2026 INSIGHT REPORT

The Grid at a Crossroads

Flexibility, Demand, and the Choice for an Affordable Energy Future

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By **Candice Ammori, CEO of Climate Vine**
with Michael Greenhouse, Editorial Advisor

Climate Vine | 2026

About Climate Vine

Climate Vine is a curated peer network that convenes senior leaders across clean energy, finance, regulation, and technology. These leaders share hard-won insights, compare notes on what is working, and accelerate solutions across the messy middle of the energy transition.

In late 2025, Climate Vine brought together experts spanning utilities, grid operators, data center developers, regulators, financiers, and community advocates to confront a shared diagnosis: the U.S. energy system is not limited by technology. It is limited by the policies, incentive structures, and governance frameworks that determine how existing capacity is used.

The insights in this report are drawn exclusively from Climate Vine's speakers, experts, and members. Learn more: climatevine.co

Executive Summary

The United States is entering an energy crunch unlike any in recent memory. Demand for energy is spiking while the grid remains governed by rules and incentives built for a slower, more predictable era. The problem is less about technology than about the policies and structures that determine how the grid operates.

In late 2025, Climate Vine convened leaders from clean energy, technology, finance, and policy to confront this reality and chart a path forward. The insights presented here are drawn exclusively from the voices of the speakers, experts, and members of the cohort. Their conclusion is clear: the U.S. does not lack capacity. It lacks the frameworks to use the capacity it already has.

Three Converging Crises

Affordability. Across the country, many households are already struggling to pay their utility bills. When utilities propose major new construction to meet rising demand, those costs ultimately fall on customers least able to absorb them. This creates a political conundrum: once people fall behind on their bills, there is little public tolerance for large, long-term spending plans. States facing aging infrastructure and rapid load growth are being forced to acknowledge that building their way out of the problem is too slow, too expensive, and too burdensome for ratepayers.

Underutilization. The U.S. grid was built to handle the most extreme hours of the year, not the typical ones. As a result, much of the system sits unused most of the time. In any other capital-intensive sector, operating far below capacity would trigger immediate reform. But current rules reward utilities for constructing new assets rather than optimizing existing ones. This misalignment drives up costs and leaves valuable capacity stranded, even as demand rises.

Breakdown in forecasting. For decades, electricity demand grew gradually and predictably. That era is over. New loads arrive in large, concentrated blocks — often hundreds of megawatts at a time — creating sudden pressure on specific substations or regions. A single facility can trigger billions of dollars in unplanned upgrades. Traditional planning tools, which assume steady, systemwide growth, no longer reflect how demand actually materializes. Utilities are now forced into reactive, high stakes decisions that strain budgets and timelines.

The Political Bottleneck and Shifting Power Dynamics

The biggest barrier to progress is not engineering – it's governance. Regulatory commissions turn over frequently, slowing institutional learning. Utilities are still financially rewarded for capital investment, not for efficiency or flexibility. Elected officials often engage only when reliability or affordability becomes a crisis. These dynamics make it difficult to shift toward lower-cost, software-enabled solutions, even when they are proven.

At the same time, the rise of hyperscale computing has introduced a new force into grid politics. Large technology companies now require enormous amounts of power and have the resources to push aggressively for access. For the first time, utilities face counterparties with comparable influence. This is reshaping regulatory debates and raising urgent questions about how to balance private demand with public obligations.

> *"The U.S. has capacity. But it lacks the frameworks to use the capacity it already has."*
> **— Climate Vine 2025 Cohort**

Climate Vine's Key Takeaways: Use What We Have Before Building More

Through peer groups and focused working sessions, participants reached a common diagnosis: the grid's core challenge is not insufficient supply but insufficient flexibility. The system is structured around building new infrastructure rather than coordinating and optimizing what already exists. Rising demand should be an opportunity to use the grid more intelligently – not an automatic trigger for costly expansion.

A more affordable and resilient path is already emerging. States and utilities are beginning to evaluate traditional infrastructure upgrades alongside alternatives such as storage, switching technologies, and grid-enhancing tools. In many cases, these flexible approaches deliver the same reliability at far lower cost and in a fraction of the time. Virtual power plants are showing that distributed resources can support the grid at scale.

The tools to manage rising demand already exist. What's needed now is alignment among regulators, utilities, large customers, and the public. With updated rules and incentives, the U.S. can meet growing demand while protecting households, improving reliability, and avoiding unnecessary infrastructure spending.

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Prologue: The Lake

> *"The problem isn't the lake. It's the treetops."*
> **— McGee Young, CEO, WattCarbon**

If you wanted a visual of America's grid problem, you could start with load shapes, interconnection queues, or substation constraints. Or, if you're **McGee Young**, CEO of WattCarbon, you think of grid capacity as a lake. "When you look at the lake, representing the grid capacity, it just looks like flat water. But let's say there are trees in the lake that represent peak demand. As they start to grow, you start to see tree tops pop up."

For decades, the U.S. built more capacity than it needed. The water was high, and from the shoreline everything looked fine. But as demand surges from data centers, electric vehicles, heat pumps, and reshored manufacturing, suddenly, the treetops are becoming visible.

"Adding a data center is going to grow the trees, but most hours of the day are still going to be fine," Young explained. "We'll still have enough capacity on the grid for something like 95 percent of the day. It's during that roughly five percent of the year, when demand is peaking, that we need to worry."

The question facing America's energy system isn't whether it has enough capacity. It does, for most of the day. The question is, why have utilities and large loads been trying to raise the water level of the entire lake to cover a few treetops?

Raising the lake, or expanding grid capacity, by building new transmission lines and power plants is expensive and slow. Moreover, the people least able to pay tend to foot the bill. Trimming the treetops, through flexibility, storage, and contracts that reflect what the system actually needs is faster, cheaper, and more honest about where the real problem is. In this report are examples of people doing the trimming. What's less certain is whether the system will let them.

Part One: The Diagnosis

> *"Affordability isn't a side issue. It's the constraint."*
> **— NYS Government Official[1]**

Today, the U.S. grid faces a knot of problems around affordability, underutilized infrastructure, and unpredictable load growth. These problems shape every grid-related investment, policy decision, and innovation.

Crisis 1: The Affordability Constraint

New York State is targeting 100 percent zero-carbon electricity by 2040.[2] But the numbers that alarm the New York State Government officials we spoke to in Climate Vine aren't about carbon. They're about who can't pay their bills.

One in five customers in New York State is behind on their electric bill, and nationally, it ranges from one in four to one in six for any given month.[3,4] This is a predictable outcome of a system that was never designed with energy consumers, or everyday people, as the primary stakeholders. In the current system, when investors, utilities, and corporations discuss massive new investments to meet load growth, it can be assumed that average families pay more. Once a region gets into double-digit arrears, utilities have lost permission to experiment in expensive ways. As **Allison Bates-Wannop**, VP of Sparkfund, puts it, “If people can’t pay their bills, it doesn’t matter how elegant your grid plan is.”

> *"If people can't pay their bills, it doesn't matter how elegant your grid plan is."*
> **— Allison Bates-Wannop, VP, Sparkfund**

In New York, after decades of under-investment, the state faces a brutal arithmetic: 30 percent of the grid needs new construction to meet growth and climate goals, while 70 percent needs attention simply because it's wearing out, according to the NYS government official. This is the result of a regulatory framework that often rewards building new assets, which can generate a guaranteed return on investment, over maintaining old ones, which is often accounted for as an expense with no direct profit margin. For this reason, utilities have historically prioritized expansion over upkeep.

After decades of deferred maintenance, both needs are hitting customer bills at the same time. **Andy Bochman**, former Senior Grid Strategist at Idaho National Laboratory, points to a compounding factor that rarely appears in utility planning: this infrastructure was engineered for climate conditions that no longer exist. During prolonged heat events, demand spikes precisely when equipment performance degrades, meaning the grid is at its weakest exactly when it's needed most. The result is a wave of spending that could have been gentler if it were spread over time.

Crisis 2: The Underutilization Trap

If you were to guess how much of the country's grid is used in an average year, you'd likely guess more than half. The truth is: despite its capital-intensive energy system, with transmission lines spanning continents and power plants the size of small cities, the U.S. uses, on average, less than half of its grid annually.[5] Air conditioning loads spike the grid load on summer afternoons. Electric heating surges on winter mornings. And between those peaks the grid sits idle, waiting.

Astrid Atkinson, founder of Camus Energy, describes the fork in the road utilities are facing. "You can build for the largest possible demand and operate a system that's at best 40 percent loaded most of the time. The other way is to get smarter and think about using that extra slack capacity."

Atkinson's work at Camus Energy borrows heavily from cloud computing. Instead of treating the grid as static infrastructure that must be overbuilt for worst-case demand, her model treats it as a dynamic platform. Solar arrays, batteries, EV chargers, and large loads become orchestrated resources whose behavior can be coordinated in real time. In that world, the grid operator doesn't simply build more capacity; it actively manages flexibility across the network, aligning supply and demand minute by minute. The result can dramatically increase system utilization and defer expensive infrastructure upgrades.

The U.S. built its energy system to handle the worst case, not the average case. More precisely, it was built for the tightest ~100 hours of the year: those few dozen hours when demand peaks and the system strains is a wildly disproportionate share of total system costs. The other ~8,660 hours are paying for infrastructure they don't use. As **Alex Brown**, Partner at Keyframe Capital, frames it: "If you told any other capital-intensive industry that they were running at 40 percent utilization, they'd see it as a crisis, not business as usual."

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The math of electricity rates is simple: divide total spending by kilowatt-hours sold. There are two levers to make rates go down — spend less, or sell more electrons over the infrastructure you've already built. Spending less will be hard, as half of the delivered cost of electricity comes from transmission and distribution, or the wires, poles, and substations.[6] Those costs are unlikely to decline on their own. Yet every underutilized line, every idle transformer, every oversized substation is a cost that gets spread across fewer kilowatt-hours than it should. And, in a time of increased demand, there's a clear opportunity to sell more electrons over the same infrastructure and for each user to pay less per electron.

Crisis 3: The Forecasting Breakdown & Data Center Acceleration

For most of the twentieth century, load growth was predictable: a steady percentage increase each year, spread relatively evenly across the service territory. In Climate Vine, this was called "peanut butter forecasting," where the projected growth is spread evenly across the system like peanut butter on bread.

That world is gone. Most loads are bigger incremental steps than they had been. The volume of new demand is spikier and chunkier. And its concentration is another big shift: unlike the gradual, diffuse growth of the 20th century, modern loads arrive as massive, discrete blocks in specific locations, overwhelming local infrastructure before it can be anticipated. A data center doesn't grow gradually. It arrives all at once, requiring 100 megawatts, or 10 times that amount, in a specific place. An EV fleet concentrates wherever the depot is. And a reshored factory shows up in the planning process once it's committed. As the NYS government official put it: “One year, the utility says they don’t have any infrastructure investments they need, and the next year, all of a sudden, they have a petition for a billion-dollar infrastructure investment.”

> *"One year, the utility says they don't have any infrastructure investments they need, and the next year, all of a sudden, they have a petition for a billion-dollar infrastructure investment."*
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No single issue captures the tensions in American energy planning quite like data centers. They represent enormous new loads, often hundreds of megawatts at a single site, backed by some of the most powerful companies on the planet. Data center developers argue they bring economic development, tax revenue, and jobs.[7] But a data center that consumes as much power as a small city may employ only a few dozen people, mostly on contract, once built. A manufacturing plant of similar size might employ thousands.

Data center developers have a ready answer to concerns about grid burden: self-supply. They'll build their own generation and sign their own power purchase agreements. But self-supply just obscures the resource constraint — they're still consuming finite physical resources: land, labor, equipment, and interconnection capacity that might otherwise serve public decarbonization goals.

Furthermore, Atkinson, drawing on her background in cloud computing, believes the surge of data center projects currently in interconnection queues will outpace real compute demand. In other words, the pipeline may be assuming more growth than the market will ultimately provide.

States now must decide which loads matter, how to integrate them into public goals, and what they want their energy futures to look like. Data centers illustrate the tension between new demand and public priorities. Their rapid growth will either stress the system and accelerate all the major problems above, or, if managed more wisely, catalyze smarter planning around energy affordability and grid underutilization issues in the U.S. Managing them wisely means requiring curtailment agreements before interconnection, setting minimum load factor thresholds, conditioning tax incentives and grid access on demonstrated community benefit, and counting demand flexibility as a grid resource rather than an afterthought.

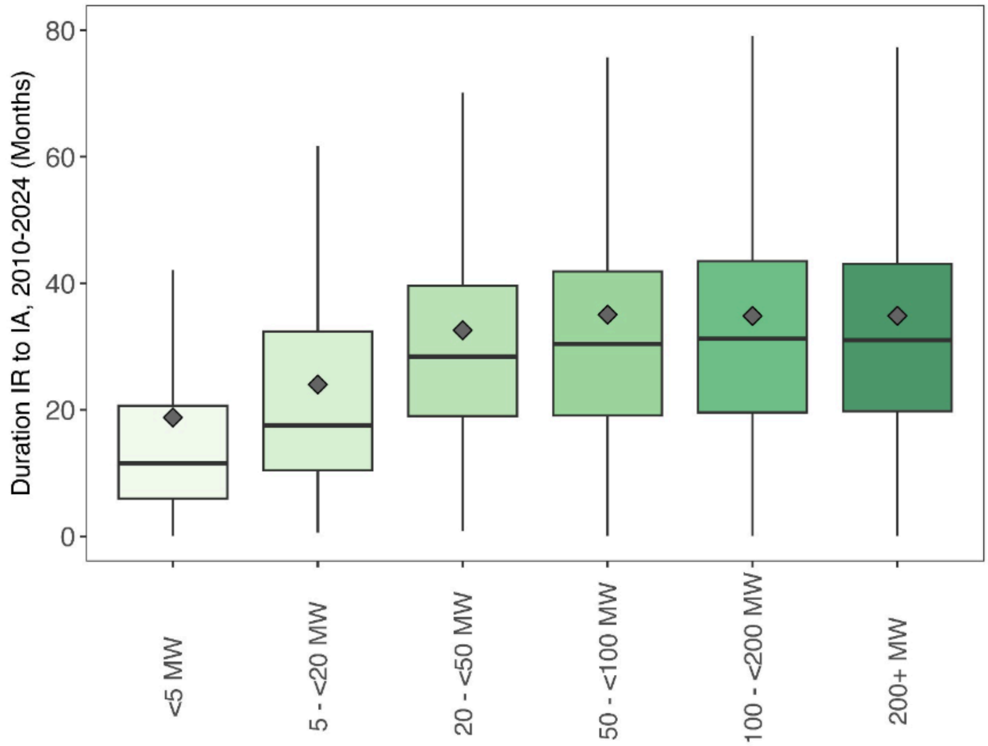

Image 1: New electric generation projects over 20MW double in interconnection time regardless of capacity. Ie, a 20MW facility or a 1000MW facility will take the same time to interconnect. This implies that building more capacity (even a mega project) doesn't solve the grid's structural inability to integrate new resources efficiently. Lawrence Berkley National Lab 2025

Part Two: The Political Bottleneck

> *"Politics is the bottleneck. Trust is the unlock."*
> **— Allison Bates-Wannop, VP, Sparkfund**

Technology can solve the engineering problem, but it cannot solve the political one. The ideas in this report live or die based on whether they can survive the political process: a process shaped by commissioners who generally have four-year terms, governors who tend to pay attention only when electricity becomes a crisis, and advocates who understand that language often matters more than policy.

Messaging: Meeting People Where They Are

Few people understand the politics of energy communication better than Bates-Wannop. After years working in regulatory battles across dozens of states, she has learned that the regulators and advocates most likely to succeed are the ones who understand that the people they need to persuade are operating inside a specific political context with real constraints.

Her core insight is simple: stop trying to change people's values and show how the policy you're advancing solves problems they already care about. This matters for regulators because commissions don't exist in a vacuum. A commissioner in Louisiana operates under different political pressure than one in Vermont, and a reform that's been framed as a climate mandate will face different resistance than the same reform framed as grid reliability or cost control.

"I'm trying to understand their interests and their problems, and show them how what I'm doing is solving those," she explains. In Mississippi, that meant using "environmental stewardship" — local responsibility, rather than "climate change," which carries federal-overreach associations.

In conservative-leaning states, "zero-fuel-cost resources" and "energy independence" are accurate descriptions of what distributed energy does, and they also happen to be the terms that open doors.

Her broader point is that advocates pushing for grid reform sometimes lose not because the technical insight or policy is wrong, but because the framing isn't responsive enough to local concerns. From Bates-Wannop's perspective, leading with cost, reliability, and genuine respect for different political contexts is how good policy moves.

Regulatory Turnover: The Institutional Memory Problem

Danielle Sass Byrnett, Senior Director at the Center for Partnerships & Innovation at the National Association of Regulatory Utility Commissioners (NARUC), has identified an underappreciated barrier to progress: commissioner turnover. With an average tenure of just four years, commissions face constant re-education and a continual loss of institutional memory. A commissioner who finally understands virtual power plants may retire or be replaced, and the next one starts from scratch.

"We desperately need time-of-use rates... or we're not going to be able to squeeze the juice out of the existing system by valuing what's actually valuable. Michigan just went and did it," she says. "The results have been fantastic. And the sky did not fall."[8] The fear is almost always worse than the reality. Yet commissioners know they may not be in their seats long enough to see the benefits of a policy they championed. Uncertainty makes bold action harder.

Ironically, load growth may be the catalyst that breaks the stalemate. "I'm very optimistic about being able to update electricity planning to be more comprehensive... because of load growth, we need all options on the menu," Sass Byrnett says. Crisis creates permission. When the status quo visibly fails, reform becomes possible.

The New Counterparty: Big Tech Meets the Utility

Jigar Shah, Co-Managing Partner at Multiplier and former Director of the U.S. Energy Department's Loan Programs Office, describes a system where everyone is waiting for someone else to move. Utilities understand their business model is at risk and know cheaper solutions exist, but they can't walk into Wall Street and say they want to do things "90 percent cheaper" when their earnings depend on capital spending. Regulators see themselves as judicial bodies that review rate cases, not as proactive planners. And governors often don't engage until electricity becomes a political crisis, at which point, Shah says, they "don't have any idea" what to do.

But that gridlock may finally be breaking. Rising load and rising frustration are creating a rare moment of political permission. "Every politician is like, just get this off my goddamn plate," Shah says. That urgency opens the door to laws that simply require utilities and regulators to use more of the assets they already have instead of building more. And once prices reflect real system conditions, **Eric Goff**, founder of Goff Policy, notes, "flexibility shows up fast."

Neil Chatterjee, former chairman of the Federal Energy Regulatory Commission (FERC), has watched the politics of electricity for decades and noticed a similar breaking point for utilities. For most of that time, utilities dominated the landscape. They were the essential service providers, and regulators rarely pushed them because no one wanted to be responsible for blackouts. But that era, Chatterjee argues, is ending: “Utilities have always held the cards, but now they have a counterparty with equal clout.”

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> **— Neil Chatterjee, Former FERC Chairman**

That counterparty is Big Tech. Google, Microsoft, Amazon, and Meta need electricity urgently, and they have the money, lawyers, and political influence to demand it on their timeline. As Chatterjee puts it, "These hyperscalers have as much sway as utilities, and the utilities are going to face a significant challenge."

Federal directives to FERC are accelerating the tension and, for the first time, investor-owned utilities face opponents who can match them in regulatory proceedings, both in Congress and in the court of public opinion. What's notable about this new counterparty is that it isn't residential ratepayers, municipal governments, or community organizations. Two powerful private actors fighting over grid access is a negotiation over a public resource that neither of them owns, conducted almost entirely without the people who pay for it.

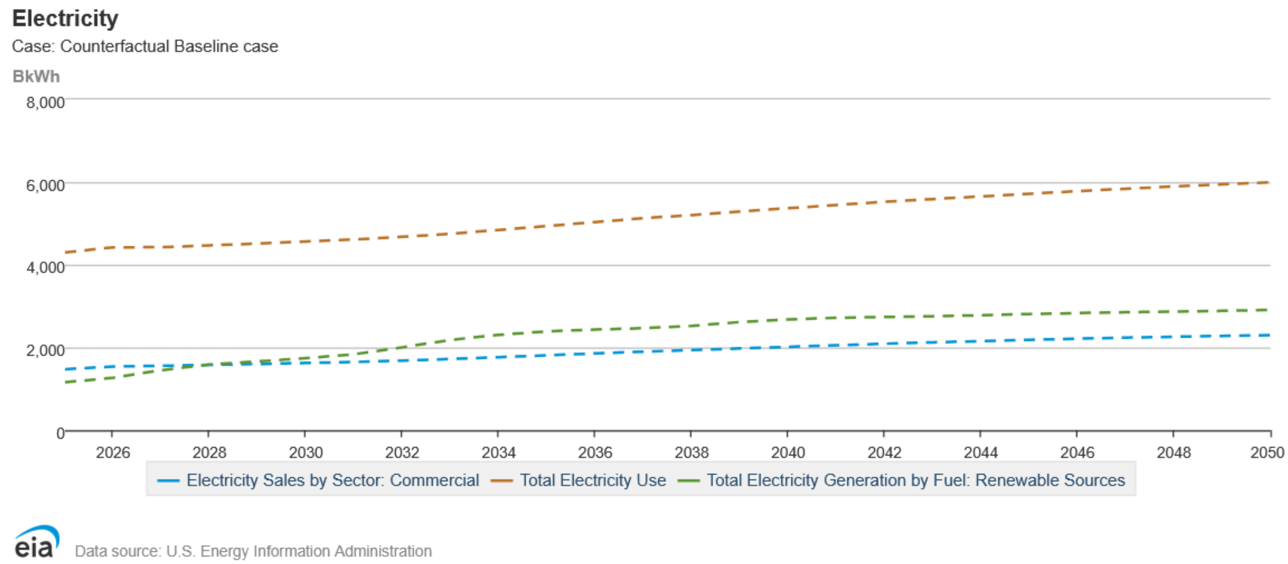

Image 2: The EIA projects a highest electric case that by 2050, demand from data centers will grow by 4.6x the current data center use ~180TWh/year. Meanwhile, total US electric use in comparison is only projected to grow 1.5x by 2050 in the baseline case. EIA April 2026

The implications extend far beyond data centers. If federal policy formally recognizes distributed resources as core grid assets, which would include enabling virtual power plants to participate in wholesale markets on equal footing with traditional generation, the fundamental economic structure of the utility industry could be upended, shifting the focus from capital-intensive infrastructure expansion to the optimization of existing distributed capacity.

Chatterjee sees the structural shift clearly: “This is flexibility's moment.” What that moment becomes depends on whether the policies unlocking flexibility are designed to benefit the grid as a whole, or primarily the parties with the leverage to demand it. The answer won't come from technology. It will come from what regulators decide to require.

Part Three: Bridges to the Future

> *"We have the tools. What we lack is agreement."*
> **— Jigar Shah**

Curtailable Power: The Oregon Breakthrough

While elected officials wrestle with impossible tradeoffs in New York, a very different experiment is unfolding in Oregon. Aligned Data Centers, one of the world's largest data center developers and operators, has been trying to get data center facilities connected to the grid for years, asking for firm power — reliable, around-the-clock electricity that never wavers. Invariably, the utility looks at its interconnection queue, consults its planning models, and delivers the bad news: it will take seven to ten years, maybe, if they can do it at all.

For an industry where competitive advantage is measured in months, a decade-long wait is a deal-breaker, even for one of the largest data center developers in the country. Projects stall. Capital flees. Then the company asked a different question: "If we can't do it 24/7, how about curtailable power?"

Curtailable power is electricity the utility can cut off during grid stress to maintain grid stability, prevent blackouts, and balance supply and demand. This works because not all computing workloads are created equal. Cloud services, the backbone of email, streaming, and e-commerce, must run continuously. Interruptions break things. AI training is different. Training a large model involves running calculations for days or weeks. If the process pauses for a few hours, nothing breaks; it can simply resume later.

Aligned built a deal around this insight.[9] Instead of firm power, they accepted curtailable power in Oregon. Then Aligned paired these contracts with on-site batteries. When the utility needs relief, Aligned either pauses training or switches to storage. The grid gets flexibility, and utilities don't have to plan as if every megawatt of contracted demand will arrive simultaneously. The data center gets connected years sooner. And curtailable power plus batteries creates much better economics for hyperscalers than waiting a decade for firm service. Aligned is now trying to replicate the model nationwide.

The Incentive Insight

The Oregon breakthrough exposes something more than a contracting gap: it points to the fact that the energy system was never designed for the people who depend on it most. Residential ratepayers, who cannot negotiate their service terms, cannot afford backup generation, and cannot absorb rate increases, are the last stakeholders whose needs shape how capacity gets built and allocated. As Goff frames it, "Markets don't fail because we lack technology. They fail because the contracts don't line up incentives with what the system actually needs."

> *"Markets don't fail because we lack technology. They fail because the contracts don't line up incentives with what the system actually needs."*
> **— Eric Goff, Founder, Goff Policy**

What the system needs, in this context, is grid stability for everyone.

The deeper issue is that capital markets reward buildout, not restraint. Utilities earn returns on infrastructure investment and have limited financial incentive to manage existing capacity more efficiently. Data centers, meanwhile, have an incentive to request firm power at 100 percent of nameplate capacity if they can get it because the cost of that over-request is socialized across all ratepayers, while the operational security accrues to them. Typical data center load factors run 40 to 50 percent of contracted capacity, meaning the grid is routinely sized for demand that never materializes, and consumers pay for the infrastructure gap.[10]

As Atkinson explains, "If we build to the queue numbers literally… half the generation capacity will sit idle."[11] That idle capacity isn't free. It is embedded in rate bases, recovered through electricity bills, and distributed across millions of households.

The lake-and-trees metaphor is useful here: the solution isn't to raise the water level, or grid capacity, indefinitely and assume load growth will spread predictably and diffusely like peanut butter. It's to ask whether those big trees, or new sources of peak demand, actually need that much power, and whether the agreement to provide it was ever in the public interest. The breakthrough in Oregon wasn't primarily that data centers got built more quickly. It was that the grid wasn't broken in the process.

As Shah notes, "We have all the technologies we need… we lack contract formation." And a follow-up question is contract formation in whose interest, and enforced by whom? The answer, historically, has been: in the interest of whoever has the resources to negotiate. Fixing that requires not just better contracts but regulators and utility commissions willing to treat grid resources as a public resource, or one that belongs, first, to the households and small businesses that have no alternative.

Part Four: Implementing the Distributed Future

> *"This isn't about innovation at the edge of the utility. Instead, it's about fully transforming the utility at the core."*
> **— Michael Schneider, Xcel Energy**

Virtual Power Plants: Proof of Concept at Scale

The clearest proof that virtual power plants work for ordinary customers is already a decade old. In 2016, Vermont's Green Mountain Power utility began piloting residential battery programs with discounted Tesla Powerwalls.[12] Bills fell, reliability rose, and what started with a handful of customers was approved for 500 in 2020 and opened to unlimited customers in 2023.[13] GMP earned money from the program. The math worked for the utility and the customer simultaneously, so the technology scaled. When it doesn't, it stalls, and that's been the story almost everywhere else.

A virtual power plant (VPP) is a cloud-based system that aggregates thousands of distributed energy resources, residential batteries, rooftop solar, EVs, smart appliances, and coordinates them to function as a single flexible power source. Unlike a peaker plant, a VPP can both generate electricity and reduce demand, often responding faster and more precisely than conventional infrastructure. That alignment is what **Michael Schneider** has spent seven years trying to build at Xcel Energy utility. But Schneider's first lesson wasn't technical. "We're going away from the Big Bang approach," he says. "VPPs aren't a tech rollout; they're a re-architecture of the entire utility." Forecasting, interconnection, billing, and contractor workflows all change. It requires enterprise-wide alignment before a single battery is dispatched.

VPP liftoff

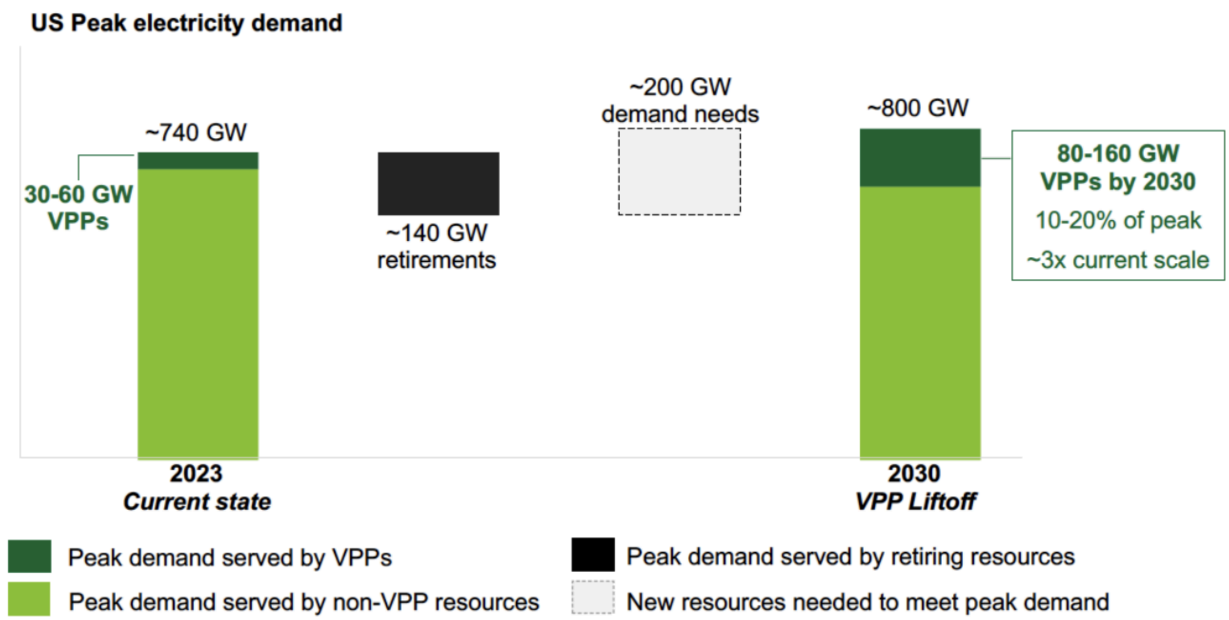

Image 3: 2023 DOE Liftoff Report details multiple options for meeting peak demand without overbuilding capacity. In this example VPPs alone could meet demand needs by 80%.

By 2031, Xcel plans to move through three phases: demand response, aggregator-level Distributed Energy Resource (DER) management, and full grid orchestration.[14] The future is already visible in Boulder, where DER-rich neighborhoods are becoming common. Scaling it everywhere is less a technology problem than an organizational one.

The scale of what's already possible is not theoretical. During the summer of 2025, Sunrun routinely dispatched more than 360 megawatts from its California-wide distributed power plant for two hours at a time, flattening the evening demand peak visible in CAISO's own data.[15] This was one of a portfolio of nearly twenty Sunrun programs that also included working with PG&E in California to provide non-wire alternatives for local distribution congestion relief in certain neighborhoods.[16] In Puerto Rico, Sunrun and other aggregators were the only reserve margin on the system for roughly 40 to 50 evenings last year, keeping the lights on for the entire island during peak hours.[17] Chris Rauscher, VP of Grid Services at Sunrun, prefers the term "distributed power plants" precisely because it reflects what these systems actually are: real, dispatchable assets producing utility-scale results today, not a future aspiration.

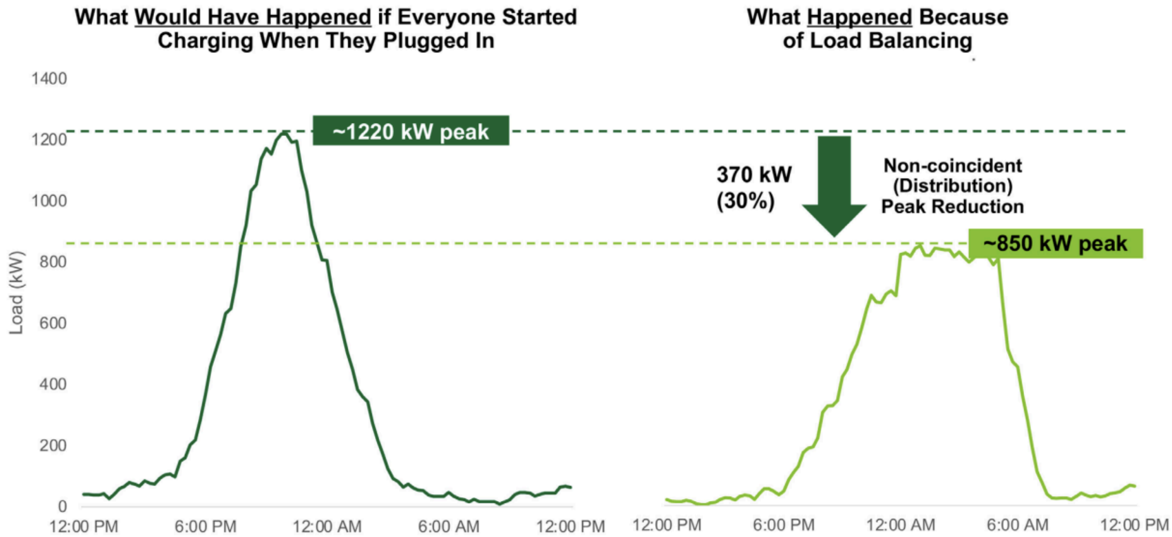

Image 4: Peak shaving and distribution grid impact of managed charging program from Baltimore Gas & Electric. WeaveGrid.

The shared-savings model, letting utilities capture a portion of battery program benefits, is what made GMP work and what's now spreading to Duke Energy and Xcel. The technology has been proven for nearly a decade, and the financial structures are being proven as well.

The DER Hidden Opportunity

David Roberts, climate journalist and host of the Volts podcast, reported that just three percent of the AI data center capital pledged today could unlock 100 gigawatts of virtual power plants.[18] That figure reframes the entire conversation about data centers and the grid. Data centers are clearly stressing the system. Can they be required to help fix the system as a condition of joining it?

"We install 20,000 new heat pumps or furnaces and water heaters per day," says WattCarbon's Young.[19] Each heat pump can shave roughly 10 kilowatts off-peak demand. Ten thousand heat pumps means 100 megawatts saved, without building a single new plant. And a kilowatt-hour saved at 5 p.m. in August is worth far more than one saved at 3 a.m. in March.

This creates an opportunity: data centers could fund efficiency and other DER investment upgrades in surrounding communities as a condition of interconnection, or to make space for themselves on the grid. If large loads are consuming public grid capacity and headroom built and maintained by ratepayers, then contributing to community efficiency isn't social license. It's closer to fair exchange.

Stack this with residential batteries and VPPs funded by data centers, and the potential capacity grows dramatically. Early reports from Rewiring America and signals from data center executives suggest this isn't just theory, it's a viable pathway.

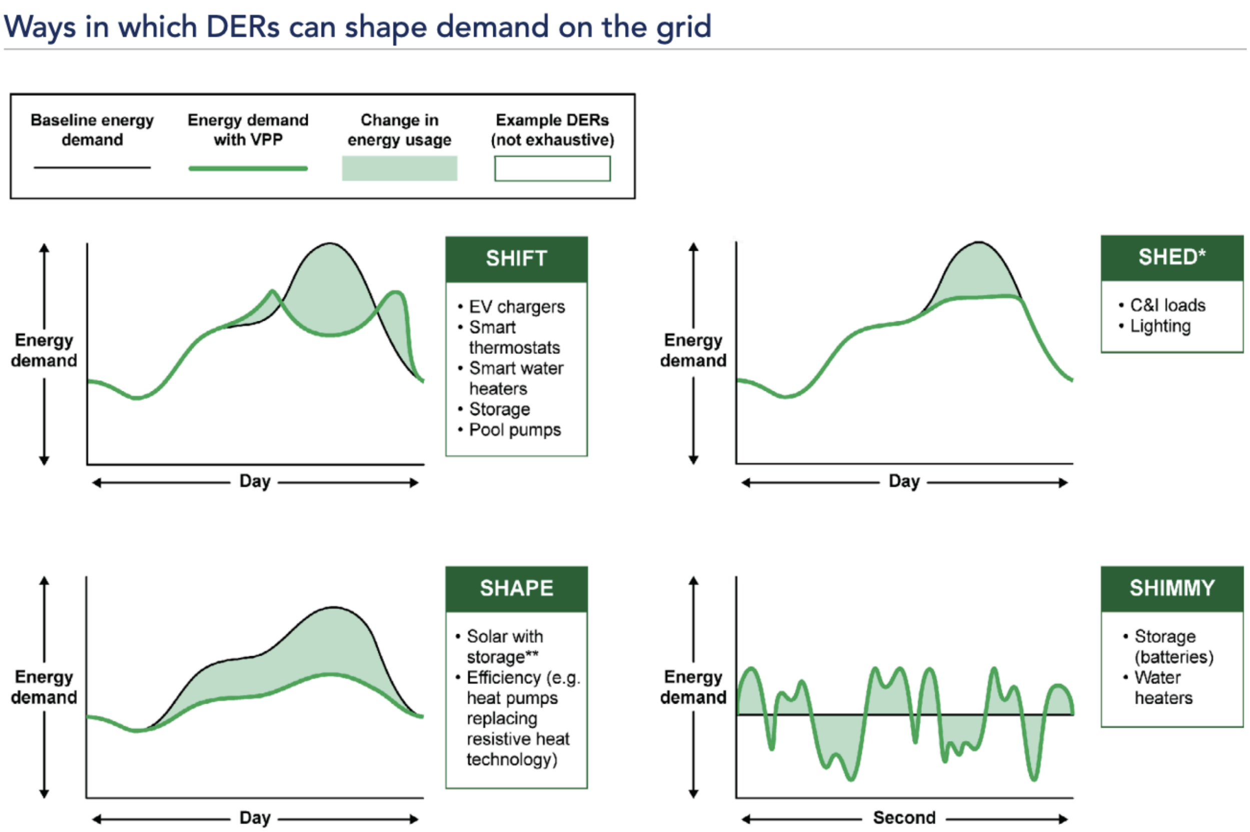

Image 5: Contemporary DER management tools allow for second-to-second “shimmy” of generation matching to energy demand, creating extremely flexible, efficacious, and efficient grids. Lawrence Berkeley National Laboratory and NASEO-NARUC Grid-Interactive Buildings Working Group 2023

Align Incentives, Unlock Capacity: The Path Forward

The grid has more capacity than often assumed, scattered across homes and businesses, waiting to be orchestrated. The key energy challenge before the United States is not about building new infrastructure. The challenge is aligning incentives to unlock the grid capacity that already exists. Lessons from VPPs, DER deployment, and shared-savings models point to a single truth: utilities and communities adopt new approaches only when the math works for everyone.

Across the U.S. energy system, the hardware and operational capability are already here to use the grid more efficiently. What's missing is repeatable financial structures, standardized contracts, and regulatory models that reward flexibility. Distributed assets, like batteries, thermostats, heat pumps, only become valuable when utilities or investors can reliably call on them during tight grid conditions. As Brown puts it, "Financial innovation must come before capital market participation." The "PPA moment" for distributed energy, when these resources become bankable, scalable, and predictable, is within reach. Once it arrives, millions of devices can finally work together, reducing peaks, improving reliability, and lowering costs.

At the same time, the grid's architecture must catch up. The system was designed for centralized power plants, but today's resources are distributed: rooftop solar, electric vehicles, flexible loads, and community batteries. **Lorenzo Kristov**, former market design principal at California ISO, proposes a layered model: regional transmission organizations handle bulk power, while new Distribution System Operators manage local resources and markets at the grid edge. Local communities, cities, cooperatives, tribes, and public institutions, can then participate directly, selling electricity to neighbors over existing wires without the cost and unnecessary complexity of RTO (regional transmission organization) market participation.

Kristov's model points toward something larger than grid efficiency. When local communities, cities, cooperatives, tribes, and public institutions can sell electricity to neighbors over existing wires, distributed energy stops being a technical feature and becomes an economic one. It becomes a way for the places that have historically been on the receiving end of infrastructure decisions to own a piece of what powers them. As Kristov puts it: “Localization is bigger than energy. It behooves us to become more locally self-reliant.”

> *"Localization is bigger than energy. It behooves us to become more locally self-reliant.”*
>
> **— Lorenzo Kristov, Former Market Design Principal, CAISO**

Local assets generate local revenue. This creates a different kind of grid, not just a more efficient one.

The Choice

The treetops are visible above the lake water, and the U.S. now faces a choice.

One path is familiar: raise the water level by building more plants, more transmission, and more substations, locking in decades of spending based on guesses about tomorrow's demand. Rates rise, arrears deepen, and political permission erodes.

The other path is less familiar, but more promising: trim the treetops. Use what is already available. Raise utilization. Deploy flexibility instead of steel infrastructure. Create contracts that reward customers for adjusting during the few hours that matter. Turn data centers from burdens into catalysts. Fund efficiency upgrades that cut bills while creating capacity.

Some of the people in this report are already building that second path. Michael Schneider is rebuilding a utility from the inside out. Green Mountain Power customers are paying lower bills for batteries in their basements. NYS government officials are building a path through tradeoffs in New York. Danielle Sass Byrnett is training commissioners, hoping that they'll be able to act before their terms end. Lorenzo Kristov is working with local communities to own the infrastructure that serves them. And McGee Young is explaining lakes to anyone who will listen.

The path they're building points toward a distributed future. Kristov argues that the 20th-century model of centralized generation and one-way distribution cannot scale to a world with millions of distributed resources. "Centralized systems fail big. Distributed systems fail small," Goff notes. Distributed assets offer more than electrons. They offer local economic value and local resilience. Kristov calls it "the real miracle...of locally owning assets that provide an essential service and earning revenues from those assets."

More treetops are above the waterline. Now is the moment for the United States to decide what kind of grid it wants, and whether it is willing to use the one it already has.

The case for making this the default, not the exception, is already being made in the field. Utilities themselves are beginning to rethink how they justify new investments. At PG&E and Con Edison, resilience planning now sits closer to traditional planning. Rather than automatically building larger wires or substations, planners increasingly compare conventional infrastructure upgrades with alternatives such as battery storage, switching technologies, or grid-enhancing tools. In one California case, PG&E replaced a $90 million transmission upgrade with roughly $10 million of storage and grid-enhancing technology[5] The lesson is simple: when planners evaluate flexibility on equal footing with steel infrastructure builds, the cheaper, more flexible solutions often win.

Shah, after 25 years in the field, has never been more optimistic or more impatient. He believes a credible path to 20 percent rate cuts by 2030 exists: unlock DERs and data, scale grid-enhancing technologies, adopt flexible interconnection frameworks, and require the use of existing assets before approving new ones. "We have all the technologies we need," Shah says. "Now we need the mindshare around what to do."

> *"We have all the technologies we need. Now we need the mindshare around what to do."*
> **— Jigar Shah, Co-Managing Partner, Multiplier**

The treetops are growing, right now and in every state where large loads are arriving faster than the system was built to absorb them. The question of whom the grid exists to serve has always had a clear answer: the public. What's new is the pressure to say so out loud, and to build rules that mean it. This means things like utility regulators requiring non-wires alternatives to be formally evaluated and documented before any traditional infrastructure build is approved; performance-based regulation that ties utility returns to affordability and reliability outcomes rather than capital expenditure; open data requirements that let third parties see where the grid has capacity before new investment is proposed; and ratepayer advocates with the standing and resources to match utilities in the proceedings that set rates. There are people today building a grid that treats ordinary ratepayers not as a cost to be managed but as the whole point. Whether that grid gets built at scale depends on whether regulators, policymakers, and the rest of us demand it. That choice is still ours to make, for now.

Endnotes

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Contact and Connect

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