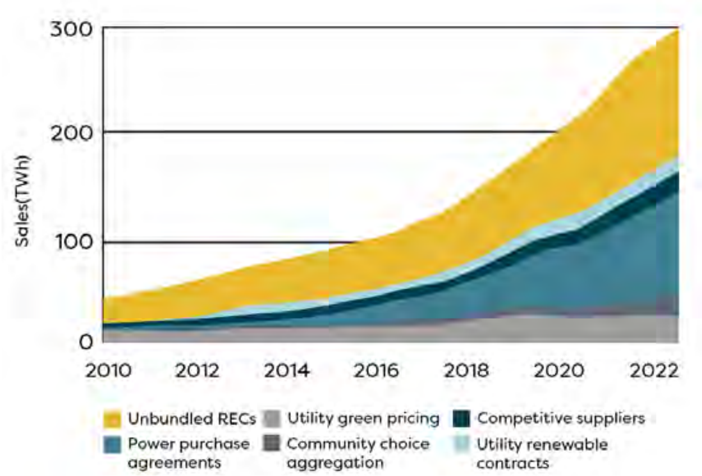
Some of the largest drivers of load growth, including technology (i.e. data center) and manufacturing customers, have charted pathways to meet their own corporate climate commitments by buying "green" power, a term that includes a wide swath of procurement strategies from renewable energy credits (RECs) to virtual or physical power purchase agreements, to self-build behind-the-meter renewable energy (discussed in "A Deeper Look", below). But are those strategies delivering, and do they get us far enough?

Large customers are demanding and buying clean power at a growing rate, but that is not always translating into increased deployment of clean energy resources and emission reductions. According to industry trade groups, corporate buyers have contracted with nearly 65 gigawatts (GW) of clean energy capacity since 2014,[24] and have contracts in place with over 16 percent of US renewable capacity. [25] The voluntary market for "green power" has grown massively over the last decade, from 54 TWh in 2012 to 272 TWh in 2022,[26] and corporate procurement has blossomed from just several hundred MW per year prior to 2015 to nearly 17 GW in 2022.[27] In aggregate, these customers "represent a large amount of electric load and bring significant investment capital to accelerate decarbonization."[28] That's the good news.

The vast majority of corporate procurement is arranged through unbundled RECs and virtual power purchase agreements (VPPAs).[31] As discussed in more detail below, these financial arrangements may

FIGURE 1A

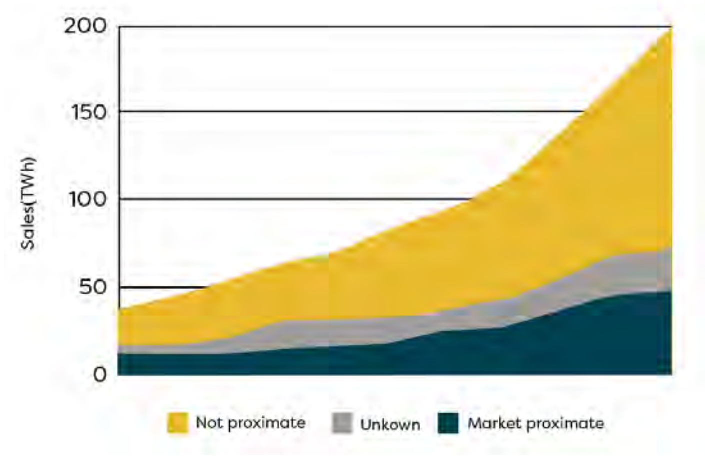
**Voluntary Clean Energy Procurment by Type**




Voluntary clean energy procurment by type over time.[29]

FIGURE 1B

**Voluntary Clean Energy Procurment by Market Proximity**




Voluntary clean energy procurment by market proximity over time.[30]

provide an incentive or financial security for renewable energy producers, but often have no geographic relationship to the system where the demand is actually located. At least two-thirds of voluntary renewable energy procurement is not market proximate[32] to where demand occurs, and thus may have little or no impact on how a specific utility is actually meeting its customer's electricity needs. Texas, Oklahoma, and Kansas alone account for more than half of the renewable energy procured under PPA structures, even though corporate buyers may not be in-state, or even connected to the same grid.[33]

Corporate clean energy procurement has played a significant role in creating a consistent and valuable market for renewable energy, contributing to gigawatts of new clean energy. However, traditional forms of corporate procurement may not be providing the needed market signals to further decarbonize our electric system.

At the extreme, if a buyer signs a contract with an existing producer, it may offer little or no price signal to incent new clean energy that displaces the need for emitting fossil plants.

But even contracts associated with new renewable energy may not meaningfully contribute to additional emissions reductions, particularly if the renewable energy is located in a region already saturated with that same energy. For example, corporate clean procurement has historically targeted low-cost wind and solar energy, but (thus far) very little to battery storage or other balancing resources. Yet battery storage is critical to enabling deeper renewable penetration and emissions reductions—and in some cases are more important than clean energy itself—but under current greenhouse gas accounting standards does not generate offset value for corporate sustainability measures. Instead, many corporate buyers seek only to ensure they have enough renewable energy, in volumetric terms, to meet their needs on paper.

Modeling analyses suggest that voluntary renewable procurements that only seek to match the bulk annual use of a customer with the equivalent amount of annual clean energy ("volumetric matching") do not meaningfully contribute to new clean energy, and do not achieve additional emissions reductions.[34] As stated by one set of analysts, "in other words, all or nearly all of the carbon-free energy procured by voluntary market participants pursuing volumetric or emission-matching strategies would have been generated anyway."[35] (see Box: Meeting clean energy needs?")

**Meeting clean energy needs?**

A new data center requires 100 megawatts of power at its peak (i.e. its capacity requirement). Data centers and large manufacturing facilities may run around the clock, meaning they require that 100 megawatts of power be available every hour of the day. To meet its energy requirements, the data center enters a PPA to buy the energy produced by a 250 MW wind farm that produces, on average, in 40 percent of hours. The data center might contend that it has successfully met the amount of energy it requires in the year (i.e. volumetrically matched) with wind energy

Even if the wind farm is near the data center, the customer still has demands that aren't being met by clean energy when the wind isn't blowing. In those hours, the wider grid supplies the energy - and in most cases that's still gas and coal. When demand drives up requirements during non-renewable hours, utilities start building new fossil facilities, and drive up emissions.

The realized problem may be even worse. If the output of the procured renewable energy doesn't meet the needs of the corporate purchaser in every hour of the year (or when the customer actually has demand), then gas and coal plants will continue to run to generate electricity when clean energy is not online, or be kept in reserve, offsetting the emissions benefits of the clean energy commitment. [36]

This is the crux of the problem driving new gas and delayed coal retirements: even where a new large energy consumer on paper matches all of its annual ***energy*** (megawatt-hours) needs with renewable energy purchases, the utility serving that consumer still may have to build or maintain other sources of generation to meet the ***capacity*** obligations of that new customer. [37] Utilities have a regulatory obligation to ensure they are able to meet the needs of their customers safely, reliably, and cost effectively during all hours of the year; to fulfill that obligation, utilities then seek to ensure that they have the capacity needed to serve their entire load during peak times, plus a reserve margin. So if the large energy consumers' wind farm is not generating electricity, the utility still has to provide reliable electricity to that customer, which may lead a utility to build a gas plant or keep a coal plant running for those hours.

This problem is illustrated in a 2020 Google paper that found that despite having achieved its commitment of meeting 100 percent of its annual electricity needs with renewable energy contracts, most of its data centers were still dependent on fossil fuel-based electricity from the grid during the hours when its contracted projects were not producing energy. Google offered the example shown in Figure 2, which shows the gaps in carbon-free energy associated with variable clean energy from wind and solar.

The problem with many fossil capacity resources is that they operate far more than just the hours needed to service a customer's incremental load. Thermal resources, like coal plants and combined cycle gas plants, have physical operating constraints that make them hard to turn on or off at the flip of a switch. In Google's example, if the hours with "gaps in carbon-free energy" are even partially filled with a coal plant, that coal unit will run right through many of the hours in which carbon-free energy is actually available. Volumetric procurement not only ignores the gaping differences between the timing and magnitude of the carbon-free generation and load requirement, but ignores how the remainder of a utility's system responds.

Princeton's Net Zero Lab framed the issue as follows:

> "Today's most common procurement strategy — known as volumetric or annual matching — proved to be almost entirely ineffective in reducing long-term emissions in the U.S. In a volumetric matching approach, companies can claim full decarbonization by simply calculating their total annual energy consumption and procuring enough clean energy to match that yearly consumption, regardless of when it is actually produced."[39]

So how do we rectify these findings with the assertion that corporate procurement is responsible for a sizable fraction of new clean energy, and where do we go from here?

When renewable energy costs are high, and corporate procurement targets new clean energy projects, the premium for producers may be enough to move the needle on new projects. Today, clean energy is relatively cheap. But for recent supply-chain constraints, the cost of wind and solar has fallen steadily in most regions of the country,[40] and thanks to continued incentives in the Inflation Reduction Act, that trend is likely to continue. The constraint on new renewables is often not price, but the ability to interconnect, and to serve energy during profitable hours. And yet, it is undoubtedly the case that some fraction of voluntary—and even volumetric—clean energy procurement has brought to fruition renewable projects that may not have otherwise transpired. Virtual PPAs that provide price certainty, renewable energy credits that provide a premium to the producer, and physical power purchase agreements all serve to reduce the cost and risk of building new clean energy. And these strategies have allowed corporate players of all stripes to participate in clean energy markets.

But by the same measure, hundreds of corporations now claim carbon neutrality from their electricity operations, what are known as "Scope 2" emissions, when they may have contributed little or nothing to actual emissions reductions by buying cheap RECs from surplus renewable energy. This hasn't gone without notice. For example, in 2020, Walmart announced that "We want to do more than just shift around ownership (and marketing rights) of existing renewable energy, so we have made a decision that under normal circumstances, we prefer not to simply offset our non-renewable power by purchasing standalone renewable energy credits (RECs)."[41]

How can we meet our climate targets while serving increasing amounts of electricity? Next, we offer three potentially powerful routes: 24/7 carbon-free energy, utility regulatory engagement, and mandatory clean portfolio standards.


Photo by, Dennis Schroeder

## POTENTIAL SOLUTION: 24/7 CARBON-FREE ENERGY

*Large energy buyers with climate targets should reorient from annual (or volumetric) renewable energy purchases to hourly tracking to ensure that their energy requirements are being met by local, time-matched clean energy. Doing so can drive clean generation that is able to produce during the hardest hours, storage, and demand management, all of which serve to reduce reliance on fossil capacity and improve system reliability.*

## FIGURE 2

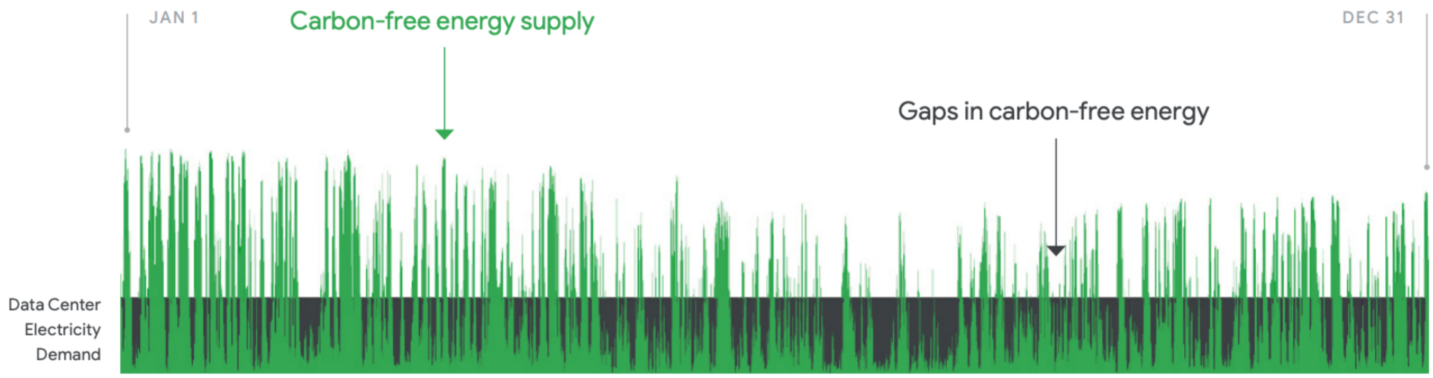



Figure 2. Excerpted from Google "24/7 by 2030: Realizing a Carbon-free Future." Caption reads "Hourly carbon-free energy performance at an example data center. While Google buys large amounts of wind and solar power (symbolized by green spikes below), these resources are variable, meaning that our data centers still sometimes rely on carbon-based resources."[38]

The problem with volumetric procurement—even when it is completely additional—is that it targets the cheapest resources, not necessarily those that are needed to more deeply decarbonize a system. Adding incremental wind to a system already saturated with wind may drive down wholesale prices, and result in excess generation, but leave a gas plant filling in the remaining hours. Instead, achieving the next tranche of emissions reductions requires paying for more premium services, like grid storage.

One mechanism to drive these services is to procure a combination of local clean energy resources—wind, solar, storage, and other zero emissions sources—that together deliver clean electricity around the clock, matching the load profile of the customers (or a group of customers). This procurement strategy, coined "24/7 carbon-free energy" or CFE, is meant to affirmatively demonstrate that a customer's requirements are being consistently met with resources contractually obligated to the customer.

Put another way, a commitment to 24/7 CFE—or hourly-matched clean energy–addresses "the times and places on the grid where emissions have been most difficult to reduce," and where "fossil-fueled resources are currently depended upon" to deliver a reliable grid.[42]

Analyses of 24/7 CFE show that these portfolios have a far larger impact on reducing emissions by displacing fossil power plants, rather than just other clean energy. The efficacy of 24/7 CFE—and the cost to procure customers—increases as the portfolio targets more hours (i.e. 100 percent of hours vs. 90 percent).[43] This type of procurement is complex, and may preclude smaller customers unless it is put together by a third-party or utility.

In 2020, Google announced a goal of achieving what it calls 24/7 clean energy by 2030: enough clean energy to meet its energy and capacity needs in every hour. It was later joined by Microsoft in that commitment. In 2021, a coalition of buyers and suppliers launched the **24/7 Carbon-Free Energy Compact** [44] to expand adoption of this "around the clock" clean energy commitment.[45]

Unfortunately, very few other corporate customers or utilities have yet committed to the 24/7 CFE standard, or are even looking at the issue. As discussed, a 24/7 CFE framework can be applied to direct procurement by large buyers (via PPAs), utility green tariffs, and potentially through developing hourly REC markets.

Photo by, Javier Sierra

## POTENTIAL SOLUTION: UTILITY REGULATORY ENGAGEMENT

*Large energy buyers with climate commitments should actively engage in utility matters through state utility regulatory proceedings to ensure that their host utilities are driving towards cost-effective, sustainable, long-run investments in the generation and transmission system.*

Large customers in restructured electricity markets—i.e. those where utilities do not own generating assets or where customers can directly access wholesale electricity—may procure energy through their own bilateral contracts with clean energy producers. However, customers served by vertically-integrated utilities, or that don't have the ability to arrange for their own procurement, may be compelled to rely on the energy served by their utility. These customers have historically had less access to large, local renewable energy projects, unless arranged through a green tariff or a one-off agreement with their utility.

Customers, however, are not without a voice. Regulated utilities recover their costs through rate cases, justify fuel expenses through fuel adjustment clauses, and often engage in long-range planning and procurement through Integrated Resource Plans (IRP) and certificates for public convenience and necessity (CPCN). Each of these docket proceedings provides an opportunity for customers and public interest organizations to ensure that utilities are both providing competitive, low-cost service and meeting the needs of their customers.

One **critically important** pathway toward substantial emissions reductions at regulated utilities is through persistent engagement by customer groups, ensuring that both utilities and regulators are aware of opportunities for low-cost, clean energy to replace expensive, aging, high-emissions coal plants and preclude long fossil investments in the form of new gas-fired power plants.

Despite their critical importance to customers both large and small, as well as climate, security, and economic development, utility regulatory proceedings are rarified spaces, and incremental voices can be meaningful. As a practical matter, engagement before regulated utilities can take two forms: public comment and formal engagement.

- Public comment allows interested parties, such as customers, to submit recommendations, findings, and priorities to regulators, and can be made more powerful by releasing similar statements publicly via social media, websites, and press releases. For example, in early 2024, Microsoft filed comments before the Arizona Corporation Commission in a resource planning docket, commenting both on potential errors in the utility's demand forecast that could lead to an overbuild of carbon intensive resources, and recommending that the utility pursue long-duration storage, enabling increased renewable energy penetration.[46]

- Formal intervention entails entering docketed proceedings as an interested party, and usually requires legal representation. In docketed proceedings, intervening parties are usually entitled to examine relevant utility records, and may submit expert and/or policy testimony. Regulators are required to consider the positions of intervening parties. As an example, in 2023, Google submitted testimony in a South Carolina utility planning docket, asking that the utility, Santee Cooper, accelerate its investments in solar and storage, improve transmission planning, and look to retire uneconomic coal plants quickly.[47]

Large customers are sometimes represented by trade groups in utility regulatory proceedings. However, trade groups and coalitions may be severely limited by the collective minimum interest of the trade organizations' members. Thus, corporate buyers interested in changing utility outcomes to achieve emissions reductions should consider either entering coalitions with that specific mission, or engaging separately in their own self-interest.

We discuss opportunities for formal engagement in more depth in Recommendation 3, below.


Photo by, Henrik Kam

## POTENTIAL SOLUTION: BINDING CLEAN ENERGY STANDARDS

*Large customers can contribute meaningfully to emissions reductions by advocating for more rigorous state RPS and/or CES, a federal CES, or other binding emissions targets. Customers should seek to ensure that both their energy, and the energy that serves other customers, is on track to meet climate commitments.*

Corporate procurement of clean energy is designed to alleviate the climate or sustainability concerns of specific corporations, and is by design, voluntary. However, corporate procurement is, to some extent, a complicated workaround meant to fill a portion of the gap caused by society's collective failure to internalize the costs of climate pollution. In overly simplified terms, if policy makers agreed that reducing emissions was in our aggregate best interest, and required the electric system to meet specific and meaningful clean energy benchmarks, then large load customers could be agnostic in their procurement: the entire system would be on its way to a cleaner grid.

Today, there are thirty states (and the District of Columbia) with clean energy standards, which either require a certain percentage of a utility's energy to be derived from renewables (renewable portfolio standards, or RPS), or to be derived from low or zero emissions resources (clean energy standards, or CES). See Figure 2 for a map.

The rigor of existing RPS and CES varies widely across states, from New York's requirement for 70 percent renewable energy by 2030, to North Dakota's voluntary objective to reach 10 percent renewable energy,[48] a target which was exceeded more than a decade ago. Using a rigorous CES to achieve real emissions reductions is both a viable, and cost-effective, pathway— but only if states with aging, or absent, standards raise their expectations. Indeed, one of the most effective ways of aligning interests across states, tapping into renewables across the US, and reducing the cost of compliance is to migrate from state-based RPS and CES to a national standard. A federal CES ensures that the entire electric system is decarbonized as load increases, and not just that of individual large customers.

# A Deeper Look at Traditional Corporate Clean Energy Procurement

Corporate procurement describes a broad swath of strategies—ranging in effectiveness—for large customers to directly buy the energy services or clean energy attributes that meet their corporate goals or commitments. Corporate procurement strategies range from purchasing unbundled renewable energy certificates (RECs), to providing the capital to finance renewable projects, to purchasing portfolios of energy (and capacity) designed to meet the needs of a buyer around the clock.

Corporate procurement has been celebrated by some as a key driver of rapid renewable development in the absence of regulatory mandates. By some accounts, in 2020, corporate procurement drove a third of all clean energy additions to the grid.[49] However, this assessment assumes that the clean energy supported by corporate procurement would not have otherwise been added, an assumption that may vary on the basis of the procurement methodology.

In this section we take a closer look at three modes of traditional corporate procurement. In our recommendations below, we examine emerging improvements to these procurement strategies that may achieve substantially better outcomes.

### Unbundled RECs/EACs:

The majority of voluntary renewable energy procurement occurs through the sale of unbundled RECs, or Energy Attribute Credits (EACs),[50] a mechanism for tracking the renewable attribute of a unit of energy separately from the sale of energy itself, and with no financial responsibility for the energy from the renewable producer. RECs are used to both track regulatory compliance with mandatory renewable portfolio standards (RPS), and allow third-party entities, like corporations, to participate in renewable energy procurement at an arm's length, and with relatively little risk (see Box: What exactly is a REC?).

**What exactly is a REC?**

A renewable energy credit (REC) is a tradable credit that represents the attribute of a unit of energy being renewable. Typically, one REC is generated for every MWh of renewable energy provided to the grid. As a practical matter, RECs serve as a premium for a clean energy product, allocating the attribute at any given time to a single owner.

When there is more demand for renewable energy and supplies are thin, REC prices rise. If the renewable market is oversaturated, REC prices fall.

RECs can be used both for compliance with renewable portfolio standards (where they exist), or for voluntary markets (like corporate procurement). A REC used for compliance demonstrates that a utility has supported enough renewable energy to meet its obligations under state law, and a REC used for a voluntary market helps a customer demonstrate that it is contributing financially to clean energy. For example, a utility with a 20 percent renewable compliance obligation that serves 10 million MWh in a year may purchase, and then retire (i.e. never sell again) 2 million RECs, or the equivalent of the output from 600 MW wind farm. Compliance RECs often need to meet specific statutory criteria, such as where they were generated, and tend to be priced higher than voluntary RECs.

FIGURE 3

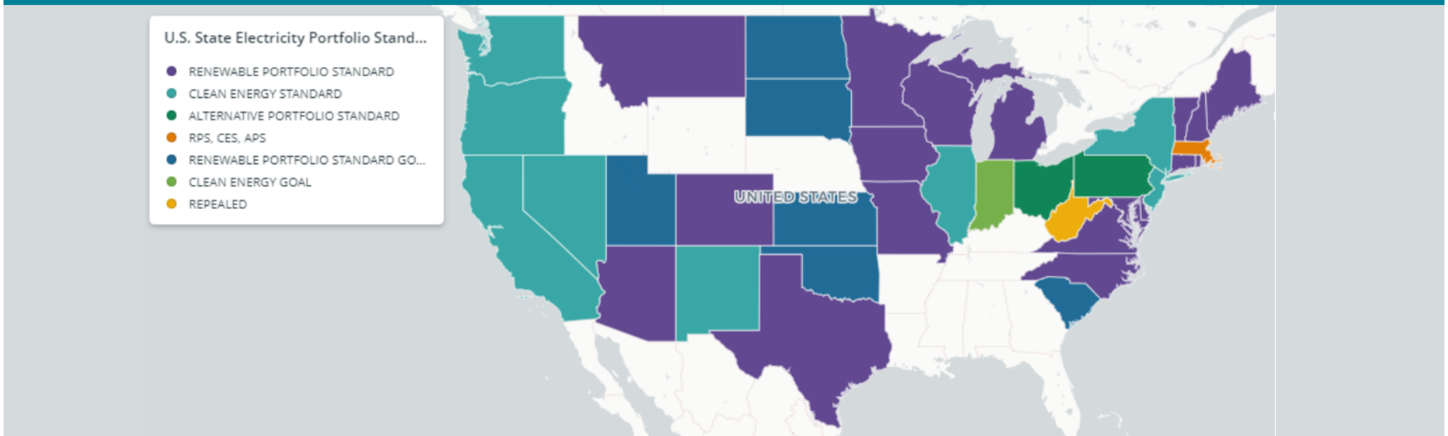



Figure 3. The Center for Climate and Energy Solutions Credit: The Center for Climate and Energy Solutions

Unbundled RECs represented roughly 40 percent of all corporate renewable procurement in 2022.[51] In the United States, 110 million MWh of renewable energy were sold through voluntary unbundled RECs in 2022, [52] accounting for about 17 percent of all domestic renewable energy production. Unfortunately, studies have found that these agreements have little or no impact on the emissions of the host utility serving the buyer, [53] and in most cases have had a diminishing impact on driving new clean energy projects onto the grid. [54]

In broad swaths of the country, renewable growth has outpaced mandatory RPS, [55] and created a glut of voluntary RECs, driving down the monetary and emissions value of these voluntary RECs to near zero. [56] In contrast, however, compliance targets for mandatory RPS and CES in northeastern states have maintained a robust market for RECs, and RECs in some of these states almost certainly contributes to new clean energy.

Because RECs are not currently tagged with a particular time of day, there is no guarantee under current REC market structures to guarantee that the renewable energy generation is matched to the buyer's demand. One reform that would address this could be a shift to time-based REC markets (see Recommendation 9, below).

Unbundled voluntary RECs are also potentially at risk of double-counting, wherein multiple parties may claim some form of credit for the same renewable project.

## Power Purchase Agreements (PPA)

PPAs represent the next largest tranche of renewable procurement. A PPA is typically a long-term contract to procure energy directly from a generator (for example, a wind farm), where the corporate buyer bears financial responsibility for the energy generated by a renewable project. In a physical PPA, the buyer typically takes on responsibility for ensuring the energy is scheduled and delivered to the buyer's load, or the market. In a virtual PPA (VPPA), the buyer typically ensures that a renewable project has a guaranteed fixed revenue, and then receives the variable revenue from that project. In both cases, the corporate buyer takes on the renewable project as a financial hedge, where the cost of energy delivered through the agreement is fixed, and may be lower or higher than prevailing, or spot, energy prices.[57] In almost all cases, the PPA or VPPA is bundled with (tied to) the renewable energy attributes of a specific project. PPAs and VPPAs represent about 34 percent of voluntary renewable procurement in the United States, with VPPAs dominating the voluntary PPA market.[58]

PPAs can either be executed directly with a provider, or "sleeved" through a utility or third-party contract, wherein the utility or third-party is responsible for handling the buying and selling of electricity ("marketing and scheduling" of energy). Buyers working with vertically-integrated utilities (i.e. in the absence of a wholesale market) may seek to sleeve their PPAs through the utility.[59] In almost all cases, PPAs (and VPPAs) require substantial sophistication on the part of the buyer to assess market opportunities, forecast power prices, negotiate terms, and potentially participate directly in scheduling and marketing purchased power. As a consequence, this model may not work for smaller buyers that do not have dedicated energy teams.

Historically, most PPAs have been volumetric—i.e. a buyer seeks to procure a bulk amount of energy from a producer, irrespective of when it is produced, and then either markets that energy as a price hedge, or (in a delivered, physical PPA) uses the energy when needed, and markets the remainder. However, some leading customers are beginning to engage with 24/7 CFE PPAs, where a third party or the buyer itself puts together portfolios of resources meant to cover as many hours as feasible (See Recommendation 2, below).

## Green Tariffs

Green Tariffs are tariffs, or electricity rates, designed by utilities to provide clean energy to large customers. They currently represent just 7 percent of voluntary renewable energy sales in the US,[60] but are a growing mechanism for corporate buyers to procure clean energy in states with vertically-integrated monopoly utilities rather than deregulated energy markets.[61] In particular, as climate-conscious tech companies and manufacturers build new facilities in states with no competitive markets, they increasingly demand green tariffs from their utilities, and a growing number of utilities are offering these programs.[62] As noted by the Regulatory Assistance Project, "[t]he success of these programs demonstrates that customer interest in clean energy is at an all-time high, with many willing to pay a premium to participate."[63]

Some green tariffs operate similarly to sleeved PPAs, where buyers can specify (within boundaries) the renewable energy provider(s) with which they want to contract, while other green tariffs are subscription models, akin to residential green pricing programs, where the utility selects the providers and offers a tranche to large buyers. Tariff models have the advantage of being accessible to smaller buyers, or those that do not have dedicated energy procurement teams, because the

Photo by, Hugh Kenny. The Piedmont Environmental Council

details are handled by the utility. Green tariffs also require regulatory review to ensure they do not disadvantage non-participating customers (like residential consumers), and many have capped participation.

The efficacy of a green tariff program depends on the design of the tariff, and interest(s) of the sponsoring utility. A green tariff can be substantially less effective at advancing grid decarbonization where they are not tied to the addition of new clean energy projects, fail to meet energy and capacity obligations of the utility, would have been built as a least cost solution irrespective of the tariff, or are simply not built by the utility (see Box: Swapping customer and corporate clean energy [64]). However, emerging novel green tariff structures may provide some of the benefits of 24/7 CFE procurement (see Recommendation 2, below).

**Swapping customer and corporate clean energy: Georgia Power's degraded green tariff**

In late 2022, Georgia Power announced that it had not fulfilled 1,030 MW of subscribed demand for large buyer renewable energy under its new Customer Renewable Supply Procurement (CRSP) green tariff program, having rejected all of the bids in the second tranche of the program. In September 2023, the company asked for permission to take 500 MW of renewable energy out of its existing portfolio - paid for and benefiting all retail customers - and use that to satisfy the contractual obligation for its CRSP green tariff. The solar projects transferred under this 2023 swap were all built prior to 2021. In effect, under the swap, Georgia Power removed the emissions reduction benefit of its green tariff.

# Demanding Better: Evolving Best Practices for Regulators, Advocates, and Large Customers

We recommend that large customers, utilities, regulators, and advocates consider the following best practices to ensure load growth needs are met with clean energy rather than deeper entrenchment of reliance on fossil fuels. Given the pace and scale of load growth, our recommended best practices are likely to evolve as novel practices are refined, and utilities, customers, regulators, and stakeholders learn from each other.

## Recommendation 1: Large customers should assess their host utilities' decarbonization plans when siting

Many large customers are powerful voices for economic development, and recruiting them is often vital to their host states. New commercial and industrial electric utility customers may provide thousands of jobs, and a much-needed investment injection into underinvested communities. Large customers can play an important role by conditioning their own decision to grow in a utility's territory on whether the utility will meet that growth in a way that advances the transition to a clean grid. When deciding where to grow operations, large customers with climate commitments should also consider the utility's own climate commitment and track record towards decarbonization.

Sierra Club's Dirty Truth Report [65] grades major utilities on their progress towards a clean energy grid, and is a useful tool for large customers seeking to identify places to expand their operations.

## Recommendation 2: Large customers should migrate past annual volumetric renewable purchases to pursue either 24/7 clean energy or other forms of rigorous clean energy and capacity procurement

One of the most important steps that large corporate climate leaders can take is to move away from annual clean energy commitments and toward clean energy procurement that addresses both energy **and capacity** needs. One of the most promising structures today is the 24/7 CFE procurement framework, either executed through a PPA or green tariff. A recent deep dive by the Regulatory Assistance Project (RAP) provides several recommendations for designing 24/7 procurement and tariffs to benefit both large customers and utilities, and avoid impacts to non-participating ratepayers.[66]

**In deregulated markets,** large customers can directly procure 24/7 CFE from suppliers via PPAs. For example, in 2021, Google announced it had entered into a contract with the energy provider AES [67] that it has since cited as a model for the type of 24/7 clean energy portfolio deal it now seeks. According to media sources, that contract includes a 10-year commitment by AES to meet 90 percent of Google's Northern Virginia data centers' needs via a 500 MW portfolio of wind, solar, hydro, and battery storage resources to be developed or contracted by the power provider. Google has since proposed a model structure meant for broader competitive wholesale or retail electricity markets. [68]

**In regulated markets,** there are two main models that climate-committed buyers should prioritize: 24/7 CFE tariffs, and "bring your own" capacity and energy tariffs. The 24/7 CFE tariff is structured by the utility, and approved by regulators, to have no impact on other customers, and (ideally) provide the full range of 24/7 CFE services being sought by customers. The advantage of a green tariff structure is that the utility can both co-optimize the remainder of its system with the 24/7 CFE resources under the tariff, and take responsibility for contracts with the provider.

As of this writing, there are not yet formalized utility-run 24/7 CFE green tariff structures available. However, NV Energy, in collaboration with Google, has proposed a green tariff structure in Nevada [69] meant to allow customers (in the first instance, Google) to create a 24/7 CFE. [70] In this instance, Google proposed a partnership with enhanced geothermal provider FRVO to provide around-the-clock energy to a new data center. Similarly, Duke, Amazon, Google, Microsoft and Nucor recently announced an agreement to explore the 24/7 CFE approach in North and South Carolina. According to Duke, [71] the proposed Accelerating Clean Energy (ACE) tariff would allow large customers to "directly support carbon-free energy generation investments through innovative financing structures and contributions that address project risk to lower costs of emerging technologies," and would "facilitate beneficial on-site generation…and participation in load flexibility programs…". It would include a "Clean Transition Tariff" to allow Duke to provide individualized clean energy portfolios of clean energy to match data center load.[72]

The second model for 24/7 CFE is a "bring your own capacity and energy" model that would allow buyers to identify resources that meet their requirements. In effect, these types of transactions are similar to physical PPAs, except sleeved through the utility. Under a "bring your own" framework, the utility still acts as the offtaker for the energy, and takes responsibility for scheduling and marketing the energy from the identified resource, but passes the costs (and benefits) of the service through to the buyer. Strictly speaking, the NV Energy proposal is akin to a "bring your own" framework, as is an early-stage proposal in Georgia.[73]

### Recommendation 3: Large customers should actively engage in utility proceedings to demand a clean energy transition

In vertically-integrated regulated utilities, key decisions about the electric grid's future often happen at the Public Utility Commission (PUC), the state utility regulator. Resource planning in Integrated Resource Plans (IRP), rate cases, and Certificates for Public Convenience and Necessity (CPCN) can all have dramatic impacts on how utilities acquire (and retire) resources and run their systems. Historically, large customers have pulled up to the table primarily to advocate for their rate interests—but more comprehensive regulatory engagement can result in effective clean energy deployment.

Large customers with an interest in cost and a decarbonized electric system should ensure that utilities are conducting all-source procurement,[74] are advancing cost-effective renewable, storage, and transmission projects at scale and speed, aren't charging customers for uneconomic coal operations, [75] are appropriately planning for coal retirements, [76] aren't protecting stranded assets at customer cost, or simply shuffling resources.[77] Large customers with climate commitments should explicitly ask that utilities meet their energy and capacity needs with clean energy and capacity, not continued reliance on coal or large gas buildouts.

Engaging in utility proceedings requires resourcing legal and utility experts, but can yield extraordinary returns by fundamentally changing the fabric of a utility's resource mix, incentives, and ultimately its business model. And clean, cost-effective energy benefits everyone, not just the buyer.

At the highest level, it is **insufficient for large corporate buyers to limit the scope of their participation in the energy transition to corporate procurement or green tariffs aimed at meeting their specific demand.** It is critically important that large buyers engage their regulators and utility providers to ensure their host utilities are both not simply shifting cost, risk, and emissions from large loads to other rate classes, and are working to transition their **entire** systems to clean energy, not just the fraction associated with large customers.

Large customers are often influential stakeholders with decision-makers, and the utilities benefit by addressing the demands of the large customers without addressing the demands of the general public. Large customers' voices are needed to push utilities towards a system-wide transition to clean energy. System-wide solutions also lower costs for all customers, reduce the risk of misalignment between large customers and other rate classes, and ensure that solutions are real, incremental, and additional. In other words, system-wide solutions remove doubt that large customers are contributing to lower emissions.

Investor-owned regulated utilities are generally supposed to minimize costs when making infrastructure investment decisions to ensure the lowest electricity costs for customers. Utilities, however, are responsive to other factors, including political pressure, profit maximization, and corporate inertia. Too often, regulators may approve utility requests to add new supply-side generation to rates without first carefully reviewing whether a utility has adequately justified the need for the resource or even, in many cases, requiring utilities to show its proposed resource is lower in cost than clean alternatives. As a result, without sufficient engagement by other stakeholders, utility decision-making may not reflect the most cost-effective outcomes for ratepayers, nor will it necessarily deliver the clean energy that customers are demanding.

While studies show that our electric system can be substantially decarbonized cost-effectively, doing so will require creative solutions from utilities, and rigorous oversight from regulators and consumers. **Consumers, including large customers, can and should participate in utility matters before state**

**regulators, either formally or informally (as discussed previously),** to ensure that those solutions are examined, to the benefit of both the buyers, and the system as a whole.

There are four key engagement opportunities for large customers: rate cases, Integrated Resource Plans, certificates for public convenience and necessity, and green tariff dockets.

### 1. General rate cases

Rate cases are important proceedings where utilities seek to adjust rates to ensure that they are recovering their costs of providing power to customers—plus a guaranteed rate of return. During a rate case, regulators open utility books to examine the utility's finances, how the utility has proposed to structure rates to recover costs from customers equitably, and may assess major investments of the utility to determine if they were reasonable, or prudent. Rate cases also set the utility's guaranteed rate on equity (i.e. the interest rate that utility investors can expect to earn), historically at 10 percent or more.

A rate case provides intervenors an opportunity to assess if a utility has made decisions that are in the public interest, and provides some of the only leverage available to regulators to hold utilities accountable. If a utility made an imprudent investment (i.e. was not the right decision, or for which the utility failed to control costs), regulators can choose to disallow those costs (i.e., prevent the utility from recovering costs from ratepayers) or may reduce the rate of return.

Large customers can use utility rate cases as opportunities to ensure that utility decisions are not only reasonable and prudent, but are also compatible with their long-term interests. Consumer advocates engage to protect the interests of residential customers and the general public. Intervenors can submit testimony to regulators on utility decisions, such as investments in fossil infrastructure or extended fuel contracts, and non-decisions, such as failures to appropriately invest in clean energy, storage, transmission, or demand management.

### 2. Integrated Resource Plans (IRPs)

IRPs are forward-looking proceedings conducted in many vertically-integrated states that ask utilities to assess their requirements and resources for the next two to three decades. In an IRP, a utility will typically solicit input from stakeholders, and use information about their system and forecasts—of demand, weather, economic conditions, commodity and fuel prices, and potential future regulations—to develop a model of their system. Key findings from an IRP may include resource decisions within the next five years (i.e. new power plants, retirements, or transmission lines), or new contracts or requests for proposals for resources.

In some states, IRPs are contested proceedings, where the utility and intervenors may file testimony, and the Commission will formally accept or reject the IRP (or elements of the IRP). In other states, IRPs are conducted informally and presented to the Commission for filing. While IRPs do not always have "teeth," they often set the expectation for how a utility will conduct business, and many commissions rely on findings from IRPs to inform their evaluation of future decisions, such as the need to build a new gas plant or solar farm, for example.

**IRPs are often the best forum to ensure that a utility is fairly considering clean energy portfolios** and the transmission required to deliver that clean energy. Additionally, intervenors can ensure a utility is not unreasonably favoring maintaining or building fossil-based assets, has assessed cost-effective opportunities to retire high-emissions fossil units, and has appropriately forecasted energy demands. Large customers may be some of the best equipped to weigh in on the accuracy of the utility's industrial load forecast, and may have the resources to ensure that an IRP model is well conducted, and represents the best possible set of portfolios going forward.

A 24/7 clean energy tariff offered in the utility's territory should also be co-optimized and aligned with the comprehensive Integrated Resource Plan towards overall grid decarbonization.

3. Certificates for Public Convenience and Necessity (CPCN)

CPCN [80] are requests by utilities to acquire a specific resource (such as a new gas plant) or make a large-scale capital investment on behalf of ratepayers. A CPCN is designed to provide an assurance to a utility that, once approved, a specific capital expense will be allowed into rates, assuming that it was prudently managed. Like IRPs, CPCNs typically include intensive modeling, but are usually restricted to scenarios examining the value of the specific capital expense or resource decision relative to alternatives. A CPCN is, practically speaking, often the last opportunity to assess and comment on a resource choice. Large customers can participate in CPCNs to ensure that newly identified resources are, in fact, not only least-cost, but also meet their expectations of their host utility's investment decisions.

4. Green Tariffs

Green tariffs (discussed in the "Deeper Look" section) offer opportunities for customers to procure energy with clean attributes. However, the structure and rigor of green tariffs varies widely across utilities, ranging from unbundled REC purchases to RECs produced by renewable projects identified and owned by the utility to specific new projects identified and negotiated with a utility.[81]

Green tariffs must be approved by utility regulators to ensure that they cause no harm to existing customers and other rate classes (such as residential customers). Large customers can engage in green tariff creation, and approval processes to ensure that these tariffs are robust, additional, and result in real emissions reductions for the premiums that they demand.

It is important for regulators, and ratepayer advocates, to ensure that green tariff designs do not simply shuffle around existing resources, giving lower emissions (as well as cost and risk) to large corporate buyers and leaving other rate classes with higher cost and risk resources in their rates.

## Recommendation 4: Large customers should advocate for fair market rules and robust transmission planning

Two-thirds of the nation's electricity load is served in wholesale electricity markets, run by Regional Transmission Operators (RTOs). These markets, including PJM (serving the eastern seaboard from Virginia to New Jersey and out to Illinois), NYISO and ISO NE (serving New York and New England states, respectively), MISO and SPP (serving the central swath of the US from the Gulf Coast and Oklahoma to Michigan and North Dakota), ERCOT (serving most of Texas), and CAISO (serving California, and parts of the West) not only act as the auction houses for real-time energy markets, but set the rules for capacity accreditation, renewable interconnection, and transmission expansion.

RTOs have a powerful influence on utilities' and independent power producers' ability to interconnect clean energy; whether transmission, engineering, and market structures enable electricity from renewable resources to reach consumers when they need it; and how clean energy is valued in state- and utility-specific planning processes. Large customers should actively engage in RTO spaces and at the Federal Energy Regulatory Commission (FERC) to ensure that market rules, interconnection queues, and transmission plans are **fair to clean energy and storage** [82] and are not artificially biasing markets towards fossil infrastructure.

### Recommendation 5: Regulators should require new large customers and utilities to be transparent about their load projections

Utilities are required to build or buy enough energy and capacity to meet load projections, because coming up short on capacity is an emergency. But this means overbuilding is a real possibility, and comes at the expense of ratepayers. Moreover, for the reasons discussed above, utilities often have a profit, as well as reliability, motive to err on the side of high-end estimates.

The more transparent, careful, and staggered large customers' load growth and load projections are, the more likely it is that utilities will be able to meet that demand in a way that is responsible to both the climate and ratepayers. Incremental load additions to the system can facilitate reasonable planning; large blocks of new load can strain even the best system planning. A utility facing a 50 percent increase in demand from new interconnection requests might have reason to doubt that new customers will actually transpire,[83] and might also be tempted to shortcut least cost planning to serve new customers. Large load customers have a **public interest obligation to provide transparency** on their requirements, even under competitive pressure.

Similarly, utilities must be able to show the basis of their load forecasts. Historically, many utilities used econometric modeling to extrapolate likely requirements from historic data, taking into account expected population changes, weather patterns, economic patterns, and shifts in end uses.[84] Increasingly, however, a significant amount of load growth is expected to come from novel, large customers, like data centers and chip manufacturers. In PJM, for example, nearly all summer peak load growth between 2024 and 2030 (over 17 GW) is attributable to "exogenous" adjustments for data centers, new industries, and electrified ports.[85] Getting these factors right is critical.

Regulators must hold utilities accountable for designing portfolios on the basis of realistic, not speculative, load. As Microsoft commented in a recent Georgia IRP docket, load forecasts should be based "primarily on known, mature projects that have made firm commitments" to the load-serving entity.[86] Not only does building on the basis of speculative load potentially harm ratepayers, but it puts the utility at risk as well. In June 2024, Fitch Ratings issued a report stating that utilities seeking to overbuild could face substantial credit risks, if "the estimated load does not materialize" subjecting excess costs into cost recovery uncertainty.[87]

In addition, regulators with utilities experiencing rapid growth should consider requiring utilities to disclose large interconnection requests, and the status of those requests.

### Recommendation 6: Utilities and large customers should work together to maximize demand management capabilities

It is not enough for utilities to produce enough energy to meet demand; they have to guarantee the capacity to generate sufficient demand at peak periods. Because renewables are often accredited at much lower values than fossil fuel plants, there are strong incentives to build gas generation, in particular, to meet these capacity obligations. Even if customers use the same amount of electricity on an annual basis, they can have an outsized impact in avoiding new fossil fuel investment (or enabling coal retirements) by participating in demand management programs that allow utilities to subtract some or all of the customer's load from its peak obligation. Large customers can ease pressure on utility systems by exploring options to manage their own demand, including engaging in utility demand-response programs, staging highly-intensive processes to be coincident with lower net system demands, investing in storage to shift demand periods, and offering backup batteries as system resources.

Transparency is needed regarding the flexibility of data center load. Google has piloted the use of "carbon-intelligent computing platform"[88] to shift tasks and associated energy consumption to the times and places where carbon-free energy is available on the grid. The extent to which demand flexibility can play a role in managing data center load growth is not yet clear, but regulators should ensure large customers are incentivized to maximize use of demand response.

### Recommendation 7: Large customers should transition to batteries as backup, not diesel or gas generation

Data centers and other processes require highly reliable energy to maintain on-site backup generation. The vast majority of data centers utilize on-site backup generators, of which the vast majority are diesel fueled. While backup generators are designed to only operate under emergency conditions, the potential emissions from these facilities can be extraordinary—with significant, localized impacts on air quality.

A research effort in Northern Virginia revealed air permits for over 11,100 MW of diesel backup generators in five municipalities alone [89] - more than **7 percent of the entire peak demand** of the 13-state PJM region. The effort revealed over 4,500 operational generators, averaging 2.4 MW each. One permitted facility alone housed 245 generators, averaging nearly 3 MW each for a total facility generating capacity of 716 MW, [90] larger than most coal or gas units operated by utilities. The capacity of diesel generators in the region, just to provide backup capacity to data centers, is equivalent to the peak demand of PacifiCorp, a utility that serves customers across six western states.

There are potentially deeply adverse health impacts from simultaneously operating (often-uncontrolled) high-emissions generators in close proximity to population centers. While each backup generator may be a small source unto itself, during an adverse event, thousands of diesel generators can result in toxic air quality conditions. Adding together the permit conditions for data center backup generators in Northern Virginia suggests that emissions from these facilities alone could double the electric sector's emissions of oxides of nitrogen (NOx, an ozone precursor) and contribute to between 50-70 premature mortalities each year.[91]

In addition to adverse health impacts, backup generators represent an extraordinary amount of capital deployed to protect very few operational hours. In many cases, there may be opportunities to require a large portion of these generators to be non-emitting—such as battery storage, as demonstrated in a pilot project in Belgium. [92] Battery storage facilities co-located at large load centers can also provide valuable utility services for balancing and shifting renewable generation, and relieving temporary grid congestion.

Replacing these backup generators with on-site battery storage, and then leaning on that storage during high net system demand [93] periods (and not coincidentally, high cost periods), would avoid a concerning new source of air pollution, significantly reduce strain on the electric system, and bolster renewable integration.

### Recommendation 8: Regulators should require utilities to conduct rigorous system planning modeling of the clean and affordable pathway to meeting load growth—before it's an electricity emergency

Irrespective of the engagement of large customers, utility regulators must hold utilities responsible for assessing how to meet load growth in long-term planning, without forgoing best practices.

Utilities have an obligation, either statutory or implicit, to model how a cost-effective system for meeting customer requirements should look like over the foreseeable future (usually 10-20 years).[94] This type of modeling, called capacity expansion modeling, identifies a cost-effective set of supply-side resources (wind, solar, battery storage, gas plants, etc…) and demand-side management resources (energy efficiency and demand response) that meets the utility's load forecast and reliability needs.

While modeling capabilities have dramatically improved in the last two decades, many utilities have also experienced relatively flat demand during that time. Today's problems require technically-advanced capacity expansion and production cost models that are able to handle high temporal resolution and chronology to capture variation in electricity generated from renewable resources and the value of long-duration storage. In addition, models need to be able to assess opportunities for new transmission, demand response, and customer-sited solar and storage.

Rigorous modeling must first seek expansive solutions prior to imposing hypothetical technical constraints. For example, alternative modeling for Dominion's (VA) IRP in late 2023 revealed that the constraints the utility artificially imposed on the amount of solar and storage that could be built, and its assumption that supply chains for solar would be indefinitely constrained, forced the utility's model to identify substantial new gas builds as the least-cost solution.[95]

Modeling also needs to be conducted in a timely fashion, before a utility starts claiming it cannot meet demand requirements with known resources. For example, in late 2023, Georgia Power submitted an update to an IRP that had been approved just one year earlier, but now projected that the utility's demand would be 20 percent higher by 2030 than anticipated in 2022, largely due to new data center interconnections.[96] This last-minute rush is certainly avoidable, particularly with realistic interconnection timelines for new loads, and transparency from new customers.

### Recommendation 9: Policy makers and registries should work together to create a national system for tracking and verifying hourly emissions to facilitate time-based REC markets (T-EACs)

Power producers and large buyers may be able to substantially expand the availability, and ease of acquiring, 24/7 CFE portfolios through time-based RECs or EACs, referred to as T-EACs. T-EACs produce an hour-linked renewable credit, differentiating the value of credits generated during hours in which renewable energy is readily available, and hours in which renewable energy is more scarce. When T-EACs are purchased from market-proximate producers, they allow buyers to effectively invest in 24/7 CFEs without arranging the full sets of services required under a PPA.[97]

With T-EACs, a buyer seeks to acquire T-EACs for every hour of their demand. Clean energy produced during an hour of the year in which renewables are readily available and/or system demand is low (like daytime during the shoulder seasons) would yield a relatively low price, while clean energy produced during adverse conditions (such as cold, darker, and still winter conditions) would command a premium, providing a much needed boost to technologies that are able to deliver in those hours.

A Princeton analysis in 2022, supported by Google, finds that T-EACs reduce the cost of procuring 24/7 CFEs by allowing both producers and consumers to tap into both demand and supply diversity.[98] In addition to a lower cost, the T-EAC framework allows buyers to enter into a more nuanced market even without a dedicated team, and allows smaller and lower-credit entities to participate. The T-EAC study also demonstrated that the price transparency of a market-mechanism would likely widen the market (for both buyers and sellers), and allow demand-management to more actively participate.[99]

Under a 24/7 CFE PPA framework, each individual consumer (or clusters of consumers) are required to arrange for a boutique portfolio. Under a T-EAC, the market prices, in aggregate, should start to develop a portfolio that meets the needs of a larger block of consumers.

Several renewable energy certificate registries in the United States have already started to adopt hourly tracking mechanisms to allow for T-EACs. Both M-RETS [100] (the registry for the upper midwest) and PJM-GATS [101] (serving the PJM interconnection from VA and NJ to IL) have adopted an early mechanism for tracking hourly renewable generation, and several other registries are on track to develop hourly platforms. The standardization of these products, and their socialization, could dramatically improve access to 24/7 CFEs.

### Recommendation 10: Large corporate buyers should consider partnering with utilities to permanently buy down emissions

The vast majority of US coal plants are more expensive to operate than buying renewable energy, [103] and portfolios of clean energy are often more cost-effective—and result in less stranded cost risk—than new gas.[104] Despite the generally prevailing economics, some utilities still struggle to replace uneconomic coal given outstanding debt,[105] or cross other logistical barriers to retiring coal. Corporate buyers searching for a clear demonstration that they are contributing to emissions reductions may have an interest in partnering with utilities to, in effect, buy down emissions by financing higher risk transition activities (such as stranded asset costs), providing low-cost financing for packages of clean energy, storage, or transmission in exchange for a firm transition commitment, or supporting the premium that tips a battery storage facility over the top, relative to a new gas plant.

FIGURE 4

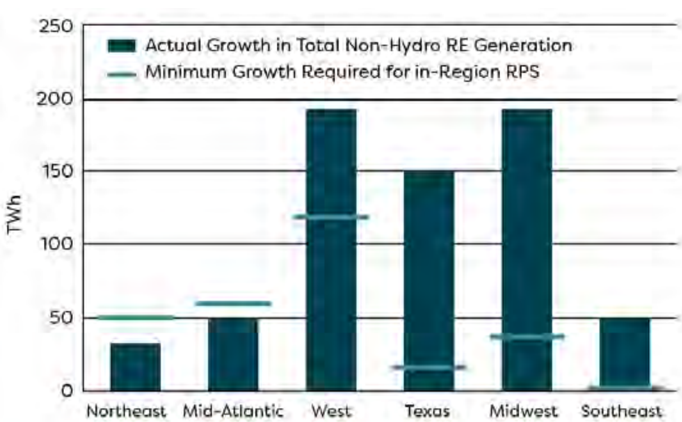



Figure 4. Growth in non-hydro renewable generation, 2000-2023, relative to state RPS requirements. From Barbose, 2024 (LBNL).

### Recommendation 11: Regulators should ensure large buyers pay their fair share of transmission and system costs

Most regulators aim to allocate the total system costs to different classes of customers (residential, commercial, industrial) on the basis of causation. Under the cost causation principle, the cost of services (and facilities) must be allocated to customers that benefit from those services. However, as demand balloons in some regions due to specific customer classes, it is critical to ensure that existing customers do not bear the incremental cost for the infrastructure required to support those new customers, including new generation, interconnection, and transmission costs.

For example, in early 2024, the Maryland Office of People's Counsel, the ratepayer advocate for the state, filed a complaint before the Federal Energy Regulatory Commission (FERC) that the explosive growth of data centers in Virginia were largely responsible for new transmission costs, and that those transmission costs should not be borne by Maryland ratepayers.[106] The complaint specifically cites Virginia's subsidies that Maryland claimed had driven data center demand growth, but as a consequence of this growth, Maryland ratepayers would shoulder more than a half billion of transmission costs, more than their fair share according to the complaint, given their lack of explosive growth similar to that in Virginia. In April, FERC turned down the complaint.[107]

To ensure existing customers are not harmed by a sudden influx of new large customers, utilities, regulators, and consumer advocates facing large load growth forecasts should consider implementing minimum term commitments and demand charges for new customers over a certain size threshold. For example, in response to 30 GW of service inquiries, AEP Ohio recently proposed a tariff that would apply to data centers larger than 25 MW and crypto/mobile data centers larger than 1 MW that would require those companies to make a 10-year financial commitment to the territory (or pay an exit fee after 5 years).[108] This is needed, according to AEP, in order to prevent other customers from having to pay for new transmission facilities in the event the load does not materialize. Data centers would also be required to pay minimum demand charges based on 90 percent of their contract capacity.

### Recommendation 12: Large buyers should partner with state policy makers to tighten mandatory renewable portfolio standards (RPS) and clean energy standards (CES), or better, develop a federal CES

One of the most cost effective mechanisms of achieving a clean energy future, both with large corporate buyers and the remainder of the electric system, is to collectively invest in mandatory clean energy standards. Rather than individual companies seeking boutique solutions to zero out their emissions impact, a mandatory CES—and in particular a federal CES—creates a consistent, predictable approach towards achieving critical climate targets at a lower cost.

Many RPS were established decades ago, and while some have been made more rigorous over time, nationally renewable energy has grown faster than established RPS.[109] In much of the country (including the West, Texas, and Midwest), non-hydro renewable energy has grown anywhere from 50 percent faster to several times faster than required by RPS, while only the Northeast and Mid-Atlantic are short on renewable energy relative to statutory requirements (see Figure 4). While the evidence suggests that these mandatory CES have been effective in some locations at launching new renewable energy, they clearly require that states with no target, or insufficient targets, adjust to drive further gains.

Clean energy standards (CES) are fundamentally technology-neutral, allowing for storage, geothermal, and even nuclear and high-performing carbon capture to participate, as cost-effective. Under this construct, novel technologies that provide system value for high renewable penetration, like long-duration storage, can gain market share and show value. CES have been adopted in 16 states since 2017.

A national CES would promote the buildout of lower cost renewable energy, and the transmission and storage required to ensure that energy makes it to market, reducing the cost of achieving a sustainable, low carbon future. [110] The pathways towards deep decarbonization and rapid electrification—and load growth—are far more cost effective when conducted as a national, rather than state or regional, approach. In 2022, the Clean Energy Buyers Institute (CEBI, precursor to CEBA), found that a 100 percent by 2035 national CES reduced emissions more than twice as much as 100 percent goals at vertically-integrated utilities alone or wholesale markets alone, and far more than the 42 percent clean energy in their reference case.[111]

Today, some of the largest single drivers of economic development and load growth are corporations with established climate targets. These companies, as well as the plethora of civic-minded smaller commercial and industrial buyers that are actively engaged in REC and EAC purchases, can dramatically multiply their impact on climate and the environment by partnering with federal and state policy makers to both dramatically improve aging RPS standards, bring new states into a CES framework, and set the stage for a national CES.

## In Closing: The Path Ahead

The last two years have seen tremendous growth in novel industries in the United States. Driven by breakthroughs in AI and cloud computing, and massive new investments in clean energy manufacturing, commercial and industrial energy users are driving economic development—and massive electric demand growth. Paired with new demands from electrification of homes, businesses, and industries, utilities and utility regulators have shown unfortunate signs of throwing out not only climate and carbon targets, but potentially good planning and procurement as well. As a result, news cycles have keyed in on the narrative that new demand is driving us away from meeting climate targets. But the very customers that are at the heart of this new growth can be, and in some cases are already, drivers of a cleaner grid. But to get there, it is imperative that large energy buyers and corporations—as well as regulators, advocates, and policy makers—**demand better** of our utilities, our electric systems, and our clean energy policies.

Already, leading buyers like Google, Microsoft, and Nucor have announced deals that specifically address utility barriers to cleaning the grid, introduced public and formal comment into utility regulatory proceedings to drive new conversations, and fundamentally shifted the way that they report their climate progress. Leading REC registries like MRETS and PJM-GATS have introduced early versions of hourly trading platforms to enable broader access to 24/7 carbon free energy, and utilities like NV Energy have proposed "bring your own" capacity and energy green tariffs to allow buyers to engage with robust clean energy sales. The pathway to a more robust grid is being charted.

But there is substantial work ahead. Utilities in the Southeast are seeing some of the fastest load growth from new industries, but lag the furthest behind in formal clean energy targets, climate targets, or robust green tariffs. And utilities and producers with large coal portfolios are still fighting to attract new loads to prop up aging, high emissions infrastructure, from private coal operators in Indiana [112] to coal-heavy utilities in Kentucky, [113] to the fantasy of gas pipeline companies hoping to serve new AI customers. [114]

Powering a cleaner grid with new electricity loads is both feasible, and with the advance of the Inflation Reduction Act, affordable. But reaching real, and rigorous, emissions reductions is going to require collective work from large buyers, utilities, regulators, policy makers, and advocates. Large buyers can, and should, start this process by making their intentions clear, and then follow through either with transparent deals to advance 24/7 CFE and clean energy, advocate before their utilities and service provider regulators, be transparent about their needs and interests, and work towards policy and regulatory frameworks that can advance RPS and CES. Together, we can power a zero emissions economy.


Photo by, Hugh Kenny, The Piedmont Environmental Council

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[57] For this reason, many sophisticated clean energy buyers have preferred to pursue deals in competitive/deregulated states where they have access to market prices.
[58] O'Shaughnessy, Jena, and Sumner, 2024 (underlying data).
[59] Note that some utility-sponsored green tariffs use a sleeved PPA framework, wherein the buyer identifies the renewable project from which they will procure energy. For the purposes of this report, we aggregate sleeved PPAs in the PPA category because they are tracked similarly to PPAs by RE100 and NREL.
[60] O'Shaughnessy, Jena, and Sumner, 2024 (underlying data, "utility contracts").
[61] Restructured states are those that opted to separate energy delivery utilities (i.e. those that own meters) from energy generation. In these states, generators competitively bid into a wholesale market, and utilities procure from the market. Because of the separation, large commercial and industrial buyers, and independent power marketers, can (and do) buy directly from the wholesale market. This structure enables direct bilateral relationships between generators and large buyers.
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